City of San Diego

CONTRACTOR'S NAME: TC Construction Company, Inc.
ADDRESS: 10540 Prospect Ave., Santee, CA 92071
TELEPHONE NO.: 619-448-4560 **E-Mail:** eschier@tcinsd.com
CITY CONTACT: Ronald McMinn Jr, Contract Specialist, Email: RMcMinn@sandiego.gov
Phone No. (619) 533-4618
D. Aivati / A. Jaro / N. Alkuree

BIDDING DOCUMENTS

e - Bidding

FINAL

FOR

LA MEDIA ROAD IMPROVEMENTS

BID NO.: **K-23-2060-DBB-3**
SAP NO. (WBS/IO/CC): **S-15018**
CLIENT DEPARTMENT: **2116**
COUNCIL DISTRICT: **8**
PROJECT TYPE: **ID, CA**
STATE AID PROJECT NO.: **TCEPSB1L 5004(212)**

THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:

- PHASED-FUNDING
- THE CITY'S SUBCONTRACTING PARTICIPATION REQUIREMENTS FOR SLBE PROGRAM
- ELIGIBLE FOR JOINT VENTURE PREQUALIFICATION STATUS (see Instructions to Bidders)
- PREVAILING WAGE RATES: STATE ☒ FEDERAL ☐
- THIS PROJECT IS FUNDED IN PART BY THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION – CALTRANS, STATE AID PROJECT NUMBER TCEPSB1L 5004(212)

BID DUE DATE:

2:00 PM

SEPTEMBER 27, 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 Engineer:

8/10/2022

1) Registered Engineer — Date

Seal:

Mastaneh Ashrafzadeh

2) For City Engineer

08/10/2022

Date

Seal:

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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.	Mandatory Disclosure of Business Interests	At Time of Bid	ALL BIDDERS
4.	Debarment and Suspension Certification for Prime Contractors	At Time of Bid	ALL BIDDERS
5.	Debarment and Suspension Certification for Subcontractors, Suppliers & Mfgrs	At Time of Bid	ALL BIDDERS
6.	Bid Bond (Original)	By 5PM 3 working days after bid opening	ALL BIDDERS
7.	SLBE Good Faith Effort Documentation	By 5 PM 3 working days after bid opening	ALL BIDDERS
8.	Form AA60 – List of Work Made Available	By 5 PM 3 working days after bid opening with Good Faith Effort (GFE) documentation	ALL BIDDERS
9.	Phased Funding Schedule Agreement	Within 10 working days of receipt by the bidder of the Notice of Intent to Award	AWARDED BIDDER
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

ITEM	DOCUMENT TO BE SUBMITTED	WHEN DUE	FROM
11.	Payment & Performance Bond: Certificates of Insurance & Endorsements	Within 10 working days of receipt by bidder of contract forms and NOI	AWARDED BIDDER
12.	Signed Contract Agreement Page	Within 3 working days of receipt by bidder of Contract Agreement	AWARDED BIDDER
13.	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 **La Media Road Improvements.** 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 **$38,500,000**.

4. **BID DUE DATE AND TIME ARE: SEPTEMBER 27, 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: **A**

6.1. **ADDITIONAL LICENSE REQUIREMENTS:** See Appendix K - Long Term Maintenance and Monitoring Agreement – Landscaping and Erosion, Appendix L - Long Term Maintenance and Monitoring Agreement - Vernal Pool, and Appendix M - Long Term Maintenance and Monitoring Agreement - Wetlands for **C-27** requirement.

7. **BUSINESS COOPERATION TAX PROGRAM:**

You must exercise your right to obtain a California State of Board of Equalization (BOE) sub-permit for the jobsite and allocate all eligible Bradley-Burns Uniform Local Sales and Use Tax (Use Tax) to the City. In addition, you will ensure that all eligible subcontractors will exercise their right to obtain this BOE sub-submit and allocate all eligible Use Tax to the City. The City will not issue a notice to proceed unless you and your eligible subcontractors have obtained this sub-permit from the BOE. More information on obtaining this permit can be found by contacting the local BOE office.

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

8.1. 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 **11.0%**
2. ELBE participation **14.1%**
3. Total mandatory participation **25.1%**

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

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

8.2.2. 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.

9. **PRE-BID SITE VISIT:** All those wishing to submit a bid are **encouraged** to attend the Virtual Pre-Bid Site Visit. The purpose of the Site Visit is to acquaint Bidders with the Site conditions. To request a sign language or oral interpreter for this visit, call the Purchasing & Contracting Department, Public Works Division at (619) 533-3450 at least 5 Working Days prior to the meeting to ensure availability. The Pre-Bid Site Visit is scheduled as follows:

9.1. Prospective Bidders are **encouraged** to attend the Pre-Bid Site Visit.

The pre-bid site visit will be held on: **Thurs. September 15, 2022, at 1:00 PM (PST)** at Microsoft Teams.

Please join the meeting from your computer, tablet or smartphone.
Click here to join the meeting

Meeting ID: 246 378 022 423

Passcode: TBNJTP

Download Teams | Join on the web

You can also dial in using your phone.
United States: +1 323-813-7079,,187232151#
Access Code: Phone Conference ID: 187 232 151#

Please Note: You will need to join the meeting with a computer, tablet or smartphone with the Teams Meetings App in place in order to sign in via the Chat feature. The Chat feature will also be used for attendees to ask any questions.

Upon entering the meeting, all attendees must use the chat feature to sign in with the following information: Name of firm, Attendee's name, Phone number and Email address.

The Teams Meeting will open thirty minutes prior to the start times listed above to allow the attendees the opportunity to sign in by the deadline.

10. AWARD PROCESS:

10.1. 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.

10.2. 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.

10.3. 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.

10.4. The low Bid will be determined by the Base Bid.

10.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base Bid alone.

11. SUBMISSION OF QUESTIONS:

11.1. 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:

RMcMinn@sandiego.gov

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

11.3. 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.

11.4. 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.

12. SUPPLEMENTAL AGREEMENTS: Supplemental agreements attached to this contract for items of Work such as revegetation maintenance/monitoring shall be signed by the BIDDER at time of award of the primary BID. The signed agreements shall be accompanied by the proper bonds and insurance as specified in 1-7.2., "CONTRACT BONDS," 5-4, "INSURANCE," and 5-4.11

WORKERS' COMPENSATION INSURANCE. Bonds shall be in the amount of the total Contract Price for all Work including the supplemental agreements.

12.1. Partial Release of Performance Bond and Labor and Materialmen's Bond: For information regarding partial release of bonds for this Contract, see Supplementary Special Provisions, **Appendix K, Appendix L and Appendix M**.

13. PHASED FUNDING: For Phased Funding Conditions, see Attachment B.

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/	2021	ECPI010122-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* https://www.sandiego.gov/ecp/edocref/greenbook	2021	ECPI010122-02
City of San Diego Standard Drawings* https://www.sandiego.gov/ecp/edocref/standarddraw	2021	ECPI010122-03
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
1200 3rd Ave., Suite 200, MS 56P
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.

Executed in Duplicate

Bond No. 024263876

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

TC Construction Company, Inc., a corporation, as principal, and Liberty Mutual 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 **Forty Two Million Eight Hundred Eighty Four Thousand Four Hundred Twenty Two Dollars and Twenty Five Cents ($42,884,422.25),** for the faithful performance of the annexed contract, and in the sum of **Forty Two Million Eight Hundred Eighty Four Thousand Four Hundred Twenty Two Dollars and Twenty Five Cents ($42,884,422.25),** 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: Matthew Vespi
Chief Financial Officer
Office of the Chief Financial Officer

Date: 12/1/2022

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By: _____

Print Name: RYAN P. GERRITY
Deputy City Attorney

Date: 12/9/2022

CONTRACTOR
TC CONSTRUCTION COMPANY, INC.

By: _____

Print Name: Astin Cameron
President

Date: _____

SURETY
Liberty Mutual Insurance Company

By: _____
Attorney-In-Fact

Print Name: Tara Bacon, Attorney-in-fact

Date: October 21, 2022

790 The City Drive South, Suite 200
Orange, CA 92868

Local Address of Surety

800-763-9268

Local Phone Number of Surety

$229,276.00

Premium

024263876

Bond Number

ACKNOWLEDGMENT

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 October 21, 2022 before me, Minna Huovila, Notary Public
(insert name and title of the officer)

personally appeared Tara Bacon,
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 _____ **(Seal)**

CSC1 MINNA HUOVILA
COMM. #2313883
NOTARY PUBLIC-CALIFORNIA
SAN DIEGO COUNTY
My Commission Expires
DECEMBER 6, 2023 CSC1

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 Loera; 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 21st day of October, 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.

ATTACHMENTS

ATTACHMENT A

SCOPE OF WORK

SCOPE OF WORK

1. **SCOPE OF WORK:** The La Media Road Improvements Project proposes to improve La Media Road from SR-905 to Siempre Viva Road. The ultimate facility will be designed as a six-lane primary arterial between SR-905 and Airway Road and a five lane major road between Airway Road and Siempre Viva Road with three southbound lanes and two northbound lanes. The proposed improvements enhance safety, provide congestion relief, and provide an improved access road for freight trucks to Otay Mesa Port of Entry.

1.1. The Work shall be performed in accordance with:

1.1.1. The Notice Inviting Bids and Plans numbered **41750-01-D** through **41750-101-D** and Traffic Control Plans numbered **41750-T1-D** through **41750-T27-D**, Wetland Mitigation Plan **0100228-1-D** through **0100228-6-D**, and **Appendix Q - La Media Road Vernal Pool Mitigation Grading** numbered **0100229-1-D** through **0100229-7-D,** inclusive.

For Plans numbered **41750-01-D** through **41750-101-D** and Traffic Control Plans numbered **41750-T1-D** through **41750-T27-D**, Wetland Mitigation Plan **0100228-1-D** through **0100228-6-D**, refer to the link below:

https://drive.google.com/drive/folders/1GE4HrJTxwrD_F8FKwjcVUxZwCJaGqWST

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

See **Appendix E – Location Map**.

3. **CONTRACT TIME:** The Contract Time for completion of the Work, including the **120 Calendar days** Plant Establishment Period (PEP) for Landscaping, **120 Calendar Days** PEP for the Vernal Pool, and **120 Calendar Days** PEP for the Wetland shall be **375 Working Days**.

ATTACHMENT B

PHASED FUNDING PROVISIONS

PHASED FUNDING PROVISIONS

1. PRE-AWARD

1.1. Within 10 Working Days of the Notice of Intent to Award, the Contractor must contact the Project Manager to discuss fund availability for each phase and shall also submit the following:

1.1.1. Construction Cost Loaded Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and 7-3, "PAYMENT.

1.2. Contractor's failure to perform any of the following may result cancelling the award of the Contract:

1.2.1. Meeting with the City's Project Manager to discuss the Phased Funding Schedule.

1.2.2. Agreeing to a Phased Funding Schedule within **thirty** days of meeting with the City's Project Manager.

2. POST-AWARD

2.1. Do not start any construction activities for the next phase until the Notice to Proceed (NTP) has been issued by the City. The City will issue a separate NTP for each phase.

2.2. The City may issue the NTP for a subsequent phase before the completion of the preceding phase.

PHASED FUNDING SCHEDULE AGREEMENT

The particulars left blank below, such as the total number of phases and the amounts assigned to each phase, will be completed with funding specific information from the Pre-Award Schedule and Construction Cost Loaded Schedule submitted to and approved by the City.

BID NUMBER: K-23-2060-DBB-3

CONTRACT OR TASK TITLE: La Media Road Improvements

CONTRACTOR: TC Construction Company, Inc.

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
1	All work as outlined in the contract document including all construction, installation, implementation, establishment and long-term maintenance activities.	Jan 2023	Jan 2031	$42,884,422.25
2				$
3				$
			Contract Total	$42,884,422.25

Notes:

1) WHITEBOOK section 7-3.10, "Phased Funding Compensation" applies.
2) The total of all funding phases shall be equal to the TOTAL BID PRICE as shown on BID SCHEDULE 1 - PRICES.
3) This PHASED FUNDING SCHEDULE AGREEMENT will be incorporated into the CONTRACT and shall only be revised by written modifications to the CONTRACT.

CITY OF SAN DIEGO

PRINT NAME: Isac Vallejo
Construction Senior Engineer

Signature:

Date: 10/26/2022

PRINT NAME: Mastaneh Ashrafzadeh
Design Senior Engineer

Signature: Mastaneh Ashrafzadeh

Date: 10/26/2022

CONTRACTOR

PRINT NAME: Austin Cameron

Title: President

Signature:

Date: 10/26/22

ATTACHMENT C

EQUAL OPPORTUNITY CONTRACTING PROGRAM

EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP)

SECTION A - GENERAL REQUIREMENTS

A. INTRODUCTION.

1. This document sets forth the following specifications:
   a) The City's general EOCP requirements for all Construction Contracts.
   b) Special Provisions for Contracts subject to SLBE and ELBE requirements only.
2. Additional requirements may apply for state or federally funded projects.
3. These requirements shall be included as Contract provisions for all Subcontracts.
4. The City specified forms, instructions, and guides are available for download from the EOCP's web site at: http://www.sandiego.gov/eoc/forms/index.shtml

B. GENERAL.

1. The City of San Diego promotes equal employment and subcontracting opportunities.
2. The City is committed to ensuring that taxpayer dollars spent on public Contracts are not paid to businesses that practice discrimination in employment or subcontracting.
3. The City encourages all companies seeking to do business with the City to share this commitment.

C. DEFINITIONS.

1. For the purpose of these requirements: Terms "Bid" and "Proposal", "Bidder" and "Proposer", "Subcontractor" and "Subconsultant", "Contractor" and "Consultant", "Contractor" and "Prime Contractor", "Consultant" and "Professional Service Provider", "Suppliers" and "Vendors", "Suppliers" and "Dealers", and "Suppliers" and "Manufacturers" may have been used interchangeably.
2. The following definitions apply:
   a) **Emerging Business Enterprise (EBE)** - A for-profit business that is independently owned and operated; that is not a subsidiary or franchise of another business and whose gross annual receipts do not exceed the amount set by the City Manager and that meets all other criteria set forth in regulations implementing Municipal Code Chapter 2, Article 2, Division 36. The City Manager shall review the threshold amount for EBEs on an annual basis and adjust as necessary to reflect changes in the marketplace.
   b) **Emerging Local Business Enterprise (ELBE)** - A Local Business Enterprise that is also an Emerging Business Enterprise.

c) **Minority Business Enterprise (MBE)** - A certified business that is at least fifty-one percent (51%) owned by one or more minority individuals, or, in the case of a publicly owned business at least fifty-one percent (51%) of the stock is owned by one or more minority individuals; and (2) whose daily business operations are managed and directed by one or more minorities owners. Minorities include the groups with the following ethnic origins: African, Asian Pacific, Asian Subcontinent, Hispanic, Native Alaskan, Native American, and Native Hawaiian.

d) **Women Business Enterprise (WBE)** - A certified business that is at least fifty-one percent (51%) owned by a woman or women, or, in the case of a publicly owned business at least fifty-one percent (51%) of the stock is owned by one or more women; and (2) whose daily business operations are managed and directed by one or more women owners.

e) **Disadvantaged Business Enterprise (DBE)** - a certified business that is at least fifty-one percent (51%) owned by socially and economically disadvantaged individuals, or, in the case of a publicly owned business at least fifty-one percent (51%) of the stock is owned by one or more socially and economically disadvantaged individuals; and (2) whose daily business operations are managed and directed by one or more socially and economically disadvantaged owners.

f) **Disabled Veteran Business Enterprise (DVBE)** - A certified business that is at least fifty-one percent (51%) owned by one or more disabled veterans; and (2) business operations must be managed and controlled by one or more disabled veterans. Disabled Veteran is a veteran of the U.S. military, naval, or air service; the veteran must have a service-connected disability of at least 10% or more; and the veteran must reside in California.

g) **Other Business Enterprise (OBE)** - Any business which does not otherwise qualify as a Minority, Woman, Disadvantaged, or Disabled Veteran Business Enterprise.

h) **Small Business Enterprise (SBE)** - A for-profit business that is independently owned and operated; that is not a subsidiary or franchise of another business and whose gross annual receipts do not exceed the amount set by the City Manager and that meets all other criteria set forth in regulations implementing Municipal Code Chapter 2, Article 2, Division 36. The City Manager shall review the threshold amount for SBEs on an annual basis and adjust as necessary to reflect changes in the marketplace. A business certified as a Micro Business (MB) or a Disabled Veteran Business Enterprise (DVBE) by the State of California and that has provided proof of such certification to the City Manager shall be deemed to be an SBE.

i) **Small Local Business Enterprise (SLBE)** - A Local Business Enterprise that is also a Small Business Enterprise.

D. CITY'S EQUAL OPPORTUNITY COMMITMENT.

1. **Nondiscrimination in Contracting Ordinance.**

a) You, your Subcontractors, and Suppliers shall comply with the requirements of the City's Nondiscrimination in Contracting Ordinance, San Diego Municipal Code §§22.3501 through 22.3517.

You shall not discriminate on the basis of race, gender, gender expression, gender identity, religion, national origin, ethnicity, sexual orientation, age, or disability in the solicitation, selection, hiring, or treatment of subcontractors, vendors, or suppliers. You shall provide equal opportunity for Subcontractors to participate in subcontracting opportunities. You understand and agree that the violation of this clause shall be considered a material breach of the Contract and may result in Contract termination, debarment, or other sanctions.

You shall include the foregoing clause in all Contracts between you and your Subcontractors and Suppliers.

b) **Disclosure of Discrimination Complaints.** As part of its Bid or Proposal, you shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against you in a legal or administrative proceeding alleging that you discriminated against your employees, Subcontractors, vendors, or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

c) Upon the City's request, You agree to provide to the City, within 60 Calendar Days, a truthful and complete list of the names of all Subcontractors and Suppliers that you have used in the past 5 years on any of your Contracts that were undertaken within the San Diego County, including the total dollar amount paid by you for each Subcontract or supply Contract.

d) You further agree to fully cooperate in any investigation conducted by the City pursuant to the City's Nondiscrimination in Contracting Ordinance, Municipal Code §§22.3501 through 22.3517. You understand and agree that violation of this clause shall be considered a material breach of the Contract and may result in remedies being ordered against you up to and including contract termination, debarment, and other sanctions for the violation of the provisions of the Nondiscrimination in Contracting Ordinance. You further understand and agree that the procedures, remedies, and sanctions provided for in the Nondiscrimination in Contracting Ordinance apply only to violations of the Ordinance.

E. EQUAL EMPLOYMENT OPPORTUNITY OUTREACH PROGRAM.

1. You, your Subcontractors, and Suppliers shall comply with the City's Equal Employment Opportunity Outreach Program, San Diego Municipal Code §§22.2701 through 22.2707.

   You shall not discriminate against any employee or applicant for employment on any basis prohibited by law. You shall provide equal opportunity in all employment practices. You shall ensure that your Subcontractors comply with this program. Nothing in this section shall be interpreted to hold you liable for any discriminatory practices of your Subcontractors.

   You shall include the foregoing clause in all Contracts between you and your Subcontractors and Suppliers.

2. If the Contract is competitively solicited, the selected Bidder shall submit a Work Force Report (Form BB05) within 10 Working Days after receipt by the Bidder to the City for approval as specified in the Notice of Intent to Award letter.

3. The selected Bidder shall submit an Equal Employment Opportunity Plan if a Work Force Report is submitted and if the City determines that there are under-representations when compared to County Labor Force Availability data.

4. If the selected Bidder submits an Equal Employment Opportunity Plan, it shall include the following assurances:

   a) You shall maintain a working environment free of discrimination, harassment, intimidation, and coercion at all Sites and in all facilities at which your employees are assigned to Work.

   b) You shall review your EEO Policy annually with all on-Site supervisors involved in employment decisions.

   c) You shall disseminate and review your EEO Policy with all employees at least once a year, post the policy statement and EEO posters on all company bulletin boards and job sites, and document every dissemination, review, and posting with a written record to identify the time, place, employees present, subject matter, and disposition of meetings.

   d) You shall review, at least annually, all supervisors' adherence to and performance under the EEO Policy and maintain written documentation of these reviews.

   e) You shall discuss your EEO Policy Statement with Subcontractors with whom you anticipate doing business, including the EEO Policy Statement in your Subcontracts, and provide such documentation to the City upon request.

f) You shall document and maintain a record of all Bid solicitations and outreach efforts to and from Subcontractors, contractor associations, and other business associations.

g) You shall disseminate your EEO Policy externally through various media, including the media of people of color and women, in advertisements to recruit. Maintain files documenting these efforts and provide copies of these advertisements to the City upon request.

h) You shall disseminate your EEO Policy to union and community organizations.

i) You shall provide immediate written notification to the City when any union referral process has impeded your efforts to maintain your EEO Policy.

j) You shall maintain a current list of recruitment sources, including those outreaching to people of color and women, and provide written notification of employment opportunities to these recruitment sources with a record of the organizations' responses.

k) You shall maintain a current file of names, addresses and phone numbers of each walk-in applicant, including people of color and women, and referrals from unions, recruitment sources, or community organizations with a description of the employment action taken.

l) You shall encourage all present employees, including people of color and women employees, to recruit others.

m) You shall maintain all employment selection process information with records of all tests and other selection criteria.

n) You shall develop and maintain documentation for on-the-job training opportunities, participate in training programs, or both for all of your employees, including people of color and women, and establish apprenticeship, trainee, and upgrade programs relevant to your employment needs.

o) You shall conduct, at least annually, an inventory and evaluation of all employees for promotional opportunities and encourage all employees to seek and prepare appropriately for such opportunities.

p) You shall ensure that the company's working environment and activities are non-segregated except for providing separate or single-user toilets and necessary changing facilities to assure privacy between the sexes.

F. SUBCONTRACTING.

1. The City encourages all eligible business enterprises to participate in City contracts as a Contractor, Subcontractor, and joint venture partner with you, your Subcontractors, or your Suppliers. You are encouraged to take positive

steps to diversify and expand your Subcontractor solicitation base and to offer subcontracting opportunities to all eligible business firms including SLBEs, ELBEs, MBEs, WBEs, DBEs, DVBEs, and OBEs.

2. For Subcontractor participation level requirements, see the Contract Documents where applicable.

3. For the purposes of achieving the mandatory Subcontractor participation percentages, City percentage calculations will not account for the following:

   a) "Field Orders" and "City Contingency" Bid items.

   b) Alternate Bid items.

   c) Allowance Bid items designated as "EOC Type II".

4. Allowance Bid items designated as "EOC Type I" will be considered as part of the Base Bid and will be included in the percentage calculation.

5. Each joint venture partner shall be responsible for a clearly defined Scope of Work. In addition, an agreement shall be submitted and signed by all parties identifying the extent to which each joint venture partner shares in ownership, control, management, risk, and profits of the joint venture.

G. LISTS OF SUBCONTRACTORS AND SUPPLIERS.

1. You shall comply with the Subletting and Subcontracting Fair Practices Act, Public Contract Code §§4100 through 4113, inclusive.

2. You shall list all Subcontractors who will receive more than 0.5% of the total Bid amount or $10,000, whichever is greater on the form provided in the Contract Documents (Subcontractors list).

3. The Subcontractors list shall include the Subcontractor's name, telephone number including area code, physical address, Scope of Work, the dollar amount of the proposed Subcontract, the California contractor license number, the Public Works contractor registration number issued pursuant to Section 1725.5 of the Labor Code, and the Subcontractor's certification status with the name of the certifying agency.

4. The listed Subcontractor shall be appropriately licensed pursuant to Contractor License Laws.

5. For Design-Build Contracts, refer to the RFQ and RFP for each Project or Task Order.

H. SUBCONTRACTOR AND SUPPLIER SUBSTITUTIONS.

1. Listed Subcontractors and Suppliers shall not be substituted without the Express authorization of the City or its duly authorized agent.

2. Request for Subcontractor or Supplier substitution shall be made in writing to Purchasing & Contracting Department, Public Works Division, Attention Contract Specialist, 1200 3rd Ave., Suite 200, MS 56P, San Diego, CA 92101 with a copy to the Engineer.

3. The request shall include a thorough explanation of the reason(s) for the substitution, including dollar amounts and a letter from each substituted Subcontractor or Supplier stating that they (the Subcontractors or Suppliers) release all interest in working on the Project and written confirmation from the new Subcontractor or Supplier stating that they agree to work on the Project along with the dollar value of the Work to be performed.

4. Written approval of the substitution request shall be received by you or from the City or its authorized officer prior to any unlisted Subcontractor or Supplier performing Work on the Project.

5. Substitution of Subcontractors and Suppliers without authorization shall subject you to those penalties set forth in Public Contract Code §4110.

6. Requests for Supplier substitution shall be made in writing at least 10 Days prior to the provision of materials, supplies, or services by the proposed Supplier and shall include proof of written notice to the originally listed Supplier of the proposed substitution.

7. A Contractor whose Bid is accepted shall not:

    a) Substitute a person as Subcontractor or Supplier in place of the Subcontractor or Supplier listed in the original bid, except that the City, or it's duly authorized officer, may consent to the substitution of another person as a Subcontractor or Supplier in any of the following situations:

        i. When the Subcontractor or Supplier listed in the Bid, after having a reasonable opportunity to do so, fails or refuses to execute a written Contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written contract, based upon the general terms, conditions, plans, and specifications for the project involved or the terms of the subcontractor's written bid, is presented to the subcontractor by the prime contractor.

        ii. When the listed Subcontractor or Supplier becomes insolvent or the subject of an order for relief in bankruptcy.

        iii. When the listed Subcontractor or Supplier fails or refuses to perform his or her subcontract.

        iv. When the listed Subcontractor fails or refuses to meet bond requirements as set forth in Public Contract Code §4108.

        v. When you demonstrate to the City or it's duly authorized officer, subject to the provisions set forth in Public Contract Code §4107.5, that the name of the Subcontractor was listed as the result of an inadvertent clerical error.

        vi. When the listed Subcontractor is not licensed pursuant to Contractor License Law.

vii. When the City, or it's duly authorized officer, determines that the Work performed by the listed Subcontractor or that the materials or supplies provided by the listed Supplier are substantially unsatisfactory and not in substantial accordance with the Plans and specifications or that the Subcontractor or Supplier is substantially delaying or disrupting the progress of the Work.

viii. When the listed Subcontractor is ineligible to work on a public works project pursuant to §§1777.1 or 1777.7 of the Labor Code.

ix. When the City or its duly authorized agent determines that the listed Subcontractor is not a responsible contractor.

b) Permit a Contract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original Subcontractor, Supplier listed in the original Bid without the consent of the City, or it's duly authorized officer.

c) Other than in the performance of "Change Orders" causing changes or deviations from the Contract, sublet or subcontract any portion of the Work, or contract for materials or supplies in excess of 0.5% of your total bid or $10,000, whichever is greater, as to which his or her original Bid did not designate a Subcontractor or Supplier.

8. Following receipt of notice from you of the proposed substitution of a Subcontractor or Supplier, the listed Subcontractor or Supplier who has been so notified shall have 5 Working Days within which to submit written objections to the substitution to the Contract Specialist with a copy to the Engineer. Failure to file these written objections shall constitute the listed Subcontractor or Supplier's consent to the substitution. If written objections are filed, the City shall give notice in writing of at least 5 Working Days to the listed Subcontractor or Supplier of a hearing by the City on your request for substitution.

I. PROMPT PAYMENT.

1. You or your Subcontractors shall pay to any subcontractor, not later than 7 Calendar Days of receipt of each progress payment, unless otherwise agreed to in writing, the respective amounts allowed you on account of the Work performed by the Subcontractors, to the extent of each Subcontractor's interest therein. In cases of Subcontractor performance deficiencies, you shall make written notice of any withholding to the Subcontractor with a copy to the Contracts Specialist. Upon correction of the deficiency, you shall pay the Subcontractor the amount previously withheld within 14 Calendar Days after payment by the City.

2. Any violation of California Business and Professions Code, §7108.5 concerning prompt payment to Subcontractors shall subject the violating Contractor or

Subcontractor to the penalties, sanctions, and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to you or your Subcontractor in the event of a dispute involving late payment or nonpayment by the Prime Contractor, deficient subcontract performance, or noncompliance by a Subcontractor.

J. PROMPT PAYMENT OF FUNDS WITHHELD TO SUBCONTRACTORS.

1. The City will hold retention from you and will make prompt and regular incremental acceptances of portions, as determined by the Engineer, of the Work and pay retention to you based on these acceptances.
2. You or your Subcontractors shall return all monies withheld in retention from a Subcontractor within 30 Calendar Days after receiving payment for Work satisfactorily completed and accepted including incremental acceptances of portions of the Work by the City.
3. Federal law (49CFR26.29) requires that any delay or postponement of payment over 30 Calendar Days may take place only for good cause and with the City's prior written approval. Any violation of this provision by you or your Subcontractor shall subject you or your Subcontractor to the penalties, sanctions, and other remedies specified in §7108.5 of the Business and Professions Code.
4. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to you or your Subcontractor in the event of a dispute involving late payment or nonpayment by you, deficient subcontract performance, or noncompliance by a Subcontractor.

K. CERTIFICATION.

1. The City accepts certifications of DBE, DVBE, MBE, SMBE, SWBE, or WBE by any of the following certifying agencies:
   a) Current certification by the State of California Department of Transportation (CALTRANS) as DBE, SMBE, or SWBE.
   b) Current MBE, WBE, or DVBE certification from the California Public Utilities Commission.
   c) DVBE certification is received from the State of California's Department of General Services, Office of Small and Minority Business.
   d) Current certification by the City of Los Angles as DBE, WBE, or MBE.
   e) Subcontractors' valid proof of certification status (copies of MBE, WBE, DBE, or DVBE certifications) shall be submitted as required.

L. CONTRACT RECORDS AND REPORTS.

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.

EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP)

SECTION B - SLBE-ELBE SUBCONTRACTING REQUIREMENTS

THESE SPECIAL PROVISIONS SUPPLEMENT THE POLICIES AND REQUIREMENTS ESTABLISHED BY THE CITY OF SAN DIEGO EQUAL OPPORTUNITY CONTRACTING PROGRAM SPECIFIED IN THE CITY'S GENERAL EOCP REQUIREMENTS.

A. GENERAL.

1. It is the City's policy to encourage greater availability, capacity development, and contract participation by SLBE and ELBE firms in City contracts. This policy is, in part, intended to further the City's compelling interest to stimulate economic development through the support and empowerment of the local community, ensure that it is neither an active nor passive participant in marketplace discrimination, and promote equal opportunity for all segments of the contracting community.

2. The City is committed to maximizing subcontracting opportunities for all qualified and available firms.

3. This policy applies to City-funded construction contracts. Bidders shall be fully informed of this policy as set forth in these specifications. Mandatory or voluntary subcontracting percentages, Bid Discounts, and restricted competitions are specified in the Contract Documents.

4. You shall make subcontracting opportunities available to a broad base of qualified Subcontractors and shall achieve the minimum SLBE-ELBE Subcontractor participation identified for your project.

5. Failure to subcontract the specified minimum (mandatory) percentages of the Bid to qualified available SLBE-ELBE Subcontractors will cause a Bid to be rejected as non-responsive unless the Bidder has demonstrated compliance with the affirmative steps as specified in the City's document titled "Small Local Business (SLBE) Program, INSTRUCTIONS FOR BIDDERS COMPLETING THE GOOD FAITH EFFORT SUBMITTAL" and has submitted documentation showing that all required positive efforts were made prior to the Bid submittal due date. The required Good Faith Effort (GFE) documentation shall be submitted to the Contract Specialist. The instructions for completing the good faith effort submittal can be found on the City's website:

   https://www.sandiego.gov/sites/default/files/legacy/eoc/pdf/slbegfeinst.pdf

6. The current list of certified SLBE-ELBE firms and information for completing the GFE submittal can be found on the City's EOC Department website:

   http://www.sandiego.gov/eoc/programs/slbe.shtml

7. These requirements may be waived, at the City's sole discretion, on projects deemed inappropriate for subcontracting participation.

B. DEFINITIONS.

1. The following definitions shall be used in conjunction with these specifications:

   a) **Bid Discount** – Additional inducements or enhancements in the bidding process that are designed to increase the chances for the selection of SLBE firms in competition with other firms.

   b) **Commercially Useful Function** – An SLBE-ELBE performs a commercially useful function when it is responsible for the execution of the Work and is carrying out its responsibilities by actually performing, managing, and supervising the Work involved. To perform a commercially useful function, the SLBE-ELBE shall also be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quantity and quality, ordering the material, and installing (where applicable) and paying for the material itself.

      To determine whether an SLBE-ELBE is performing a commercially useful function, an evaluation will be performed of the amount of Work subcontracted, normal industry practices, whether the amount the SLBE-ELBE firm is to be paid under the contract is commensurate with the Work it is actually performing and the SLBE-ELBE credit claimed for its performance of the Work, and other relevant factors. Specifically, an SLBE-ELBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of meaningful and useful SLBE-ELBE participation, when in similar transactions in which SLBE-ELBE firms do not participate, there is no such role performed.

   c) **Good Faith Efforts (GFE)** – Documentation of the Bidder's intent to comply with SLBE Program goals and procedures included in the City's SLBE Program, Instructions for Completing Good Faith Effort Submittal available from the City's EOCP website or the Contract Specialist.

   d) **Independently Owned, Managed, and Operated** – Ownership of a SLBE-ELBE firm shall be direct, independent, and by individuals only. Business firms that are owned by other businesses or by the principals or owners of other businesses that cannot themselves qualify under the SLBE-ELBE eligibility requirements shall not be eligible to participate in the Program. Moreover, the day-to-day management of the SLBE-ELBE firm shall be direct and independent of the influence of any other businesses that cannot themselves qualify under the SLBE-ELBE eligibility requirements.

   e) **Joint Venture** – An association of two or more persons or business entities that is formed for the single purpose of carrying out a single defined business enterprise for which purpose they combine their

capital, efforts, skills, knowledge, or property. Joint ventures shall be established by written agreement to qualify for this program.

f) **Local Business Enterprise ("LBE")** – A firm having a Principal Place of Business and a Significant Employment Presence in San Diego County, California that has been in operation for 12 consecutive months and a valid business tax certificate. This definition is subsumed within the definition of Small Local Business Enterprise.

g) **Minor Construction Program** – A program developed for bidding exclusively among SLBE-ELBE Construction firms.

h) **Principal Place of Business** – A location wherein a firm maintains a physical office and through which it obtains no less than 50% of its overall customers or sales dollars.

i) **Protégé** – A firm that has been approved and is an active participant in the City's Mentor-Protégé Program and that has signed the required program participation agreement and has been assigned a mentor.

j) **Significant Employee Presence** – No less than 25% of a firm's total number of employees are domiciled in San Diego County.

C. SUBCONTRACTOR PARTICIPATION.

1. For the purpose of satisfying subcontracting participation requirements, only 1st tier SLBE–ELBE Subcontractors will be recognized as participants in the Contract according to the following criteria:

   a) For credit to be allowed toward a respective participation level, all listed SLBE-ELBE firms shall have been certified by the Bid due date.

   b) The Subcontractor shall perform a commercially useful function for credit to be allowed toward subcontractor participation levels. The Subcontractor shall be required by you to be responsible for the execution of a distinct element of the Work and shall carry out its responsibility by actually performing and supervising its own workforce.

   c) If the Bidder is seeking the recognition of materials, supplies, or both towards achieving any mandatory subcontracting participation level, the Bidder shall indicate on Form AA40 – Named Equipment/Material Supplier List with the Bid the following:

      i. If the materials or supplies are obtained from a SLBE-ELBE manufacturer, the Bidder will receive 100% of the cost of the materials or supplies toward SLBE participation. For the purposes of counting SLBE-ELBE participation, a manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the Contract and of the general character described by the specifications.

ii. If the materials or supplies are obtained from a SLBE-ELBE supplier, the Bidder will receive 60% of the cost of the materials or supplies toward SLBE participation. For the purposes of counting SLBE-ELBE participation a Supplier is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the Contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a supplier, the firm shall be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a supplier in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business if the person both owns and operates distribution equipment for the products. Any supplementing of the suppliers' own distribution equipment shall be by a long-term lease agreement and shall not be on an ad hoc or contract-by-contract basis.

iii. If the materials or supplies are obtained from a SLBE-ELBE, which is neither a manufacturer nor a supplier, the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, fees or transportation charges for the delivery of materials or supplies required on a job site will be counted toward SLBE-ELBE participation, provided the fees are reasonable and not excessive as compared with fees customarily allowed for similar services. No portion of the cost of the materials and supplies themselves will be counted toward SLBE-ELBE participation.

d) If the Bidder is seeking the recognition of SLBE-ELBE Trucking towards achieving any mandatory subcontracting participation level, the Bidder shall indicate it on Form AA35 – List of Subcontractors with the Bid. The following factors will be evaluated in determining the credit to be allowed toward the respective participation level:

i. The SLBE-ELBE shall be responsible for the management and supervision of the entire trucking operation for which it is getting credit on a particular Contract and there shall not be a contrived arrangement for the purpose of counting SLBE-ELBE participation.

ii. The SLBE-ELBE shall itself own and operate at least 1 fully licensed, insured, and operational truck used on the Contract.

iii. The SLBE-ELBE receives credit for the total value of the transportation services it provides on the Contract using trucks it owns, insures, and operates using drivers it employs.

iv. The SLBE-ELBE may lease trucks from another SLBE-ELBE firm including an owner-operator who is certified as a SLBE-ELBE. The SLBE-ELBE who leases trucks from another SLBE-ELBE receives credit for the total value of the transportation services the lessee SLBE-ELBE provides on the contract.

v. The SLBE-ELBE may also lease trucks from a non-SLBE-ELBE firm, including an owner-operator. The SLBE-ELBE who leases trucks from a non-SLBE-ELBE is entitled to credit for the total value of transportation services provided by non-SLBE-ELBE lessees not to exceed the value of transportation services provided by SLBE-ELBE owned trucks on the contract. Additional participation by non-SLBE-ELBE lessees receive credit only for the fee or commission it receives as a result of the lease arrangement.

vi. A lease shall indicate that the SLBE-ELBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the SLBE-ELBE so long as the lease gives the SLBE-ELBE absolute priority for use of the leased truck.

D. SLBE-ELBE SUBCONTRACTOR PARTICIPATION PERCENTAGES.

1. Contracts valued at $1,000,000 and above will be considered Major Public Works Contracts and will include a mandatory Subcontractor participation requirement for SLBE–ELBE firms.

   a) The Bidder shall achieve the mandatory Subcontractor participation requirement or demonstrate GFE.

   b) The Bidders shall indicate the participation on Forms AA35 - List of Subcontractors and AA40 - Named Equipment/Material Supplier List as applicable regardless of the dollar value.

   c) An SLBE-ELBE Bidder may count its own participation toward achieving the mandatory goal as long as the SLBE-ELBE Bidder performs 51% of the Contract Price.

2. Contracts Valued over $500,000 and under $1,000,000 will also be considered Major Public Works Contracts and will include the mandatory subcontractor participation requirements described above and the following:

   a) 5% bid discount for SLBE-ELBE firms.

   b) Non-certified Contractor will receive 5% bid discount if they achieve the specified mandatory Subcontracting participations.

c) Bid discounts shall not apply if the award will result in a total contract cost of $50,000 in excess of the apparent lowest Bid.

d) In the event of a tie bid between a SLBE-ELBE Bidder and a non-SLBE-ELBE Bidder, the SLBE-ELBE Bidder will be awarded the Contract.

e) In the event of a tie bid between a discounted Bid and a non-discounted Bid, the discounted Bid will be awarded the Contract.

3. Contracts valued over $250,000 up to $500,000 will be considered Minor Public Works Contracts and will be awarded through a competitive Bid process open only to City certified SLBE-ELBE firms. If there are no bidders or no responsible bidders, the Contract will be made available to all Bidders and will be subject to requirements listed in items 1 and 2 for Major Public Works Contracts above.

4. Contracts valued at $250,000 and below will also be considered Minor Public Works Contracts and will be awarded through a competitive bid process open only to City certified ELBEs unless there are less than 2 firms available at which it will be awarded through a competitive process open only to the City certified SLBE-ELBE firms. If there are no bidders or no responsible bidders, the Contract will be made available to all Bidders and subject to requirements listed in items 1 and 2 for Major Public Works Contracts above.

E. JOINT VENTURES.

1. The City may allow for Joint Venture bid discounts on some Contracts. Contracts that allow for Joint Venture bid discounts will be designated in Bid documents. A firm that is bidding or competing for City Contracts may partner with a certified SLBE or ELBE to compete for Contracts as a Joint Venture.

2. A Joint Venture shall be between two entities with the same discipline or license as required by the City. Joint ventures will receive bid discounts depending on the SLBE or ELBE percentage of participation. To be eligible for a discount, a Joint Venture Agreement shall be approved by the City at the time of Bid submittal. The maximum allowable discount shall be 5%. The parties shall agree to enter in the relationship for the life of the projects.

3. Joint Venture shall submit a Joint Venture Management Plan, a Joint Venture Agreement, or both at least 2 weeks prior to the Bid due date. Copies of the Joint Venture applications are available upon request to the Contract Specialist. Each agreement or management plan shall include the following:

a) Detailed explanation of the financial contribution for each partner.

b) List of personnel and equipment used by each partner.

c) Detailed breakdown of the responsibilities of each partner.

d) Explanation of how the profits and losses will be distributed.

e) Description of the bonding capacity of each partner.

f) Management or incentive fees available for any one of the partners (if any).

4. Each Joint Venture partner shall perform a Commercially Useful Function. An SLBE or ELBE that relies on the resources and personnel of a non-SLBE or ELBE firm will not be deemed to perform a Commercially Useful Function.

5. Each Joint Venture partner shall possess licenses appropriate for the discipline for which a proposal is being submitted. If a Joint Venture is bidding on a single trade project, at the time of bid submittal, each Joint Venture partner shall possess the requisite specialty license for that trade bid.

6. The SLBE or ELBE partner shall clearly define the portion of the Work to be performed. This Work shall be of the similar type of Work the SLBE or ELBE partner performs in the normal course of its business. The Joint Venture Participation Form shall specify the Bid items to be performed by each individual Joint Venture partner. Lump sum Joint Venture participation shall not be acceptable.

7. Responsibilities of the SLBE or ELBE Joint Venture Partner:

   a) The SLBE or ELBE partner shall share in the control, management responsibilities, risks and profits of the Joint Venture in proportion with the level of participation in the project.

   b) The SLBE or ELBE partner shall perform Work that is commensurate with its experience.

   c) The SLBE or ELBE partner shall use its own employees and equipment to perform its portion of the Work.

   d) The Joint Venture as a whole shall perform Bid items that equal or exceed 50% of the Contract Price, excluding the cost of manufactured items, in order to be eligible for a Joint Venture discount.

F. MAINTAINING PARTICIPATION LEVELS.

1. Credit and preference points are earned based on the level of participation proposed prior to the award of the Contract. Once the Project begins you shall achieve and maintain the SLBE-ELBE participation levels for which credit and preference points were earned. You shall maintain the SLBE-ELBE percentages indicated at the Award of Contract and throughout the Contract Time.

2. If the City modifies the original Scope of Work, you shall make reasonable efforts to maintain the SLBE-ELBE participation for which creditor preference points were earned. If participation levels will be reduced, approval shall be received from the City prior to making changes.

3. You shall notify and obtain written approval from the City in advance of any reduction in subcontract scope, termination, or substitution for a designated SLBE-ELBE Subcontractor. Failure to do so shall constitute a material breach of the Contract.

4. If you fail to maintain the SLBE-ELBE participation listed at the time the Contract is awarded and have not received prior approval from the City, the

City may declare you in default and will be considered grounds for debarment under Chapter 2, Article 2, Division 8, of the San Diego Municipal Code.

G. SUBCONTRACTING EFFORTS REVIEW AND EVALUATION.

1. Documentation of your subcontracting efforts will be reviewed by EOCP to verify that you made subcontracting opportunities available to a broad base of qualified Subcontractors, negotiated in good faith with interested Subcontractors, and did not reject any bid for unlawful discriminatory reasons. The EOCP review is based on the federal "Six Good Faith Efforts" model.

2. The GFEs are required methods to ensure that all ELBE and SLBE firms have had the opportunity to compete for the City's Public Works procurements. The Six Good Faith Efforts, also known as affirmative steps, attract and utilize ELBE and SLBE firms:

   a) Ensure ELBE firms are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities.

   b) Make information of forthcoming opportunities available to SLBE-ELBE firms and arrange time for Contracts and establish delivery schedules, where requirements permit, in a way that encourages and facilitates participation by SLBE-ELBE firms in the competitive process. This includes posting solicitations for Bids or proposals to SLBE-ELBE firms for a minimum of 10 Working Days before the Bid or Proposal due date.

   c) Consider in the contracting process whether firms competing for large Contracts could subcontract with SLBE-ELBE firms.

   d) Encourage contracting with a consortium of ELBE-SLBE firms when a Contract is too large for one of these firms to handle individually.

   e) Use the services and assistance of the City's EOC Office and the SLBE-ELBE Directory.

   f) If you award subcontracts, require your Subcontractors to take the steps listed above.

H. GOOD FAITH EFFORT DOCUMENTATION.

1. If the specified SLBE-ELBE Subcontractor participation percentages are not met, you shall submit information necessary to establish that adequate GFEs were taken to meet the Contract Subcontractor participation percentages. See the City's document titled "Small Local Business (SLBE) Program, INSTRUCTIONS FOR BIDDERS COMPLETING THE GOOD FAITH EFFORT SUBMITTAL." The instructions for completing the good faith effort submittal can be found on the City's website:

   https://www.sandiego.gov/sites/default/files/legacy/eoc/pdf/slbegfeinst.pdf

I. SUBCONTRACTOR SUBSTITUTION.

1. Evidence of fraud or discrimination in the substitution of Subcontractors will result in sanctions including assessment of penalty fines, termination of Contract, or debarment. This section does not replace applicable California Public Contract Code.

J. FALSIFICATION OF SUB-AGREEMENT AND FRAUD.

1. Falsification or misrepresentation of a sub-agreement as to company name, Contract amount or actual Work performed by Subcontractors, or any falsification or fraud on the part your submission of documentation and forms pursuant to this program, will result in sanctions against you including assessment of penalty fines, termination of the Contract, or debarment. Instances of falsification or fraud which are indicative of an attempt by you to avoid subcontracting with certain categories of Subcontractors on the basis of race, gender, gender expression, gender identity, religion, national origin, ethnicity, sexual orientation, age, or disability shall be referred to the Equal Opportunity Contracting Program's Investigative Unit for possible violations of Article 2, Division 35 of the City Administrative Code, §§22.3501 et seq. (Nondiscrimination in Contracting).

K. RESOURCES.

1. The current list of certified SLBE-ELBE firms and information for completing the GFE submittal can be found on the City's EOC Department website:

   http://www.sandiego.gov/eoc/programs/slbe.shtml

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 **2021 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").

2. The **2021 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.

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

1-2 TERMS AND DEFINITIONS. To the "WHITEBOOK", item 55, "Normal Working Hours", ADD the following:

Normal Working Hours (Phase 1 and Phase 2, per 6-1.2.1 Construction Phasing) **-** Normal Working Hour core periods shall be 7:00 AM – 5:00 PM, Monday through Friday, inclusive. Saturdays, Sundays, and City Holidays are excluded.

SECTION 2 - SCOPE OF THE WORK

2-2 PERMITS, FEES, AND NOTICES. To the "WHITEBOOK", ADD the following:

2. The City will obtain, at no cost to you, the following permits:

   a) Caltrans Parent Encroachment Permit

   b) Site Development Permit No. 2463617

   c) Addendum to the EIR No. 30330/304032

   d) Department of the Army Permit for La Media Road Improvement Project (SPL-2021-00315-MER)

   e) Regional Water Quality Control Board Order No. R9-2021-0184 for Clean Water Act Section 401 Water Quality Certification and Waste Discharge Requirements.

   f) California Department of Fish & Wildlife - Streambed Alteration Agreement for La Media Road Improvements Project (EPIMS-SDO-18151-R5)

   g) Regional Water Quality Control Board Notice of Applicability, 2004-0004-DWQ for the Otay Advance Permittee- Responsible Vernal Pool Mitigation Project (File No. R9-2021-0193)

h) Project Permits can be accessed for review via the following link: https://drive.google.com/drive/folders/1rGvzkXpSn5FgTbStdU6tVuZJkHfKXxbn

i) It is the contractors responsibility to follow the conditions as outlined in the corresponding agency permits listed above and ensure compliance.

2-2.2 **Caltrans Encroachment Permit.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. You shall apply and obtain the Caltrans Encroachment Permit. The City will provide the Parent Encroachment Permit for the work within the Caltrans Right-of-Way.

   a) You shall pay for and secure the Contractor's encroachment permit prior to construction.

   b) You shall arrange and pay for inspection as required by Caltrans.

   c) It is the contractors responsibility to follow the conditions as outlined in the Caltrans Encroachment Permit and ensure compliance.

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

2. The payment for applying and obtaining the Caltrans Encroachment Permit shall be included in the Allowance Bid item for "**Caltrans Encroachment Permit Submittal**".

SECTION 3 – CONTROL OF THE WORK

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

1. You shall perform, with your own organization, Contract Work amounting to at least **50%** of the Base Bid.

3-8.7 **Contractor's Quality Control Plan (QCP).** To the "WHITEBOOK", ADD the following:

7. The establishment and implementation of a Quality Control Plan (QCP), as defined in the standard specifications, shall be required for this Contract. See example in **Appendix F - Sample Contractor's Daily Quality Control Inspection Report.**

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) Geotechnical Investigation, Metropolitan Airpark Phases 1A & 1B Off-Site Roadway Improvements, prepared by Geocon, Inc., dated December 21, 2016.

   b) Update Geotechnical Report, La Media Road and Truck Route Improvements, prepared by Geocon Inc., dated May 8, 2020 (Revised October 19, 2020).

   c) Wetland Mitigation Plan for the La Media Road Improvement Project prepared by RECON Environmental, Inc.

   d) Vernal Pool Mitigation Plan for the La Media Road Improvement Project prepared by RECON Environmental, Inc.

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

   https://drive.google.com/drive/folders/16T0lCzi4Tl5y48kUZxoj86egZly5QGwZ

3-12.1 **General**. To the "WHITEBOOK", ADD the following:

2. You shall provide a PM-10 certified self-loading motorized street sweeper equipped with a functional water spray system for this project.

3. You shall sweep all paved areas within the Work site and all paved haul routes as specified below:

   a) Every Friday on a weekly basis.
   b) 1 Working Day prior to each rain event.
   c) As directed by the Engineer.

   If these requirements would require you to sweep on a Holiday or Weekend, then you shall sweep the next available Working Day prior to that Holiday or Weekend.

3-12.7 **Drinking Water Discharges Requirements.** To the "WHITEBOOK", ADD the following:

1. You shall record the results for each discharge event on the City's Drinking Water Discharge Monitoring form included as **Appendix G- Monthly Drinking Water Discharge Monitoring Form.**

SECTION 4 - CONTROL OF MATERIALS

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 issuance of the Notice of Intent to Award** and on the City's Product Submittal Form available at:

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

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 and defense duties set forth in the Contract.

5-4.1 Policies and Procedures.

1. You shall procure the insurance described below, at your 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 as required by this Contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this Contract. Your duties under the Contract, including your indemnity obligations, are not limited to the insurance coverage required by this Contract.
4. If you maintain broader coverage or higher limits than the minimums shown below, City requires and shall be entitled to the broader coverage or the higher limits maintained by you. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to City.
5. Your payment for insurance shall be included in the Contract Price you bid. You are not entitled to any additional payment from the City to cover your insurance, unless the City specifically agrees to payment in writing. Do not begin any Work under this Contract or allow any Subcontractors to begin work, until you have provided, and the City has approved, all required insurance.
6. Policies of insurance shall provide that the City is entitled to 30 days advance written notice of cancellation or non-renewal of the policy or 10 days advance written notice for cancellation due to non-payment of premium. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage and 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 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	$10,000,000
Products/Completed Operations Aggregate Limit	$10,000,000
Personal Injury Limit	$5,000,000
Each Occurrence	$5,000,000

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.

5-4.2.3 Workers' Compensation Insurance and Employers Liability Insurance.

1. In accordance with the provisions of California Labor Code section 3700, 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 this requirement.

2. Statutory Limits shall be provided for Workers' Compensation Insurance as required by the state of California, and Employer's Liability Insurance with limits of no less than $1,000,000 per accident for bodily injury or disease.

3. By signing and returning the Contract, you certify that you are aware of the provisions of California's Workers' Compensation laws, including Labor Code section 3700, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance, and that you will comply with these provisions before commencing the Work..

5-4.2.4 Contractors Pollution Liability Insurance.

1. You shall procure and maintain at your expense or require your Subcontractor, as described below, to procure and maintain Contractors Pollution Liability Insurance applicable to the Work being performed, with a limit no less than $2,000,000 per claim or occurrence and $4,000,000 aggregate per policy period of one year.
2. All costs of defense shall be outside the limits of the policy.
3. You shall obtain written approval from the City for any insurance provided by your Subcontractor instead of you.
4. For approval of a substitution of your Subcontractor's insurance, you shall certify that all activities for which the Contractors Pollution Liability Insurance will provide coverage will be performed exclusively by the Subcontractor providing the insurance. The deductible shall not exceed $25,000 per claim unless the City has provided prior, written approval.
5. Occurrence based policies shall be procured before the Work commences. Claims Made policies shall be procured before the Work commences, shall be maintained for the Contract Time, and shall include a 12-month extended Claims Discovery Period applicable to this contract or the existing policy or policies that shall continue to be maintained for 12 months after the completion of the Work without advancing the retroactive date.

5-4.2.8 Architects and Engineers Professional Insurance (Errors and Omissions Insurance).

1. For Contracts with required engineering services, including Design-Build and preparation of engineered Traffic Control Plans (TCP) by you, you shall keep or require all of your employees and Subcontractors, who provide professional engineering services under Contract, to provide to the City proof of Professional Liability coverage with a limit of no less than $**1,000,000** per claim and $**2,000,000** aggregate per policy period of one year.
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 three years after completion of the Project or termination of the 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 here.

5-4.3 **Rating Requirements.** Except for the State Compensation Insurance Fund, all insurance required by this Contract 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 of California, 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 of California 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 in this Contract.

5-4.4 **Evidence of Insurance.** You shall furnish the City with original Certificates of Insurance, including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause), prior to your commencement of Work under this Contract. In addition, The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

5-4.5 **Policy Endorsements.**

5-4.5.1 **Commercial General Liability Insurance.**

5-4.5.1.1 **Additional Insured.** To the fullest extent permitted by law and consistent with the limiting provisions set forth at California Civil Code section 2782, California Insurance Code section 11580.04, and any applicable successor statutes limiting indemnification of public agencies that bind the City, the policy or policies shall be endorsed to include as an Additional Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to liability arising out of:

i. Ongoing operations performed by you or on your behalf,

ii. your products,

iii. your work, e.g., your completed operations performed by you or on your behalf, or

iv. 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 Workers' Compensation Insurance and Employers Liability Insurance.

5-4.5.2.1 **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.

5-4.5.3 Contractors Pollution Liability Insurance Endorsements.

5-4.5.3.1 **Additional Insured.** To the fullest extent permitted by law and consistent with the limiting provisions set forth at California Civil Code section 2782, California Insurance Code section 11580.04, and any applicable successor statutes limiting indemnification of public agencies that bind the City, the policy or policies shall be endorsed to include as an Additional Insured the City and its respective elected officials, officers, employees, agents, and representatives, with respect to 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.

5-4.5.3.2 **Primary and Non-Contributory Coverage.** The policy or policies shall be endorsed to provide that the insurance afforded by the Contractors Pollution Liability Insurance policy or policies is primary to any insurance or self-insurance of the City and its elected officials, officers, employees, agents and representatives with respect to operations including the completed operations of the Named Insured. 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.

5-4.5.3.3 **Severability of Interest.** For Contractors Pollution Liability Insurance, the policy or policies shall provide that your insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability and shall provide cross-liability coverage.

5-4.6 **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. The City may require you to purchase coverage with a lower retention or provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within the retention. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or City.

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, in writing, 30 days prior to any material change to the policies of insurance provided under this Contract. This written notice is in addition to the requirements of paragraph 8 of Section 5-4.1. Policies of insurance shall provide that the City is entitled to 30 days advance written notice of cancellation or non-renewal of the policy or 10 days advance written notice for cancellation due to non-payment of premium. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage and to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

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

5-10.1.3 **Weekly Updates Recipients.**

1. Submit a weekly correspondence with updates, traffic control issues and locations, lane closures, and any other pertinent information (with additional contact names given during award process) to the following recipients:

   Mastaneh Ashrafzadeh, Senior Engineer, MAshrafzadeh@sandiego.gov

   Doran Aivati, Project Manager, DAivati@sandiego.gov

   Resident Engineer, TBA,

5-10.3 **Exclusive Community Liaison Services.** To the "WHITEBOOK", ADD the following:

2. You shall retain an Exclusive Community Liaison for the Project that shall implement Work in accordance with the specifications described in 5-10.2 "Community Outreach Services" and 5-10.3 "Exclusive Community Liaison Services".

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

6-1.1 Construction Schedule. To the "WHITEBOOK", ADD the following:

3. Refer to the Sample City Invoice materials in **Appendix D – Sample City Invoice with Cash Flow Forecast** and use the format shown.
4. The **120 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".
5. Construction impacting any bus service or bus stops, you shall coordinate with MTS four (4) weeks in advance, JP Garcia (619) 446-4018 for bus detours and Clarke Peters (619) 595-7037 for bus stop closures.
6. Implementation of the Vernal Pool Mitigation Plan can not begin until authorized in writing by the City of San Diego.
7. Implementation of the Vernal Pool Mitigation Plan and Wetland Mitigation Plan must be concurrent with project construction and completed no later than 9 months following the start of Project construction. Completion refers to site preparation, grading, irrigation installation (as required), planting acceptance and the start of the Plant Establishment Period (PEP).
8. Sequence of work for this project must follow the conditions as outlined in the corresponding agency permits and construction phasing outlined in section 6-1.2.1.

6-1.2.1 Construction Phasing To the "Whitebook", ADD the following:

3. The project will be constructed in 2 phases:

   Phase 1: Shall consist of grading and improvements on La Media Road from I-905 south to Avenida De La Fuente and the grading and improvements along Airway Road to be completed to allow for the full opening for through traffic in all directions of La Media Road from I-905 to Avenida De La Fuente and Airway Road. La Media Road from I-905 to Avenida De La Fuente will be closed; construction access only.

   Vernal Pool and Wetland Mitigation implementation shall be completed concurrently and in accordance with conditions as outlined in the corresponding agency permits.

   Duration: 11 months

   Phase 2: Shall consist of grading and improvements on La Media Road from Avenida De La Fuente south to Siempre Viva Road, in addition to completing any minor improvements and/or punchlist items of Phase 1. La Media Road is required to remain open to allow two (2) southbound lanes during construction. Phase 2 may begin in advance of Phase 1 being completed, with the requirement of the 2 southbound lanes remaining open during construction.

   Duration: 7 months

   Total Project Duration: 18 months

ADD:

6-6.1.1 Environmental Document.

1. The City of San Diego has prepared a **Site Development Permit No. 2463617** for **La Media Road Improvements**, **Project No. S-15018**, as referenced in the Contract Appendix. You shall comply with all requirements of the **Site Development Permit No. 2463617,** as set forth in **Appendix A.**

2. The City of San Diego has prepared an **Addendum to EIR No**. **30330/304032** for **La Media Road Improvements**, **Project No. S-15018**, as referenced in the Contract Appendix. You shall comply with all requirements of the **Addendum to EIR No. 30330/304032,** as set forth in **Appendix A.**

3. The City of San Diego has prepared a **CEQA Resolution CM-7026-1** for **La Media Road Improvements**, **Project No. S-15018**, as referenced in the Contract Appendix. You shall comply with all requirements of the **CEQA Resolution CM-7026-1,** as set forth in **Appendix A.**

4. The City of San Diego has prepared a **Notice of Determination** for **La Media Road Improvements**, **Project No. S-15018**, as referenced in the Contract Appendix. You shall comply with all requirements of the **Notice of Determination, Project No. 667298,** as set forth in **Appendix A.**

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

   The environmental documents listed above are available for review at the following link:

   https://drive.google.com/drive/folders/1aPZgu7p0LBTDDhjlwoEGY5iqYDq-AUQh

6-6.2.1 Archaeological and Native American Monitoring Program. To the "WHITEBOOK", ADD the following:

4. Contractor retain a qualified archaeologist and Native American Monitor for this Contract. You shall coordinate your activities and Schedule with the activities and schedules of the archaeologist and Native American monitor. Notify the Engineer before noon of the Working Day before monitoring is required. See 3-5, "INSPECTION" for details.

6-6.2.2 Paleontological Monitoring Program. To the "WHITEBOOK", ADD the following:

3. Contractor retain a qualified paleontologist for this Contract. You shall coordinate your activities and Schedule with the activities and schedules of the paleontologist monitor. Notify the Engineer before noon of the Working Day before monitoring is required. See 3-5, "INSPECTION" for details.

SECTION 7 – MEASUREMENT AND PAYMENT

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

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

SECTION 209 – PRESSURE PIPE

209-1.1.1 **General.** To the "WHITEBOOK", ADD the following:

1. PVC products, specifically type C900 and C905, as manufactured or distributed by J-M Manufacturing Company or JM Eagle shall not be used on the Contract for pressurized pipe.

2. Refer to AWWA C900-16 for all references to AWWA C905.

SECTION 300 – EARTHWORK

300-1.4 **Payment.** To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. The lump sum Bid item for "**Clearing and Grubbing**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for all work necessary including but not limited to the removal and disposal, as shown on the plans and to complete the work, of curb and gutter, asphalt concrete dike, sidewalk, concrete paving/apron, headwalls, storm drain structures, utility piping, street lights, traffic signal pull boxes, manhole structures, and all the resulting materials except where included in separate Removal bid items.

300-2.1.1 **General.** To the "GREENBOOK", ADD the following**:**

Unclassified excavation shall be performed in accordance with the recommended grading specifications as described in the Update Geotechnical Report, La Media Road and Truck Route Improvements, Prepared by Geocon, Inc. dated May 8, 2020; Revised October 19, 2020.

300-2.2.1 **General.** To the "GREENBOOK", ADD the following

Unsuitable material shall consist of the unclassified excavated material that is determined unsuitable for use as a fill material by the Geotechnical engineer and/or excess material that requires to be removed, loaded, hauled, and disposed at an approved landfill facility.

ADD:

300-2.7.1 **Remedial Grading**.

The remedial grading, as documented in the Geotechnical Report, includes "the upper approximately 2 feet of the undocumented fill or Very Old Paralic Deposits present in roadway areas may require remedial grading." The remedial grading earthwork volume is based on the the area of grading that has cut depths of less than 2 feet

covering the entire project limits. The actual extent and depth of remedial grading below the road subgrade will be determined in the field by the geotechnical engineer during the grading operations.

300-2.8 Measurement. To the "GREENBOOK", first paragraph, Add the following:

h) placement and compaction of the unclassified excavation to the lines, grades, and cross sections shown on the plans for the roadway subgrade, parkway improvements subgrade, and the finish grade of the adjacent slopes outside of the roadway prism.

i) placement of unclassified excavation in stockpile for the drying, mixing and preparation for placement of fill

j) excavating and placement of stockpiled soil into final fill location to meet line and grade as described in "h" above

300-2.9 Payment. To the "GREENBOOK", Add the following:

Payment for "**Remedial Grading**" will be made at the Contract Unit Price per cubic yard. Payment for remedial grading shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work required for remedial grading which includes but is not limited to excavating, removal, stockpiling, temporary relocating of material/stockpiles, surveying, loading, placement and compaction. The measurement of remedial grading shall be based on a field survey of the removal areas performed by a licensed surveyor to be provided by the Contractor for completing the remedial grading.

Measurement and payment for "**Unsuitable Material/Export**" shall be made at the Contract Unit Price per cubic yard and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work required for disposal of the material off-site, including but not limited to excavating, stockpiling, temporary relocating of material/stockpiles, loading, hauling, disposing at an approved landfill facility and fees required for the hauling, disposal of all unsuitable materials.

300-5.4 Measurement and Payment. To the "GREENBOOK", ADD the following:

Quantities of **"Imported Parkway Backfill (DG**)" will be measured per cubic yard of the installed quantity of decomposed granite (DG) placed within the excavated graded areas beneath the proposed sidewalk improvements. Removal depth to be determined in accordance with 301-1.2 Preparation of Subgrade, and replaced with a non-expansive material having an expansion index of less than 20 (ASTM D4829).

Payment for "**Imported Parkway Backfill (DG)"** will be made at the contract unit price per cubic yard and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work necessary including but not limited to the compaction of the imported parkway backfill material.

301-1.7.1 **Payment.** To the "GREENBOOK", ADD the following:

Payment for Class 2 Aggregate Base will be made at the contract unit price per ton and included in the bid item for **"Class 2 Aggregate Base".** The contract unit price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all work necessary to complete in place the placement of Class 2 Aggregate Base that shall include but is not limited to; the preparation of subgrade, stockpiling, temporary relocation of excavated soil/stockpiles, placement, compaction, and placement.

301-5.14 **Payment** To the "GREENBOOK", ADD the following:

Payment for **"Excavation and Lime Treated Soil"** will be made at the contract unit price per cubic yard for the quantity of soil excavated and combined with lime and placed as lime treated subgrade within the roadway as shown on the plans and specified in section 301-5. The contract unit price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all work necessary to complete in place the excavation and placement of the Lime Treated Soil that shall included but is not limited to; the excavation of the unclassified fill, stockpiling, temporary relocating of excavated soil/stockpiles, mixing of lime and soil, water, compaction, placement to the lines, grades, and cross sections shown on the plans, and curing of the lime treated soil.

302-5.1 **General.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

Asphalt concrete pavement shall be constructed of Hot Mix Asphalt, Type A as specified in the California Department of Transportation 2018 Standard Specifications Section 39-2 Hot Mix Asphalt**.**

302-5.9 **Measurement and Payment**. To the "WHITEBOOK", ADD the following:

2. **"Asphalt Concrete Reinforcement Paving Grid"** will be paid for at the Contract Unit Price per square foot for the grid installed adjacent to and overlapping the box culvert construction as shown in the Plans. The contract unit price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work necessary for installation of "Asphalt Concrete Reinforcement Paving Grid".

3. The contract's linear footage price for **"Asphalt Concrete Dike (Type A)",** shall include full compensation for the construction of 6" asphalt concrete dike (Type A), and for furnishing all labor, materials, tools, equipment, and incidentals for performing all the work complete and accepted in place, as shown on the drawings and as specified in these special provisions. No additional payment will be made theoreof.

SECTION 303 – CONCRETE AND MASONRY CONSTRUCTION

303-1.2 Subgrade for Concrete Structures. To the "GREENBOOK", ADD the following:

The preparation of the subgrade of the box culverts shall be excavated to a depth of 2 feet below the bottom of the box culvert foundation and filled with a 2-sack sand cement slurry up to the planned box culvert foundation grade. The cost for preparation of subgrade for concrete structures (box culverts), shall be considered as included in the price bid for construction or installation of the box culverts. The measurement and cost for the excavation shall be included in the Contract Unit Price for Unclassified Excavation.

303-6.1.2 Measurement and Payment. To the "WHITEBOOK", ADD the following:

3. Payment for **"Concrete Raised Median"** will be made at the contract unit price per square foot and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work necessary.

4. Payment for **"Turn Block Open Celled Pavers Filled with DG"** will be made at the contract unit price per square foot and shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work necessary including but not limited material delivery, installation, subgrade preparation, DG, and DG placement.

SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

ADD:

306-15.12 Payment. To the "WHITEBOOK", ADD the following:

The payment for **"18-Inch Welded Steel Casing (0.5-Inch Thick)" and "48-Inch Welded Steel Casing (0.5-Inch Thick)"** for sewer mains shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, for doing all work necessary including but not limited to the payment for casing installation, casing spacers, casing end seals.

SECTION 401 – REMOVAL

401-7 PAYMENT. To the "WHITEBOOK", ADD the following:

7. The contract's cubic yardage price paid for **"Removal of Existing Asphalt Concrete",** shall include full compensation for removal and disposal of existing asphalt concrete and for furnishing all labor, materials, equipment, tools and incidentals and for performing all the work complete and accepted in place, as shown on the drawings and as specified in these special provisions. No additional payment will be made thereof.

8. The contract's square footage price paid for **"Removal of Existing Rip Rap",** shall include full compensation for removal and disposal of existing rip rap energy dissipators and for furnishing all labor, materials, equipment, tools and incidentals and for performing all the work complete and accepted in place, as shown on the drawings and as specified in these special provisions. No additional payment will be made thereof.

SECTION 402 – UTILITIES

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

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

402-4 RELOCATION. To the "GREENBOOK", ADD the following:

Utility	Contact	Lead Time	Work Window	Stage of Construction Prior to Utility Work	Type of Work to be Conducted By Utilities
AT&T	Cary Hernandez ch2729@att.com 619-673-6013	60 Days	120 Days – after all SDG&E poles have been placed 150 Days – after permit is received and joint trench placed	SDG&E poles installation	Place conduit and cables. Remove existing underground cables that conflict with City project.
Cox Communications	Robert Mote Robert.Mote3@cox.com 619-977-5243	60 Days	120 Days – after all SDG&E poles have been placed 150 Days – after permit is received and joint trench placed	SDG&E poles installation	Place conduit and cables. Remove existing underground cables that conflict with City project.
SDG&E	Ben Mandaluniz bmandalu@ sdgecontractor.com 619-676-4381	8 Weeks	4-6 Months	Road closure, grading	Trench, conduit, substructures, pads, pole install and removals, cable, connections

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

1. Notify SDG&E at least **60 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

601-7 **PAYMENT.** To the "WHITEBOOK", Item 3, DELETE in its entirety and SUBSTITUTE with the following:

The Lump Sum Bid item for **"Traffic Control"** shall include the payment for all traffic control devices, permits, required signs, notices, temporary striping, and detours as shown in the provided Engineered Traffic Control Plans, and for additional traffic control work not covered by the Traffic Control Plans that is necessary to complete the work of this project. For the work not covered by the Engineered Traffic Control plans; the Contractor shall prepare traffic control working drawings and submit them to the Resident Engineer.

SECTION 701 - CONSTRUCTION

701-2 **PAYMENT.** To the "WHITEBOOK", item 5, ADD the following:

u) The payment for relocating APS push button shall be included in the Bid Item for each **"Relocate APS Push Button".** Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

v) The payment for relocating traffic signal and street light conduit (SR-905) shall be included in the Bid Item for **"Relocate Traffic Signal and Street Light Conduit (SR-905)".** Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

w) The payment for communication conduit system (for future fiber optic) shall be included in the Bid Item for **"Communication Conduit System (For Future Fiber Optic)".** Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

SECTION 800 – MATERIALS

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

Landscape Rock Cobble shall be Mission Cobble (or approved equal), sizes per plan.

Landscape Mulch shall be type 8 mulch (recycled); water quality basin mulch shall be "Gorilla Hair" 4" thick layer.

Decomposed Granite shall be ¾" California Gold (or approved equal), stabilizer at a rate of 12 lbs. per ton; mix at plant prior to delivery to site.

800-1.7 **Boulders.** To the "WHITEBOOK", ADD the following:

Boulders shall be Malibu (or approved equal), sizes per plan; at least one dimension shall meet the largest dimension specified.

800-1.8 **Landscape Fabric** (at Decomposed Granite). To the "WHITEBOOK", ADD the following:

Landscape Fabric shall be Mirafi 160N, color to be tan.

SECTION 801 – INSTALLATION

801-9 **PAYMENT.** To the "WHITEBOOK", ADD the following:

4. Payment for Landscape Rock Cobble shall be paid for at the Contract Unit Price per ton and included in the bid item for "**Landscape Rock Cobble**". Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

5. Payment for Landscape Boulders shall be paid for at the Contract Unit Price per ton and included in the bid item for "**Landscape Boulders (Lg, Md, Sm) at Cobble Swale, Rain Garden and Boulder Retaining Wall (at Tree Planting Basins**)". Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

6. Payment for Decomposed Granite shall be paid for at the Contract Unit Price per ton and included in the bid item for "**Decomposed Granite (Stabilized)**". Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

7. Payment for Landscape Fabric at Decomposed Granite shall be paid for at the Contract Unit Price per ton and included in the bid item for "**Landscape Fabric at Decomposed Granite**". Work shall include all labor, materials, equipment, tools, and incidentals necessary to complete the work and no additional compensation shall be provided.

SECTION 802 – NATIVE HABITAT PROTECTION, INSTALLATION, MAINTENANCE, AND MONITORING

802-2.1 **Project Biologist.** To the "WHITEBOOK", ADD the following:

5. You shall retain a qualified Project Biologist to perform biological monitoring Work for this Contract. You shall coordinate your activities and Schedule with the activities and schedules of the Project Biologist.

802-4 **PAYMENT.** To the "WHITEBOOK", item d) and e), DELETE in its entirety and SUBSTITUTE with the following:

d) The payment for the monitoring, reporting, and maintenance Work required during the maintenance period beyond the PEP in accordance with the Long

Term Maintenance and Monitoring Agreement (LTMMA) included in the Contract Documents includes payment for the Project Biologist when required, furnishing the required reports, site observations, and bond(s), and shall be included in the lump sum Bid item for the **"32-Month Re-vegetation Maintenance and Monitoring Program",** unless otherwise specified.

802-4 PAYMENT. To the "WHITEBOOK", ADD the following:

2. Vernal Pool Implementation and 120-day (4-month) Plant Establishment Period

Payment for the Vernal Pool Mitigation Project shall be paid for at the lump sum contract price and shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved for the implementation and 120-day Plant Establishment Period (PEP), as stated in the Vernal Pool Mitigation Plan for the La Media Road Improvement Project prepared by RECON Environmental, Inc., June 15, 2022, and no additional compensation shall be made therefor.

3. Vernal Pool Seven-Year (84-month) Maintenance

Payment for the Vernal Pool Mitigation Project shall be paid for at the lump sum contract price and shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved for the seven-year (84-month) maintenance and monitoring program, as stated in the Vernal Pool Mitigation Plan for the La Media Road Improvement prepared by RECON Environmental, Inc., June 15, 2022, and no additional compensation shall be made therefor.

4. Wetland Implementation and 120-day (4-month) Plant Establishment Period

Payment for the Wetland Mitigation Project shall be paid for at the lump sum contract price and shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved for the implementation and 120-day Plant Establishment Period (PEP), as stated in the Wetland Mitigation Plan for the La Media Road Improvement Project prepared by RECON Environmental, Inc., June 14, 2022, and no additional compensation shall be made therefor.

5. Wetland Five-year (60-month) Maintenance

Payment for the Wetland Mitigation Project shall be paid for at the lump sum contract price and shall include full compensation for furnishing all labor, materials, tools, equipment and doing all work involved for the five-year (60-month) maintenance and monitoring program, as stated in the Wetland Mitigation Plan prepared by RECON Environmental, Inc., June 14, 2022, and no additional compensation shall be made therefor.

802-5 **VERNAL POOL MITIGATION PROJECT.** Refer to the Vernal Pool Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc., June 15, 2022.

The Vernal Pool Mitigation Plan for the La Media Road Improvement Project can be accessed for review via the following link:

https://drive.google.com/drive/folders/16T0lCzi4Tl5y48kUZxoj86egZIy5QGwZ

802-5.1 **Contractor's Qualifications.**

Vernal Pool Restoration Specialist. Refer to the Vernal Pool Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Restoration Installation/Maintenance Contractor. Refer to the Vernal Pool Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Grading Contractor. Refer to the Vernal Pool Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Vernal Pool Biologist. Refer to the Vernal Pool Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

802-6 **WETLAND MITIGATION PROJECT.** Refer to the Wetland Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

The Wetland Mitigation Plan for the La Media Road Improvement Project can be accessed for review via the following link:

https://drive.google.com/drive/folders/16T0lCzi4Tl5y48kUZxoj86egZIy5QGwZ

802-6.1 **Contractor's Qualifications.**

Wetland Restoration Specialist. Refer to the Wetland Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Installation/Maintenance Contractor. Refer to the Wetland Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Grading Contractor. Refer to the Wetland Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

Wetland Biologist. Refer to the Wetland Mitigation Plan for the La Media Road Improvement Project, San Diego, California prepared by RECON Environmental, Inc.

SECTION 1001 – CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPs)

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

8. Based on a preliminary assessment by the City, this Contract is subject to **SWPPP**.

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 J - SWPPP Construction BMP Maintenance Log**.

SECTION 1002 - PERMANENT BEST MANAGEMENT PRACTICES (BMPS)

1002-7.11 Payment. To the "WHITEBOOK", ADD the following:

2. The contract's lump sum price for **"Rain Garden (Green Street Element)",** shall include full compensation for the excavation, fill placement and compaction, subgrade preparation, installation of 8" PVC perforated and solid-wall underdrain pipe, underdrain PVC cleanouts, 30 mil impermeable membrane, Class II permeable filter course, and landscape rock cobble and for furnishing all labor, materials, equipment, tools and incidentals and for performing all the work complete and accepted in place, as shown on the drawings and as specified in these special provisions. No additional payment will be made theoreof.

TECHNICALS

TECHNICAL SPECIFICATIONS

La Media Road & Truck Route Improvements

WATER AGENCIES STANDARDS TECHNICAL SPECIFICATIONS

SECTION	TITLE
02223	TRENCHING, EXCAVATION, BACKFILL AND COMPACTION
02223A	ADDITIONS TO TRENCHING, EXCAVATION, BACKFILL AND COMPACTION
03000	CAST-IN-PLACE CONCRETE
03000A	ADDITIONS TO CAST-IN-PLACE CONCRETE
09910	FIELD PAINTING AND COATING
13110	CATHODIC PROTECTION AND JOINT BONDING
13110A	ADDITIONS TO CATHODIC PROTECTION AND JOINT BONDING
15000	GENERAL PIPING SYSTEM AND APPURTENANCES
15000A	ADDITIONS TO GENERAL PIPING SYSTEM AND APPURTENANCES
15010	BURIED PIPING
15041	DISINFECTION OF PIPING
15041A	ADDITIONS TO DISINFECTION OF PIPING
15044	HYDROSTATIC TESTING OF PRESSURE PIPELINES
15055	DUCTILE-IRON PIPE
15055A	ADDITIONS TO DUCTILE-IRON PIPE
15056	DUCTILE-IRON FITTINGS
15057	COPPER TUBING, BRASS AND BRONZE PIPE FITTINGS
15064	POLYVINYL CHLORIDE PRESSURE (PVC) PIPE
15064A	ADDITIONS TO POLYVINYL CHLORIDE PRESSURE (PVC) PIPE
15074	BLOWOFF ASSEMBLIES
15074A	ADDITIONS TO BLOWOFF ASSEMBLIES
15100	RESILIENT WEDGE GATE VALVES
15102	BUTTERFLY VALVES
15102A	ADDITIONS TO BUTTERFLY VALVES
15103	BUTTERFLY AND RESILIENT WEDGE GATE VALVE TESTING PROCEDURE

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 02223 TRENCHING, EXCAVATION, BACKFILL AND COMPACTION

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials, testing and installation for trench excavation, backfill, and compaction of piping, conduit, manholes and vaults.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

ASTM C 131	-	Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 150	-	Portland Cement
ASTM D 75	-	Practice for Sampling Aggregates
ASTM D 1556	-	Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 1557	-	Test Method for Moisture-Density Relations of Soils Using a Modified Effort
ASTM D 2419	-	Test Method for Sand Equivalent Values of Soil and Fine Aggregate
ASTM D 2922	-	Test Method for Density of Soil in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	-	Test Method for Water Content of Soil and Rock in Place by Nuclear Methods
ASTM D 3776	-	Test Method for Mass Per Unit Area (Weight) of Woven Fabric
ASTM D 4253	-	Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Plate
ASTM D 4254	-	Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D 4632	-	Test Method for Grab Breaking Load and Elongation of Geotextiles
ASTM D 4751	-	Test Method for Determining the Apparent Opening Size of a Geotextile
CAL-OSHA	-	Title 8 General Industry Safety Orders

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02202, 03461, 03462, 15000, 15044, 15056, 15061, 15064, and 15065

1.04 GEOTECHNICAL TESTING

The Developer or Contractor shall engage the services of a geotechnical engineering firm or individual licensed in the State of California to monitor soil conditions during earthwork, trenching, bedding, backfill and compaction operations. Sampling and testing procedures shall be performed in accordance with the Reference Standards and as follows:

A. The soils technician shall be present at the site during all backfill and compaction operations. Failure to have the soils technician present will subject such operations to rejection.

B. Density and optimum moisture content of soil shall be determined by the use of the sand cone method, ASTM D 1556, or nuclear density gauge method, ASTM D 2922 & D 3017. Since the composition of the pipe and the walls of the trench have an effect on the nuclear density gauge output, a minimum of 25% of the density and optimum moisture tests shall be made using the sand cone method.

C. Determine laboratory moisture-density relations of existing soil by ASTM D 1557, Method C and/or D (formerly ASTM D 4253 and ASTM D 4254).

D. Determine the relative density of cohesionless soils by ASTM D 1557, Method C and/or D (formerly ASTM D 4253 and ASTM D 4254).

E. Sample backfill material by ASTM D 75.

F. Express "relative compaction" as a percentage of the ratio of the in-place dry density to the laboratory maximum dry density.

A report of all soils tests performed shall be stamped and signed by the soils firm or individual and shall be submitted by the Contractor prior to the filing of the Notice of Completion by the District. The report shall document the sampling and testing of materials, the location and results of all tests performed, and shall certify that materials and work are in compliance with this specification.

1.05 PIPE ZONE

The pipe zone includes the full width of the trench from 150mm (6") below the bottom of the pipe to 300mm (12") above the top of the pipe and extends into manhole or vault excavations to the point of connection to or penetration of such structure.

1.06 TRENCH ZONE

The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the pavement zone in paved areas, or to the existing surface in unpaved areas, and extends into manhole or vault excavations above the pipe zone.

1.07 PAVEMENT ZONE

The pavement zone includes the concrete or asphalt concrete pavement and aggregate base section placed over the trench zone and extends into manhole or vault excavations above the trench zone.

1.08 PROTECTION OF EXISTING UTILITIES AND FACILITIES

The Contractor shall be responsible for the care and protection of all existing utilities, facilities and structures that may be encountered in or near the area of the work in accordance with Section 01000.

1.09 PROTECTION OF EXISTING LANDSCAPING

The Contractor shall be responsible for the protection of all trees, shrubs, fences, and other landscape items adjacent to or within the work area in accordance with Section 01000.

1.10 ACCESS

The Contractor shall provide continuous, unobstructed access to all driveways, water valves, hydrants, or other property or facilities within or adjacent to the work areas.

1.11 SAFETY

A. Protection of workers within trenches shall be as required by the California Labor Code and in accordance with Section 01000.

B. All excavations shall be performed in a safe manner and shall be protected and supported in accordance with CAL-OSHA regulations.

C. Barriers and traffic delineators shall be placed in accordance with the requirements of the agency having jurisdiction.

1.12 BLASTING

Blasting for excavation shall not be performed without the written permission of the District. Procedures and methods of blasting shall conform to all Federal, State and local laws and ordinances.

1.13 PIPE JACKING

Pipe jacking may be permitted in accordance with Section 15125. District approval is required in advance of such operations.

1.14 EXCESS EXCAVATED MATERIAL

A. The Contractor shall remove and legally dispose of all excess excavated material and demolition debris.

B. It is the intent of these specifications that all surplus material shall be legally disposed of by the Contractor. Before acceptance of the work by District, the Contractor shall provide the District with written releases signed by all property owners with whom the Contractor has entered into agreements for disposing of excess excavated material, absolving the District from any liability connected therewith.

1.15 FILTER FABRIC

Filter fabric shall be used when excessively wet, soft, spongy, or similarly unstable material is encountered or in areas of suspected high groundwater in accordance with the soils technician's recommendation and the approval of the District Engineer.

1.16 CHANGES IN LINE AND GRADE

In the event obstructions not shown on the plans are encountered during the progress of the work, and which will require alterations to the plans, the District Engineer shall have the authority to change the plans and order the necessary deviation from the line and grade, in accordance with Section 01000. The Contractor shall not deviate from the specified line and grade without prior written approval by the District Engineer.

1.17 HYDROSTATIC TESTING

Pre-testing of the piping system may be performed for the Contractor's convenience at any time. However, the final hydrostatic pressure test shall be as described in Section 15044.

PART 2 MATERIALS

2.01 GENERAL

The Contractor shall furnish backfill material as specified below. All materials used in and above the pipe zone shall be capable of attaining the required relative density.

2.02 IMPORTED GRANULAR MATERIAL - PIPE ZONE

Imported Granular Material shall be used within the Pipe Zone for installations of all pressure pipe and tubing.

The Imported Granular Material shall be quarry waste (decomposed granite) free from organic matter. Material shall have a sand equivalent value of not less than 30 per ASTM D 2419, a coefficient of uniformity of 3 or greater, and shall conform to the following gradation:

U.S. Standard Sieve Size	Percent Passing By Weight
25mm (1")	100
19mm (3/4")	90 – 100
4.75mm (No. 4)	50 – 95
600µm (No. 30)	25 – 45
75µm (No. 200)	3 – 15

Native materials may not be used in lieu of Imported Granular Material within the Pipe Zone unless such native materials meet all of the requirements specified above and specific written permission has been obtained from the District Engineer.

2.03 CRUSHED ROCK - PIPE ZONE

Crushed Rock shall be used within the Pipe Zone for installations of all non-pressure pipe. Crushed rock shall be clean crushed stone free of organic matter. Crushed rock shall be certified to contain less than 1% asbestos by weight or volume and shall conform to the following gradation:

U. S. Standard Sieve Size	Percent Passing By Weight
25mm (1")	100
19mm (3/4")	90-100
12.5mm (1/2")	30-60
9.5mm (3/8")	0-20
4.75mm (No. 4)	0-5
2.36mm (No. 8)	----

In addition, crushed rock for use within the pipe zone shall meet or exceed the following requirements for resistance to abrasion or impact as measured using ASTM Test Method C 131, Test Sample Grading B:

100 Revolutions:	15% Maximum Loss by Weight
500 Revolutions:	52% Maximum Loss by Weight

2.04 IMPORTED GRANULAR MATERIAL - TRENCH ZONE

Imported Granular Material shall be used within the Trench Zone for installations of all pressure pipe and tubing and all non-pressure pipe.

Imported Granular Material for use within the Trench Zone shall conform in all ways to Imported Granular Material specified for use within the Pipe Zone.

Native materials may not be used in lieu of Imported Granular Material within the Trench Zone unless such native materials meet all of the requirements specified for Imported Granular Material within the Pipe Zone and specific written permission has been obtained from the District Engineer.

2.05 SAND-CEMENT SLURRY

Sand-cement slurry shall consist of two sacks, 85.3kg (188 pounds) of Portland cement per cubic yard of sand and sufficient moisture for workability. District approval is required for use of sand-cement slurry as a backfill material.

2.06 TRENCH PLUGS

Trench plugs consisting of compacted Imported Granular Material or sand-cement slurry shall be installed on piping systems that are backfilled with crushed rock.

2.07 FILTER FABRIC

Filter fabric shall be manufactured from polyester, nylon, or polypropylene. Material shall be of non-woven construction and shall meet the following requirements:

Grab tensile strength (ASTM D 4632):	45.4kg (100 lbs) minimum for a 25mm (1") raveled strip
Weight (ASTM D 3776):	152.6g/m^2 (4.5 oz./yd^2)
Apparent opening size (ASTM D 4751):	0.150mm (0.006")

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Areas where work is to be performed shall be cleared of all trees, shrubs, rubbish, and other objectionable material of any kind, which, if left in place, would interfere with the proper performance or completion of the contemplated work, would impair its subsequent use, or would form obstructions therein.

B. Organic material from clearing and grubbing operations will not be incorporated in the trench backfill and shall be removed from the project site or retained and incorporated into the topsoil.

3.02 PAVEMENT, CURB, AND SIDEWALK REMOVAL

Bituminous or concrete pavements, curbs, and sidewalks shall be removed and replaced in accordance with the requirements of the agency having jurisdiction.

3.03 DEWATERING

A. The Contractor shall provide and maintain at all times during construction ample means and devices to promptly remove and dispose of all water from any source entering excavations or other parts of the work.

B. Dewatering shall be performed by methods that will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Dewatering methods may include well points, sump points, suitable rock or gravel placed as pipe bedding for drainage and pumping, temporary pipelines, or other means, all subject to the approval of the District Engineer. The cost of all dewatering activities shall be borne by the Developer or Contractor.

C. Sewer systems shall not be used as drains for dewatering trenches or excavations, nor for disposal of collected or accumulated groundwater, without the approval of the agency of jurisdiction.

D. Concrete shall not be poured in water, nor shall water be allowed to rise around concrete or mortar until it has set at least four hours.

E. The Contractor is responsible for meeting all Federal, State, and local laws, rules and regulations regarding the treatment and disposal of water from dewatering operations at the construction site.

3.04 SHORING AND SHIELDING

A. The Contractor's design and installation of shoring shall be consistent with the rules, orders, and regulations of CAL-OSHA.

B. Excavations shall be shored, sheeted, and supported such that the walls of the excavation will not slide or settle and all existing improvements of any kind, either on public or private property, will be fully protected from damage.

C. The sheeting and shoring shall be arranged so as not to place any stress on portions of the completed work until the general construction has proceeded far enough to provide ample strength.

D. Care shall be exercised in the moving or removal of trench shields, sheeting, and shoring to prevent the caving or collapse of the excavation faces being supported.

3.05 CORRECTION OF OVEREXCAVATION

Overexcavations shall be corrected by backfilling with approved imported granular material or crushed rock, compacted to 90% relative compaction, as directed by the District Engineer.

3.06 FOUNDATION STABILIZATION

A. When unsuitable soil materials are encountered, the unsuitable material shall be removed to the depth determined necessary in the field by the Soils Technician, and as acceptable to the District Engineer. The sub-grade shall be restored with compacted Imported Granular Material or crushed rock as recommended by the Soils Technician. Place the appropriate bedding or base material on this restored foundation.

B. When rock encroachment is encountered, the rock shall be removed to a point below the intended trench or excavation sub-grade as determined necessary in the field by the Soils Technician, and as acceptable to the District Engineer. The sub-grade shall be restored with compacted Imported Granular Material as recommended by the Soils Technician. Place the appropriate bedding or base material on this restored foundation.

C. When excessively wet, soft, spongy, or similarly unstable material is encountered at the surface upon which the bedding or base material is to be placed, the unsuitable material shall be removed to the depth determined necessary in the field by the Soils Technician, and as acceptable to the District Engineer. Restore the trench with crushed rock enclosed in filter fabric as directed by the District Engineer. Larger size rocks, up to 75 mm (3"), with appropriate gradation, may be used if recommended by the Soils Technician. Place the appropriate bedding or base material on this restored foundation.

3.07 TRENCH EXCAVATION AND PLACEMENT OF BEDDING

A. Excavate the trench to the lines and grades shown on the drawings with allowance for 150mm (6") of pipe bedding material. The trench section shall be as shown on the Standard Drawings.

B. The maximum length of open trench shall be 152m (500') except by permission of the District, City or County. The distance is the collective length at any location, including open excavation and pipe laying, which has not been backfilled to the elevation of the surrounding grade.

C. Trench walls shall be sloped or shored per the requirements of CAL-OSHA.

D. The trench bottom shall be graded to provide a smooth, firm, and stable foundation that is free from rocks and other obstructions.

E. Place the specified thickness of bedding material over the full width of the trench. Grade the top of the pipe base ahead of the pipe laying to provide a firm, uniform support along the full length of pipe.

F. Excavate bell holes at each joint to permit proper assembly and inspection of the entire joint.

G. Trenches for main pipelines and all appurtenances shall be backfilled with the materials and methods as specified for the Pipe Zone, Trench Zone and Pavement Zone.

H. Trench widths shall be in accordance with the Standard Drawings.

I. Trench depth shall be as required to install pipelines in accordance with the Approved Plans and the Water Agencies' Design Guide. Unless shown otherwise on the Approved Plans, the minimum depth of cover for pipelines shall be as follows:

Pipeline Type	Minimum Cover Required
Potable Water	0.91m (36")
Recycled Water	1.22m (48")
Sewer	1.52m (60")

J. Final street sub-grade shall be established prior to the excavation of pipeline trenches. Minimum cover above pipe shall be 24" for hydrotesting.

3.08 MANHOLE AND VAULTS

A. The Contractor shall prepare an excavation large enough to accommodate the structure and permit grouting of openings and backfilling operations. The walls of the excavation shall be sloped or shored per the requirements of CAL-OSHA.

B. Manholes and vaults shall be placed at the location and elevation shown on the plans, on undisturbed soils and 150mm (6") of compacted crushed rock base.

C. Manhole and vault excavations shall be backfilled with the materials and methods as specified for the Pipe Zone, Trench Zone and Pavement Zone.

3.09 COMPACTION REQUIREMENTS

A. Compaction shall be accomplished by mechanical means. Consolidation by water settling methods such as jetting or flooding is prohibited.

B. If the backfill fails to meet the specified relative compaction requirements; the backfill shall be reworked until the requirements are met. All necessary excavations for density tests shall be made as directed by the Soils Technician, and as acceptable to the District Engineer. The requirements of the Agency having jurisdiction shall prevail on all public roads.

C. Compaction tests shall be performed at random depths, and at random intervals not to exceed 45m (150'), as directed by the Soils Technician or District Engineer.

D. Relative compaction shall be determined by the impact or field compaction test made in accordance with ASTM D 1557 Procedure C.

E. Unless otherwise shown on the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as follows:

1. Pipe zone - 90% relative compaction.

2. Trench zone - 90% relative compaction.

3. Structural section in paved areas - per agency requirements, 95% minimum.

4. Imported Granular Material for over excavation or foundation stabilization - 90% relative density.

F. All excavations are subject to compaction tests.

3.10 TRENCH PLUGS

Trench plugs shall be installed at 60m (200') intervals along the entire length of piping systems. Trench plugs shall be 3m (10') in length and shall encompass the entire pipe zone. Additional trench plugs may be required as directed by the District Engineer.

3.11 PIPE ZONE BACKFILL

A. Care shall be taken in placing the imported granular backfill material simultaneously around the main pipeline and appurtenance pipes so that the pipe barrel is completely supported and that no voids or uncompacted areas are left beneath the pipe or on the sides of the pipe. Care shall be taken to place material simultaneously on both sides of the pipe to prevent lateral movement. This area shall be mechanically compacted to attain 90% relative density. Care shall be taken when compacting appurtenance laterals 50mm (2”) and smaller to prevent the crushing or denting of the copper lateral. Additional lifts of 300mm (12") or less thickness may be required on 400mm (16") or larger diameter pipe to attain complete support of the haunch area. Soils tests may be taken on this layer of backfill.

B. After the spring line backfill has been approved by the Soils Technician, backfill of the remainder of the Pipe Zone may proceed. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe.

C. Place and compact the imported granular material at a maximum of 300mm (12”) lifts. Compact all material placed in the Pipe Zone by mechanical methods. Sand cone tests shall be taken on this layer of backfill.

D. The use of a backhoe-mounted compaction wheel is prohibited within the pipe zone to 300mm (12”) above the top of the pipe.

E. Under no circumstances shall consolidation by water settling or water-setting methods (i.e. jetting, diking, etc.) be permitted.

3.12 TRENCH ZONE BACKFILL

A. After the Pipe Zone material has been placed, compacted, approved by the Soil Technician and accepted by the District Engineer, backfill in the Trench Zone may proceed.

B. Compaction using vibratory equipment, tamping rollers, pneumatic tire rollers, or other mechanical tampers shall be performed with the type and size of equipment necessary to accomplish the work. The backfill shall be placed in horizontal layers of such depths as are considered proper for the type of compacting equipment being used in relation to the backfill material being placed. Each layer shall be evenly spread, properly moistened, and compacted to the specified relative density. The Contractor shall repair or replace any pipe, fitting, manhole, or structure damaged by the installation operations as directed by the District Engineer.

3.13 PAVEMENT ZONE BACKFILL AND RESTORATION

A. After the Trench Zone material has been placed, compacted, approved by the Soil Technician, and accepted by the District Engineer; backfill in the Pavement Zone may proceed as necessary in accordance with the requirements of the agency having jurisdiction.

B. Replace bituminous and concrete pavement, curbs, and sidewalks removed or damaged during construction in accordance with the requirements of the agency having jurisdiction.

END OF SECTION

SECTION 02223A ADDITIONS TO TRENCHING, EXCAVATION, BACKFILL AND COMPACTION

This Section 02223A makes additions, deletions or revisions to Section 02223 – Trenching, Excavation, Backfill and Compaction. All parts of Section 02223 that are not changed remain in full force and effect.

PART 1 - GENERAL

1.2 REFERENCE STANDARDS

For ASTM D 1557, replace the title with the following:

”Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort”.

Delete Test Method ASTM D 2922 and Test Method ASTM D 3017.

Delete the word “Woven” from the title of Test Method ASTM D 3776.

Replace the word “Plate” with “Table” in the title of Test Method ASTM D 4253.

Add the following:

ASTM D 6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.4 GEOTECHNICAL TESTING

Paragraph B, first sentence.

Replace “ASTM D 2922 & D3017” with:

ASTM D 6938

1.8 PROTECTION OF EXISTING UTILITIES AND FACILITIES

Delete “in accordance with Section 01000”

1.9 PROTECTION OF EXISTING LANDSCAPING

Delete “in accordance with Section 01000”

1.16 CHANGES IN LINE AND GRADE

Delete “in accordance with Section 01000”.

3.6 FOUNDATION STABILIZATION

Paragraph B, Add the following:

Classified rock excavation is defined as removal of solid rock, within the specified or indicated trench limits only, in ledges, bedded deposits, or un-stratified masses which by actual demonstration cannot be reasonably excavated with a Caterpillar 345C L Hydraulic Excavator with general duty rippers and rock points, in good condition or similar approved equipment. The term “rock excavation” shall be understood to indicate a method of removal and not a geological

formation. Boulders larger than one half (1/2) cubic yard will be classified as rock, if drilling and blasting are required and actually used for their removal. The demonstration may be waived if, in the Engineer's opinion, the material is obviously un-rippable.

3.13 PAVEMENT ZONE BACKFILL AND RESTORATION

Remove and replace Paragraph B with the following:

Replace bituminous and concrete pavement, curbs, sidewalks, and pavement striping removed or damaged during construction in accordance with the requirements of the agency having jurisdiction.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 03000 CAST - IN - PLACE CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION

This section describes materials and methods for formwork, reinforcement, mixing, placement, curing and repairs of concrete, and the use of cementitious materials and other related products. This section includes concrete, mortar, grout, reinforcement, thrust and anchor blocks, valve support blocks and manhole bases.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

ASTM A 185	-	Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
ASTM A 615/A 615M	-	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 150	-	Specification for Portland Cement
ASTM C 494	-	Specification for Chemical Admixtures for Concrete
ASTM C 881	-	Specification for Epoxy-Resin-Base Bonding Systems for Concrete
CRSI	-	Recommended Practice for Placing Reinforcing Bars
SSPWC	-	Standard Specifications for Public Works Construction "Greenbook"

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02223, 03461, 03462, 15000, 15041, 15044, 15056, 15061, 15064, 15074, 15102, 15108, 15112, and 15300.

1.04 APPLICATIONS

The following materials, referenced in other sections, shall be provided and installed in accordance with this specification for the applications noted below:

A. Concrete for thrust and anchor blocks for horizontal and vertical bends, ductile-iron or steel fittings, fire hydrant bury ells, support blocks for valves 100mm (4") and larger, collars, cradles, curbs, encasements, gutters, manhole bases, protection posts, sidewalks, splash pads, and other miscellaneous cast-in-place items, all in accordance with the Standard Drawings.

B. Hand-mixed concrete is permitted when the volume of concrete required is less than 0.76 cubic meters (1.00 cubic yards).

C. Mortar for filling and finishing the joints between manhole and vault sections and setting manhole grade rings and cover frames. Mortar may also be used for repairs of minor surface defects of no more than 6.35mm (¼") in depth or 12.7mm (½") in width on non-structural, cast-in-place items such as splash pads or concrete rings around manholes. (Note that large voids, structural concrete and pipe penetrations into vaults shall be repaired with non-shrink grout; repairs to precast manholes and vaults and cast-in-place manhole bases shall be repaired with an epoxy bonding agent and repair mortar, as outlined below.)

D. Epoxy bonding agent for bonding repair mortar to concrete on repairs to damaged surfaces of precast or cast-in-place concrete manholes and vaults.

E. Repair mortar for repair to damaged surfaces of precast or cast-in-place concrete manholes and vaults. An epoxy-bonding agent shall be used in conjunction with repair mortar.

F. Non-shrink grout for general-purpose repair of large construction voids, pipe penetrations into vaults and grouting of base plates for equipment or structural members.

G. Epoxy adhesives for grouting of anchor bolts.

H. Protective epoxy coating for application to reinforcing steel within existing concrete structures exposed during construction.

I. Damp-proofing for application to the exterior surfaces of concrete manholes and vaults located at or below the water table or where showing evidence of moisture or seepage, and as directed by the District Engineer.

1.05 DELIVERY, STORAGE, AND HANDLING

Deliver reinforcing steel to the site bundled and tagged with identification. Store on skids to keep bars clean and free of mud and debris. If contaminated, all bars shall be cleaned by wire brushing, sand blasting, or other means prior to being set in forms.

PART 2 MATERIALS

2.01 CONCRETE

A. All Portland cement concrete shall conform to the provisions of Sections 201, 202 and 303 of the Standard Specifications for Public Work Construction (Greenbook).

B. All applications shall use a minimum of Class 560-C-3250 concrete, unless otherwise directed by the District Engineer. Mix design requirements for 560-C-3250 concrete shall be in conformance with the latest edition of the Greenbook, Section 201. The maximum slump shall be 100mm to 150mm (4" to 6").

C. In certain circumstances, rapid-setting concrete may be required. Accelerating admixtures shall conform to ASTM C-494 and may be used in the concrete mix as permitted by the District Engineer. Calcium chloride shall not be used in concrete.

D. Hand mixed concrete materials type and proportions shall be submitted and approved by the District Engineer prior to application on site. The maximum slump shall be 100mm to 150mm (4” to 6”).

2.02 REINFORCING STEEL

A. Reinforcing steel shall conform to ASTM A 615, Grade 60.

B. Reinforcing steel shall be fabricated in accordance with the current edition of the Manual of Standard Practice, published by the Concrete Reinforcing Steel Institute.

2.03 WELDED WIRE REINFORCEMENT

Welded wire reinforcement shall conform to ASTM A 185.

2.04 TIE WIRE

Tie wire shall be 16-gage minimum, black, soft annealed.

2.05 BAR SUPPORTS

Bar supports in beams and slabs exposed to view after removal of forms shall be galvanized or plastic coated. Use concrete supports for reinforcing in concrete placed on grade.

2.06 FORMS

A. Forms shall be accurately constructed of clean lumber. The surface of forms against which concrete is placed shall be smooth and free from irregularities, dents, sags or holes.

B. Metal form systems may be used upon approval of the District Engineer. Include manufacturer's data for materials and installation with the request to use a metal form system.

2.07 MORTAR

Cement mortar shall consist of a mixture of Portland cement, sand and water. One part cement and two parts sand shall first be combined, and then thoroughly mixed with the required amount of water.

2.08 EPOXY BONDING AGENT

The epoxy bonding agent shall be an epoxy-resin-based product intended for bonding new mortar to hardened concrete and shall conform to ASTM C 881. The bonding agent shall be selected from the Approved Materials List.

2.09 REPAIR MORTAR

Repair mortar shall be a two-component, cement-based product specifically designed for

structurally repairing damaged concrete surfaces. The repair mortar shall exhibit the properties of high compressive and bond strengths and low shrinkage. A medium-slump repair mortar shall be used on horizontal surfaces, and a non-sag, low-slump repair mortar shall be used on vertical or overhead surfaces. Repair mortar shall be selected from the Approved Materials List.

2.10 NON-SHRINK GROUT

Non-shrink grout shall be a non-metallic cement-based product intended for filling general construction voids or grouting of base plates for equipment or structural members. The non-shrink grout shall exhibit the properties of high compressive and bond strengths and zero shrinkage, and shall be capable of mixing to a variable viscosity ranging from a dry pack to a fluid consistency as required for the application. The non-shrink grout shall be selected from the Approved Materials List.

2.11 EPOXY ADHESIVE

Epoxy adhesive shall be a high-modulus epoxy-resin-based product intended for structural grouting of anchor bolts and dowels to concrete. The epoxy adhesives shall conform to ASTM C 881. A pourable, medium-viscosity epoxy shall be used on horizontal surfaces, and a heavy-bodied, non-sag epoxy gel shall be used on vertical surfaces. The epoxy adhesives shall be selected from the Approved Materials List.

2.12 PROTECTIVE EPOXY COATING

The protective epoxy coating shall be an epoxy-resin-based product exhibiting high bond strength to steel and concrete surfaces, and shall conform to ASTM C 881. The protective epoxy coating shall be selected from the Approved Materials List.

2.13 DAMP-PROOFING FOR CONCRETE STRUCTURES

Damp-proofing material shall consist of two coats of a single-component self-priming, heavy-duty cold-applied coal tar selected from the Approved Materials List.

PART 3 EXECUTION

3.01 FORMWORK

A. The Contractor shall notify the District Engineer a minimum of one working day in advance of intended placement of concrete to allow for checking the form lines, grades, and other required items before placement of concrete.

B. The form surfaces shall be cleaned and coated with form oil prior to installation. The form surfaces shall leave uniform form marks conforming to the general lines of the structure.

C. The forms shall be braced to provide sufficient strength and rigidity to hold the concrete and to withstand the necessary fluid pressure and consolidation pressures without deflection from the prescribed lines.

D. Unless otherwise indicated on the plans, all exposed sharp concrete edges shall be 19mm

(¾") chamfered.

3.02 REINFORCEMENT

The following procedures apply to all cast-in-place concrete with the exception of thrust blocks and valve support blocks. No reinforcement is required for concrete thrust blocks or concrete valve support blocks.

A. Place reinforcing steel in accordance with the current edition of Recommended Practice for Placing Reinforcing Bars, published by the Concrete Reinforcing Steel Institute.

B. All reinforcing steel shall be of the required sizes and shapes and placed where shown on the drawings or as directed by the District Engineer.

C. Do not straighten or re-bend reinforcing steel in a manner that will damage the material. Do not use bars with bends not shown on the drawings. All steel shall be cold bent - do not use heat.

D. All bars shall be free from rust, scale, oil, or any other coating that would reduce or destroy the bond between concrete and steel.

E. Position reinforcing steel in accordance with the Approved Plans and secure by using annealed wire ties or clips at intersections and support by concrete or metal supports, spacers, or metal hangers. Do not place metal clips or supports in contact with the forms. Bend tie wires away from the forms in order to provide the concrete coverage equal to that required of the bars. If required by the District Engineer, the Contractor shall install bars additional to those shown on the drawings for the purpose of securing reinforcement in position.

F. Place reinforcement a minimum of 50mm (2") clear of any metal pipe, fittings, or exposed surfaces.

G. The reinforcement shall be so secured in position that it will not be displaced during the placement of concrete.

H. All reinforcing steel, welded wire reinforcement, and tie wire shall be completely encased in concrete.

I. Reinforcing steel shall not be welded unless specifically required by the Approved Plans or otherwise directed by the District Engineer.

J. Secure reinforcing dowels in place prior to placing concrete. Do not press dowels into the concrete after the concrete has been placed.

K. Minimum lap for all reinforcement shall be 40 bar diameters unless otherwise specified on the Approved Plans.

L. Place additional reinforcement around pipe penetrations or openings 150mm (6") diameter or larger. Replace cut bars with a minimum of 1/2 of the number of cut bars at each side of the opening, each face, each way, same size. Lap with the uncut bars a minimum of 40 bar diameters past the opening dimension. Place one same size diagonal bar at the four diagonals of the opening at 45° to the cut bars, each face. Extend each diagonal bar a minimum of 40 bar diameters past the opening dimension.

M. Welded wire reinforcement is to be rolled flat before being placed in the form. Support and

tie welded wire reinforcement to prevent movement during concrete placement.

N. Extend welded wire reinforcement to within 50mm (2") of the edges of slabs. Lap splices at least 1-1/2 courses of the reinforcement and a minimum of 150mm (6"). Tie laps and splices securely at ends and at least every 600mm (24") with 16-gage black annealed steel wire. Pull the welded wire reinforcement into position as the concrete is placed by means of hooks, and work concrete under the reinforcement to ensure that it is at the proper distance above the bottom of the slab.

O. Reinforcing steel as specified herein may be used in place of welded wire reinforcement shown in the Standard Drawings or on the Approved Plans with the approval of the District Engineer.

3.03 EMBEDDED ITEMS

All embedded items, including bolts, dowels and anchors, shall be held correctly in place in the forms before concrete is placed.

3.04 MORTAR MIXING

The quantity of water to be used in the preparation of mortar shall be only that required to produce a mixture sufficiently workable for the purpose intended. Mortar shall be used as soon as possible after mixing and shall show no visible sign of setting prior to use. Re-mixing of mortar by the addition of water after signs of setting are evident shall not be permitted.

3.05 MIXING AND PLACING CONCRETE

A. Hand mixed concrete mixing method shall be in accordance with SSPWC 201-1.4.4.

B. All concrete shall be placed in forms before taking its initial set.

C. No concrete shall be placed in water except with permission of the District Engineer.

D. As the concrete is placed in forms, or in rough excavations (i.e. thrust or anchor blocks), it shall be thoroughly settled and compacted throughout the entire layer by internal vibration and tamping bars.

E. All existing concrete surfaces upon which or against which new concrete is to be placed shall be roughened, thoroughly cleaned, wetted, and grouted before the new concrete is deposited.

3.06 CONCRETE FINISHING

A. Immediately upon the removal of forms, voids shall be neatly filled with cement mortar, non-shrink grout, or epoxy bonding agent and repair mortar as required for the application and as directed by the District Engineer.

B. The surfaces of concrete exposed to view shall be smooth and free from projections or depressions.

C. Exposed surfaces of concrete not poured against forms, such as horizontal or sloping surfaces, shall be screeded to a uniform surface, steel-toweled to densify the surface, and

finished to a light broom finish.

3.07 PROTECTION AND CURING OF CONCRETE

The Contractor shall protect all concrete against damage. Exposed surfaces of new concrete shall be protected from the direct rays of the sun by covering them with plastic film wrap and by keeping them damp for at least 7 days after the concrete has been placed, or by using an approved curing process. Exposed surfaces shall be protected from frost by covering with tarps for at least 5 days after pouring.

3.08 REPAIRS TO DAMAGED CONCRETE SURFACES

Minor surface damage to hardened cast-in-place or precast concrete may be repaired, at the discretion of the District Engineer, using the specified materials in accordance with the manufacturer's recommendations and the following procedures:

A. Cast-in-place or precast concrete for manholes and vaults: Remove loose or deteriorated concrete to expose a fractured aggregate surface with an edge cut to a ninety degree angle to the existing surface. Clean all debris from the area, apply a 0.5 mm (20 mil) coat of epoxy bonding agent to the prepared surface, and place repair mortar while the epoxy is still wet and tacky. On horizontal surfaces, for repair depths greater than 50mm (2"), add aggregate to the repair mortar as recommended by the manufacturer. On vertical or overhead surfaces, for repair depths greater than 50mm (2"), apply the repair mortar in successive lifts, scarifying the lifts, allowing them to harden, and applying a scrub coat of the material prior to proceeding with the next lift. Cure the material as for concrete in accordance with this specification.

B. General Purpose: Remove loose and deteriorated concrete by mechanical means, sandblasting or high-pressure water blasting. Clean all debris from the area and apply non-shrink grout in a 6.35mm (¼") minimum thickness, at the desired consistency, ranging from a dry pack, to a fluid-poured into a formed area, according to the application. Cure the material as for concrete in accordance with this specification.

3.09 EPOXY ADHESIVES FOR ANCHOR BOLT INSTALLATION

Anchor bolts grouted in place with an epoxy adhesive shall be installed using the specified materials in accordance with the manufacturer's recommendations and the following general procedures: Drill the hole with a rotary percussion drill to produce a rough, unpolished hole surface. The hole shall be sized to the manufacturer's recommendations and should be approximately 6.35mm (¼") wider than the diameter of the bolt, with a depth equal to 10 to 15 times the bolt diameter. Remove debris and dust with a stiff bristle brush and clean using compressed air. Utilizing a medium-viscosity epoxy for horizontal surfaces, and a gel-type non-sag epoxy for vertical surfaces, apply the material to fill the hole to approximately half its depth. Insert the bolt, forcing it down until the required embedment depth and projection length are attained and then twist the bolt to establish a bond. Secure the bolt firmly in place in the permanent position until the epoxy sets.

3.10 PROTECTIVE EPOXY COATING

Following core drilling at existing concrete structures, clean the exposed concrete surface and ends of reinforcing steel and apply two coats of protective epoxy coating for a total dry film thickness of 0.254 - 0.381mm (10 –15 mils). Allow the material to cure between coats and prior to continuing the installation through the penetration.

3.11 DAMP-PROOFING FOR THE EXTERIOR OF CONCRETE STRUCTURES

Following completion of the exterior surfaces of manholes and vaults, including necessary repairs and piping penetrations into the structure, apply the specified material to prepared concrete surfaces in accordance with the manufacturer's recommendations. The surfaces to be coated shall be fully cured and free of laitance and contamination. The material shall be applied to all exterior surfaces below a point 300mm (12") above the water table or indications of seepage or moisture as directed by the District Engineer. Apply two 0.381mm (15 mil) coats, curing between coats, prior to backfill and/or immersion in accordance with the manufacturer's recommendations.

3.12 THRUST AND ANCHOR BLOCKS

The Design Engineer shall be responsible for sizing all thrust blocks and anchor blocks required for the project in accordance with the requirements of the Water Agencies' Design Guide

A. Thrust Block Placement: Thrust blocks shall be located at all unrestrained pipe fittings and shall bear against firm, undisturbed soil. The thrust blocks shall be centered on the fitting so that the bearing area is exactly opposite the resultant direction of the thrust (refer to the Standard Drawings). Thrust block concrete shall not hinder maintenance access to the valve operators. The shape and location of all thrust block excavations shall be approved by the District Engineer prior to pouring concrete. Prior to filling the pipeline with water, concrete thrust blocks shall cure for a minimum of three (3) days unless an approved accelerating admixture, as described earlier in this section, is used.

B. Anchor Block Placement: For all vertical bends in pipelines (downward bends) that do not have restrained joints, the fittings shall be retained in place by means of an anchor block. Prior to filling the pipeline with water, concrete anchor blocks shall cure for a minimum of seven (7) days. Accelerating admixtures shall not be used in concrete anchor blocks.

3.13 VALVE SUPPORT BLOCKS

Valve support blocks shall be installed as described below and in accordance with the Standard Drawings:

A. Support blocks below valves shall be cut into the side of the trench a minimum of 300mm (12").

B. Support blocks shall extend up to the height of adjoining pipe and shall have a minimum depth below the valve of 300mm (12").

C. Support blocks shall be installed so that the valves will be accessible for repairs.

END OF SECTION

SECTION 03000A ADDITIONS TO CAST-IN-PLACE CONCRETE

This Section 03000A makes additions, deletions or revisions to Section 03000 Cast-in-Place Concrete. All parts of Section 03000 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 THRUST BLOCKS AND ANCHOR BLOCKS

Thrust blocks and anchor blocks, and all appurtenant Work, for water mains 12 inches and smaller shall be included in the Bid items for the water main work.

Thrust anchors for 16 inch and 18 inch water mains shall be included in the Bid items “Thrust Anchor for 16” Water Main” and “Thrust Anchor for 18” Water Main,” and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 09910 FIELD PAINTING AND COATING

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials and field application of painting and coating systems for exposed surfaces.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C 210	-	Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
AWWA C 218	-	Liquid Coating Systems for the Exterior of Aboveground Steel Water Pipelines and Fittings
SSPC	-	Steel Structure Painting Council

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02223, 09915, 15000, 15041, 15044, 15056, 15061, 15064, 15065, 15074, 15102, 15108, 15112, and 15300.

1.04 RESTRICTION ON CONTACT WITH POTABLE WATER

A. Under no circumstances shall paint materials specified in this Section be used where they may come in contact with the public water supply or for buried installations. These products are intended for exposed exterior use only.

B. Painting and coating materials in contact with potable and recycled water or for buried installations shall be in accordance with Section 15000.

1.05 QUALITY CONTROL

A. Notify the District 48 hours in advance of field operations involving surface preparation and coating application.

B. The District will inspect shop-and field-prepared surfaces. The Contractor shall not proceed with paint application until the surface preparation has been approved by the District Engineer.

C. The District will inspect application of all prime, intermediate, finish, and touch-up coatings to verify the integrity of the coating and compliance with the specifications. Each coating application will be checked and deficiencies marked. Items exhibiting an improper finish or color, or insufficient surface preparation or dry film thickness shall be prepared as necessary and corrected, utilizing the specified paint materials to obtain compliance.

1.06 SURFACES NOT TO BE FIELD PAINTED

A. Generally, the following items or materials are not to be field painted unless specifically required elsewhere in the specifications:

1. Buried mortar-coated pipe and fittings.

2. Stainless steel.

3. Interior surfaces of valves, fittings and pipe.

4. Nameplates.

5. Grease fittings.

6. Brass, copper, bronze, or galvanized items except as required for recycled water system identification.

7. Buried pipe and appurtenances except as required in the piping specifications.

1.07 COLOR AND PAINT SYSTEM SCHEDULE

The following tables designate the color and paint system that shall be used on the District's various potable water and recycled water facilities.

Potable Water:

ITEM	COLOR	PAINT SYSTEM
Fire Hydrant	Safety Yellow	Acrylic or Epoxy/Urethane
Blow Off Box Lids	Safety Yellow	Acrylic Traffic Paint
Gate Well Lids	Safety Yellow	Acrylic Traffic Paint
Gate Well Lids - Fire Hydrant Valves	White	Acrylic Traffic Paint
Gate Well Lids - Normally Closed Valves	Safety Red	Acrylic Traffic Paint
Air/Vac Assemblies	Safety Yellow	Acrylic or Epoxy/Urethane
Air/Vac Enclosures	Chocolate Brown	Fusion Bonded Polyester (Section 09915)
Water Test Station Enclosures	Chocolate Brown	Fusion Bonded Polyester (Section 09915)
Protector Posts	Safety Yellow	Acrylic or Epoxy/Urethane
Vault Piping	Per Agency	Acrylic or Epoxy
Above Ground Piping	Per Agency	Acrylic or Epoxy/Urethane

Recycled Water:

ITEM	COLOR	PAINT SYSTEM
Gate Well Lids	Safety Purple	Acrylic Traffic Paint
Gate Well Lids – Normally Closed Valves	Safety Red	Acrylic Traffic Paint
Air/Vac Assemblies	Safety Purple	Acrylic or Epoxy/Urethane
Air/Vac Enclosures	Safety Purple	Fusion Bonded Polyester (Section 09915)
Water Test Station Enclosures	Safety Purple	Fusion Bonded Polyester (Section 09915)
Protector Posts	Safety Yellow	Acrylic or Epoxy/Urethane
Vault Piping	Safety Purple	Acrylic or Epoxy
Above Ground Piping	Safety Purple	Acrylic or Epoxy/Urethane

PART 2 MATERIALS

2.01 GENERAL

A. Coating products and colors shall be selected from the tables above and the Approved Materials List.

B. All materials of a specified paint system(s), including prime, intermediate, finish, and touch-up coats shall be provided by the same manufacturer.

C. Thinners, cleaners, driers and other additives shall be as recommended by the coating manufacturer for the specified paint system(s) and shall be approved by the District Engineer.

D. All coating products shall be delivered to the job site in original and unopened containers.

2.02 EPOXY PAINT SYSTEM

Prime, Intermediate, Finish and Touch-Up Coats: VOC-compliant, two-component, chemically cured epoxy.

2.03 EPOXY/URETHANE PAINT SYSTEM

Prime and Intermediate Coats: Field-applied, VOC-compliant, surface tolerant, two-component, chemically cured epoxy.

Finish and Touch-Up Coats: Field-applied, VOC-compliant, two-component, chemically cured aliphatic urethane semi-gloss enamel.

2.04 ACRYLIC PAINT SYSTEM

Acrylic Paint System may be either solventborne or waterborne as described below:

A. Solventborne Acrylic Paint System:

1. Prime, Intermediate, Finish and Touch-Up Coats: Field-applied, VOC-compliant, solventborne acrylic paint.

B. Waterborne Acrylic Paint System:

1. Prime, Intermediate, Finish and Touch-Up Coats: Field-applied, VOC compliant, waterborne acrylic paint.

2.05 ACRYLIC TRAFFIC PAINT SYSTEM

Prime and Finish Coats: Field-applied, VOC-compliant, rapid-drying, weather and abrasion resistant waterborne acrylic paint containing 100% solids by volume.

2.06 PAINT COLORS

A. Safety Yellow, Safety Purple and Safety Red paint colors shall be as specified in Federal OSHA regulations.

B. White paint color shall be as specified by the California Department of Transportation for striping.

C. Chocolate Brown paint color shall be as specified in Section 09915.

D. Successive coats of each paint color shall be of a slightly different shade, as directed by the District Engineer, to facilitate the inspection of surface coverage of each coat. The true colors specified above shall be used for all Finish and Touch-up coats.

PART 3 EXECUTION

3.01 LIMITATIONS TO THE APPLICATION OF COATINGS

A. Apply coatings in accordance with the manufacturer's recommendations. Do not apply coatings under adverse weather conditions. If any of the following minimum conditions are present, the application of coatings shall be delayed or postponed until conditions are favorable.

1. During rain, fog, or mist, or when the relative humidity exceeds 80 percent.

2. When the surface to be coated is wet, moist, or contaminated with any foreign matter.

3. When the surrounding air temperature or the temperature of the surface to be coated is below 13° C (55° F).

4. When the temperature of the surface to be coated is more than 2.8° C (5° F) below the air temperature or when the surface temperature is 49 C (120° F) or above.

5. When the surface temperature is less than 2.8° C (5° F) above the dew point or is expected to be so within twelve hours after application of coating.

B. If a change in weather conditions results in damage to a newly applied coating, restore the affected coatings to their specified condition as directed by the District Engineer.

3.02 PROTECTION OF SURFACES NOT TO BE PAINTED

Remove, mask, or otherwise protect hardware, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, nameplates and other surfaces not intended to be painted. Protect working parts of mechanical and electrical equipment from damage during surface preparation and the painting process. Provide drop cloths or masking to prevent paint materials from dripping or accumulating on adjacent surfaces.

3.03 FIELD TOUCH-UP OF SHOP-APPLIED PRIME COATS

A. Prior to field touch-up, prepare the surface in accordance with the manufacturer's recommendations and as directed by the District Engineer.

B. Reapply primer as required to cover all scratched, abraded, or deficient areas.

3.04 SURFACE PREPARATION

A. Do not prepare more surface area than can be coated in the same workday.

B. Surface preparation shall conform to the SSPC specifications as follows:

Solvent Cleaning	SP-1
Hand Tool Cleaning	SP-2
Power Tool Cleaning	SP-3
White Metal Blast Cleaning	SP-5
Commercial Blast Cleaning	SP-6
Brush-Off Blast Cleaning	SP-7
Pickling	SP-8
Near-White Blast Cleaning	SP-10
Power Tool Cleaning to Bare Metal	SP-11

C. Wherever the words "solvent cleaning", "hand tool cleaning", "wire brushing", "blast cleaning" or similar words are used in these specifications or in paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC Surface Preparation Specifications listed above.

D. Surface preparation shall be as specified herein, or as directed by the District Engineer.

E. Unless otherwise directed by the District, do not blast-clean items that have previously been factory primed or painted.

3.05 PROCEDURES FOR APPLICATION

A. Conform to the requirements of SSPC-PA 1, Shop, Field, and Maintenance Painting. Follow the recommendations of the coating manufacturer, if more restrictive, including the selection of spray equipment, brushes, rollers, mixing, drying time, temperature and humidity limitations during application, and safety precautions. The Engineer will review procedures for the application of coatings. The Engineer's decision will be final as to interpretation and/or conflict between these Specifications and the recommendations of the coating manufacturer.

B. Stir, strain, and keep coating materials at a uniform consistency during application. Where the Engineer permits thinning, do not reduce the coating material more than is necessary to obtain the proper application characteristics and to obtain the specified dry film thickness. Do not exceed the maximum thinning rate allowed by the manufacturer. Stir coating materials at all times when adding thinner.

C. Apply each layer of coating evenly, free from brush marks, sags, runs, bridges, shiners, laps or other imperfections or other evidence of poor workmanship. Visible areas of chipped, peeled, or abraded paint shall be hand or power-sanded, feathering the edges. The areas shall then be primed and finish coated in accordance with the specifications. Finished surfaces shall be free from defects and blemishes prior to final acceptance.

3.06 EPOXY PAINT SYSTEM APPLICATION

A. Surface preparation for the Epoxy Paint System shall be in accordance with SSPC-SP-6, Commercial Blast Cleaning. If Commercial Blast Cleaning is not feasible, prepare surfaces in accordance with SSPC-SP-11, Power Tool Cleaning to Bare Metal.

B. The Epoxy Paint System shall consist of an epoxy prime coat, an epoxy intermediate coat, and epoxy finish coat(s) to provide a total dry film thickness of 9 mils to 15 mils. Apply the coatings in accordance with the manufacturer's recommended film thickness, adding finish coats as necessary to meet the minimum total dry film thickness specified above.

C. Observe minimum and maximum re-coat times and specified by the manufacturer. If these times are exceeded, the surface shall be re-prepared as recommended by the manufacturer and as directed by the District Engineer prior to receiving additional coats.

3.07 EPOXY/URETHANE PAINT SYSTEM APPLICATION

A. Surface preparation for the Epoxy/Urethane Paint System shall be in accordance with SSPC-SP-6, Commercial Blast Cleaning. If Commercial Blast Cleaning is not feasible, prepare surfaces in accordance with SSPC-SP-11, Power Tool Cleaning to Bare Metal.

B. The Epoxy/Urethane Paint System shall consist of an epoxy prime coat, an epoxy intermediate coat, and compatible urethane finish coat(s) to provide a total dry film thickness of 9 mils to 15 mils. Apply the coatings in accordance with the manufacturer's recommended film thickness, adding finish coats as necessary to meet the minimum total dry film thickness specified above.

C. Observe minimum and maximum re-coat times and specified by the manufacturer. If these times are exceeded, the surface shall be re-prepared as recommended by the manufacturer and as directed by the District Engineer prior to receiving additional coats.

3.08 ACRYLIC PAINT SYSTEM

A. Surface preparation for the Acrylic Paint System shall be in accordance with SSPC-SP-6, Commercial Blast Cleaning. If Commercial Blast Cleaning is not feasible, prepare surfaces in accordance with SSPC-SP-11, Power Tool Cleaning to Bare Metal.

B. The Acrylic Paint System shall consist of an acrylic prime coat, an acrylic intermediate coat, and acrylic finish coat(s) to provide a total dry film thickness of 9 mils to 15 mils. Apply the coatings in accordance with the manufacturer's recommended film thickness, adding finish coats as necessary to meet the minimum total dry film thickness specified above.

C. Observe minimum and maximum re-coat times and specified by the manufacturer. If these times are exceeded, the surface shall be re-prepared as recommended by the manufacturer and as directed by the District Engineer prior to receiving additional coats.

3.09 ACRYLIC TRAFFIC PAINT SYSTEM

A. Surface preparation for the Acrylic Traffic Paint System shall be in accordance with SSPC-SP-6. , Commercial Blast Cleaning. If Commercial Blast Cleaning is not feasible, prepare surfaces in accordance with SSPC-SP-11, Power Tool Cleaning to Bare Metal.

B. The Acrylic Traffic Paint System shall consist of a rapid-drying acrylic prime coat and a rapid-drying acrylic finish coat to provide a total dry film thickness of 6 mils to 10 mils.

C. Observe minimum and maximum re-coat times and specified by the manufacturer. If these times are exceeded, the surface shall be re-prepared as recommended by the manufacturer and as directed by the District Engineer prior to receiving additional coats.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 13110 CATHODIC PROTECTION AND JOINT BONDING

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials, testing and installation of corrosion protection and monitoring systems for metallic pipes including insulating flange kits, test stations, copper/copper sulfate reference electrodes, sacrificial anodes, wiring, and exothermic welds.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA	C217 -	Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines
ASTM	D 1248 -	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials for Wire and Cable
NACE	SP0286 -	The Electrical Isolation of Cathodically Protected Pipelines
NACE	RP0375 -	Application and Handling of Wax-Type Protective Coatings and Wrapper Systems for Underground Pipelines

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02223, 03000, 15000, 15056, 15057, and 15061.

1.04 SUBMITTALS

Submit manufacturer's catalog data on wire and cable, copper sulfate reference electrodes, test stations, conduit, exothermic weld molds and charges, pipe flange insulation kits, pipe flange internal coating, wax tape system, plastic warning tape, sacrificial anodes, and any other required materials.

1.05 MANUFACTURERS

All materials furnished under this specification shall be standard products from manufacturers regularly engaged in the manufacture of such products and shall be the manufacturer's latest design that complies with the specification requirements.

1.06 PIPE JOINT BONDING CABLES

Electrical continuity bonding cables shall be installed across all buried or submerged metallic inline valves, flexible couplings, grooved couplings, pipe joints that are not circumferentially welded, and all other pipe joints except flange joints equipped with insulation gaskets. Where shown on the drawings, bonding cables shall be installed in vaults.

1.07 GALVANIC ISOLATION

All threaded outlets shall incorporate the use of an insulated ball valve for galvanic isolation of stray current.

Threaded outlets may incorporate the use of a nylon isolation bushing for galvanic isolation only with the approval of the District Engineer. Where the use of nylon bushings is required, the threaded outlet shall be increased in size to accept the bushing.

1.08 WARNING/IDENTIFICATION TAPE

All cathodic protection test wires, cables and conduit shall include Warning/Identification Tape in accordance with Section 15000.

PART 2 MATERIALS

2.01 GENERAL

Items in this section shall be selected from the Approved Materials List in accordance with the Standard Drawings.

2.02 TEST STATION BOXES

Cathodic test station boxes shall be circular precast concrete boxes with ductile-iron covers selected from the Approved Materials List

2.03 PREPACKAGED COPPER SULFATE REFERENCE ELECTRODE

A. Copper sulfate reference electrodes shall be constructed with an ion trap to prevent contamination. The reference electrode shall have a design life of 15 years and a stability of +/- 5 millivolts under a 3.0 microampere load.

B. Provide reference electrodes with minimum No. 10 AWG HMW/PE (yellow) insulated wire. Each lead wire shall be long enough to extend to the corrosion monitoring test box plus 450mm (18") of slack without splices.

C. Reference electrodes shall be prepackaged in a permeable cotton cloth bag with low resistivity backfill mixture to protect against the "drying out" type of failure. The backfill mixture shall be composed of 50% Gypsum and 50% Powdered Bentonite.

2.04 PREPACKAGED MAGNESIUM ANODES

Prepackaged magnesium anodes shall be used in low current demand applications. The amount and size of magnesium anodes shall be as shown on the Approved Plans, and shall be installed in accordance with the Standard Drawings.

A. Prepackaged magnesium anodes shall have galvanized steel rod cores encased in magnesium ingots. The ingot portion of anodes shall be of the weight as required on the Approved Plans.

B. Provide magnesium anodes with minimum No. 8 AWG HMW/PE (black) insulated wire. Each lead wire shall be long enough to extend to the corrosion monitoring test box plus 450mm (18") of slack without splices.

C. Magnesium anodes shall be prepackaged in a permeable cloth bag with low resistivity backfill mixture and shall be selected from the Approved Materials List.

2.05 SACRIFICIAL ANODES FOR COPPER TUBING

Prepackaged zinc sacrificial anodes shall be installed and connected to copper tubing where indicated on the Approved Plans. Anodes shall be selected from the Approved Materials List and shall be installed in accordance with the Standard Drawings.

A. Prepackaged zinc sacrificial anodes shall include a zinc-alloy ingot with galvanized steel core weighing not less than 6.8 kg (15 lbs.) and shall be packed in cloth bags filled with a mixture of gypsum and bentonite.

B. Prepackaged zinc sacrificial anodes shall include an integral anode lead connected to the galvanized steel core of the ingot consisting of No. 12 AWG stranded copper wire with (black) THW insulation. Anode lead wires shall be a minimum of 7.62 m (25') long.

2.06 TEST CABLE AND BONDING CABLE

All test cable and bonding cable shall be stranded copper wire with insulation rated at 600 volts. Cable with cut or damaged insulation is not acceptable. All cable shall be of sufficient length to extend from the point of connection to the appropriate corrosion monitoring test box without splices.

The cable shall have a 2.8mm (7/64") thick, high molecular weight polyethylene (HMW/PE) insulation specifically designed for cathodic protection service and suitable for direct burial in corrosive soil or water, conforming to ASTM D 1248, Type I, Class C, Category 5 (HMW/PE Type CP) Grade E-5 or J-1. Test cable shall have at least 450mm (18") of slack in the test box. Testing and/or bonding cable size shall be No. 6 AWG HMW/PE in accordance with the Standard Drawings.

2.07 PIPE FLANGE INSULATING KITS

All pipe flange-insulating materials shall be of the type designated by the manufacturer as suitable for service at the operating temperatures and pressures of the pipeline.

A. Insulating gaskets shall be full-face dielectric neoprene-faced phenolic.

B. Insulating sleeves shall be full-length phenolic

C. Insulating washers shall be phenolic.

D. Steel bolts, nuts, and washers shall be in accordance with Section 15000.

2.08 ADDITIONAL SMOOTH EPOXY LINING AT INSULATED PIPE FLANGES

In addition to the cement mortar lining, the interior of the pipe at all insulated flanges shall be coated with a two-part smooth white liquid epoxy consisting of 100 percent solids.

2.09 TAPE WRAP FOR ABOVEGROUND INSULATED PIPE FLANGES

All aboveground insulated pipe flanges shall be wrapped with minimum 0.36mm (14 mil) thick general utility pipeline tape in accordance with the Approved Materials List.

2.10 WAX TAPE COATING FOR BURIED INSULATED PIPE FLANGES

All buried insulated pipe flanges shall be coated with a three-part, cold-applied wax tape coating system as described by NACE RPO375 and AWWA C217 in accordance with the Approved Materials List. Wax tape is also required where indicated on the Approved Plans.

A. Primer: Primer shall be a blend of petrolatums, plasticizers and corrosion inhibitors having a paste-like consistency. The primer shall have the following properties:

Color	Brown
Pour Point	37.8º C - 43.3º C (100º -110º F)
Flash Point	176.7º C (350º F)
Coverage	0.41 L/M^2 (1 gal/100 sq. ft.)

B. Wax Tape: Wax tape shall consist of a plastic-fiber felt, saturated with a blend of petrolatums, plasticizers, and corrosion inhibitors, forming a tape coating that is easily form-able over irregular surfaces. The tape shall have the following properties:

Color	Brown
Saturant Pour Point	46.1º C - 48.9º C (115º - 120º F)
Thickness	1.27 - 1.78 mm (50 - 70 mils)
Tape Width	150mm (6")
Dielectric Strength	170 volts/mil

C. Tape Outerwrap: Wrapper shall be a polyvinylidene chloride plastic with three 50-gauge plies wound together as a single sheet. The wrapper shall have the following properties:

Color	Clear
Thickness	0.0381 mm (1.5 mils)
Dielectric Strength	2000 volts/mil
Tape Width	150mm (6")
Water Absorption	Negligible

2.11 EXOTHERMIC WELD MOLDS AND WELD CHARGES

Wire-to-pipe connections shall be made using exothermic welds. Weld charges and mold sizes for various surface configurations and materials shall be in accordance with the manufacturer's recommendations.

2.12 REPAIR GROUT FOR EXOTHERMIC WELDS

Repair grout shall be in accordance with cement-mortar grout described in Section 15061.

2.13 BRASS IDENTIFICATION TAGS

All wires terminating in CP Test Boxes shall be identified with brass tags securely attached to the wires with nylon fasteners. The tags shall be 38mm (1½") in diameter, 1.6mm (1/16") thick, and shall be die-stamped with identifying letters and numbers 6.4mm (¼") high.

2.14 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and the Approved Materials List.

2.15 CONCRETE

Concrete shall be in accordance with Section 03000.

PART 3 EXECUTION

3.01 CORROSION MONITORING TEST STATIONS

All test stations shall be installed behind existing or proposed curbs or otherwise out of traffic lanes to allow safe access for personnel during testing in accordance with the Standard Drawings. A utility marker post shall be installed, in accordance with the Standard Drawings, when indicated on the Approved Plans.

3.02 EXOTHERMIC WELDS

All cable-to-pipe connections shall be made using exothermic welds in accordance with the Standard Drawings.

A. Preparation of Cable: Cut cable with a wire cutter to prevent deforming the cable ends. Remove only enough insulation from the cable to allow the weld connection to be made.

B. Preparation of Pipe: The surface of the steel or ductile-iron pipe shall be ground or filed to a bright, shiny, clean and dry surface before welding the cable connection. For cement-mortar coated pipe, a nominal 75mm x 75mm (3" x 3") area of cement mortar shall be chipped off.

C. Attachment of Cable to Structure: The attachment of the cable to the structure shall be made using an exothermic weld. The cable shall be held at a 30º to 45º angle to the surface when welding. Only one cable shall be attached with each weld. All cable-to-pipe welds shall be a minimum of 75mm (3") apart. All weld slag shall be removed from the weldment with a wire brush.

D. Weldment Test: After the exothermic weld has cooled, the weld shall be tested by the Contractor for strength, in the presence of the District Engineer, by striking the weldment a sharp blow with a 0.91 Kg (2 lb.) hammer while pulling firmly on the cable. All unsound welds

shall be re-welded and retested.

E. Repair Grout: The area to be repaired shall be thoroughly clean and dry. Cement-mortar coating shall be repaired or replaced to original condition by hand-placing cement-mortar repair grout as directed by the District Engineer.

3.03 PIPE FLANGE INSULATING KITS

Pipe flange insulating kits shall be installed at the locations shown on the Approved Plans and in accordance with the Standard Drawings and the manufacturer's recommendations. Insulation shall also conform to the National Association of Corrosion Engineers' Recommended Practice RPO286 "Electrical Isolation of Cathodically Protected Pipelines". Particular attention shall be paid to properly align the pipe flanges prior to inserting the bolts with insulating sleeves to prevent cutting of the sleeves and creating an electrical path when the bolts are tightened. Care shall be taken to prevent any moisture, soil, or other foreign matter from contacting any portion of the two mating pipe flanges or gaskets prior to or during installation. If any foreign matter contacts any portion of the insulated pipe flange, the entire pipe joint shall be disassembled, cleaned with a suitable solvent and dried prior to reassembly. Strictly follow the manufacturer's recommendations regarding the torque pattern of the bolts and the amount of torque to be used when installing the pipe flange insulating kit. Conductive grease shall not be used on the flange bolts or any other flange components under any circumstances. Refer to Field Testing below for testing of the flange insulation kits.

3.04 ADDITIONAL SMOOTH EPOXY LINING AT INSULATED PIPE FLANGES

At locations indicated on the Approved Plans or as directed by the District Engineer, an additional two-part smooth epoxy lining shall be applied. The interior of the pipe and flanges shall be coated with the two-part smooth epoxy for a distance of two pipe diameters in each direction away from the insulated pipe flange.

A. Surface Preparation: The surface preparation shall consist of wire brushing to remove all rust and scale and to provide a suitable surface for adhesion of the coating in accordance with the manufacturer's recommendations.

B. Mixing the Coating: The two-part epoxy paint shall be mixed per the manufacturer's recommendations. The two-part epoxy shall be mixed thoroughly for at least two minutes by hand or with a mechanical mixer before being applied by brush.

C. Applying the Coating: The application of the undiluted coating shall be made by brushing until a minimum dry film thickness (DFT) of 0.51mm (20 mil) is achieved. Each subsequent coat shall be applied before the preceding coat cures, which is normally within 3-6 hours. The application of the coating shall be per the guidelines and at the rate recommended by the coating manufacturer.

3.05 WAX-TAPE COATING FOR BURIED INSULATED PIPE FLANGES

After continuity testing, all flange and pipe surfaces shall be clean and free of all dirt, grease, water or other foreign material prior to the application of the primer, wax tape, and tape outerwrap.

A. Apply primer by hand or brush to all surfaces of the flanges. Work the primer into all crevices, around bolts and nuts, and completely cover all exposed metal surfaces. Extend the primer a minimum of 75mm (3") onto adjacent surfaces of the pipe or valve.

B. Apply the wax tape immediately after the primer application. Cut short lengths of tape and

place completely around each bolt head and nut. Work the tape into the crevices around the bolts and nuts. Wrap the wax tape spirally around the pipe and across the flanges to the other pipe or valve. Cover the entire primed area with wax tape using a minimum overlap of 55% of the tape width. Work the tape into the crevices and contours of the irregular shaped surfaces and smooth out so that there is a continuous protective layer with no voids or spaces under the tape.

C. Apply the tape outerwrap to the completed wax tape installation. Wrap spirally around the pipe and across the flanges. Extend the plastic wrap 75mm (3") past the wax tape using a minimum overlap of 55% of the plastic material width to apply two layers of overwrap.

3.06 PREPACKAGED MAGNESIUM ANODES

A. Prepackaged magnesium anodes shall be placed a minimum of 1.5m (5') below the pipe in the trench or an augured hole. Anodes will be a minimum of 12' from finish surface unless otherwise indicated on the approved plans. Soaking of the anode is not required. Installation shall be in accordance with the Standard Drawings.

B. Over-excavated trenches or augured holes in which anodes are placed shall be backfilled with select native material from which rock or other materials larger than 25mm (1") in diameter have been removed. Over-excavated trenches shall be backfilled with native materials up to the bottom of the new water main, which shall then be backfilled with select material in accordance with these Standard Specifications. Anode and native backfill shall be thoroughly wetted after installation.

3.07 SACRIFICIAL ANODES FOR COPPER TUBING

Prepackaged zinc sacrificial anodes shall be installed in accordance with the Standard Drawings.

A. Anode Location:

1. Anodes to be attached to new copper tubing installed by trenching shall be installed horizontally, and shall be located within the paved roadway approximately 1.52m (5') to 3.05m (10') from the edge of the roadway. New copper tubing trench shall be over-excavated at anode location to a depth necessary to provide 600mm (24") minimum vertical separation between new copper tubing and anode.

2. Anodes to be attached to existing copper tubing or to new copper tubing to be installed by boring shall be installed vertically in a 1.22m (4') deep, 200mm (8") minimum diameter augured hole located adjacent to the meter box.

3. Anodes to be attached to existing copper tubing in conjunction with the replacement of existing pipelines shall be installed horizontally, and shall be located within the new water main trench below the new water main. New water main trench shall be over-excavated directly below locations where new water main is to be connected to existing copper tubing to a depth necessary to provide 600mm (24") minimum vertical separation between copper tubing and anode.

B. Anodes shall be hand-placed into over-excavated trenches or augured holes. Anodes shall be handled with care and shall not be carried, suspended or dropped by holding the attached lead wire.

C. Anode Attachment:

1. Anodes to be installed within new copper tubing trenches or within augured holes as described above and intended for the protection of service laterals shall be attached to copper tubing within meter boxes. Anode lead wire shall be securely attached to the copper tubing between anode and meter box, 600mm (24") of excess wire shall be coiled above ground within the meter box and remaining wire shall be cut. 50mm (2") of insulation shall be removed from end of anode lead wire and bare wire shall be clamped to the vertical portion of the copper tubing lying immediately below the angle meter stop. Clamp shall be entirely brass or copper, selected from the Approved Materials List. Connection point must be waterproof and shall be securely wrapped with dielectric tape selected from the Approved Materials List.

2. Anodes to be installed within new copper tubing trenches or within augured holes as described above and intended for the protection of copper tubing for air valves shall be attached to copper tubing within air valve enclosures. Anode lead wire shall be installed through concrete air valve slab within 25mm (1") PVC sleeve, and 600mm (24") of excess wire shall be coiled and placed within the sleeve. 50mm (2") of insulation shall be removed from end of anode lead wire and bare wire shall be clamped to copper tubing 75mm (3") above concrete slab. Clamp shall be entirely brass or copper, selected from the Approved Materials List. Connection point must be waterproof and shall be securely wrapped with dielectric tape selected from the Approved Materials List.

3. Anodes to be installed within new water main trenches as described above and intended for the protection of existing copper tubing shall be clamped to copper tubing at a point approximately 25mm (3") from the corporation stop. Connection point shall be backfilled along with the new water main, and no excess wire is required. Clamp shall be entirely brass or copper, selected from the Approved Materials List. Connection point must be waterproof and shall be securely wrapped with dielectric tape selected from the Approved Materials List.

D. Over-excavated trenches or augured holes in which anodes are placed shall be backfilled with select native material from which rock or other materials larger than 25mm (1") in diameter have been removed. Over-excavated trenches shall be backfilled with native materials up to the bottom of the new water main or copper tubing trench, which shall then be backfilled with select material in accordance with these Standard Specifications. Anode and native backfill shall be thoroughly wetted after installation.

3.08 COPPER SULFATE REFERENCE ELECTRODES

Reference electrodes shall be placed 300mm (12") away from the pipe at spring line. Electrodes shall be placed opposite side of the pipe from anodes. Saturate packaged electrode in 18.9 liters (5 gallons) of water prior to installation. Backfill material around the electrode shall be as specified for the pipeline trench. Installation shall be in accordance with the Standard Drawings.

3.09 TEST CABLE / ANODE LEAD CABLE

All buried lead and test cable requiring trenching to the test station box location shall be installed, without splices, in a conduit in the trench at a minimum depth of 600mm (24"). Trenches shall be backfilled and compacted in accordance with Section 02223. Care shall be taken when installing wire and backfilling trench to prevent damage to the installation. Damaged wire shall be replaced in entirety.

3.10 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape shall be installed in accordance with Section 15000 and the Standard Drawings

3.11 BRASS IDENTIFICATION TAG

Brass identification tags shall be used to identify all cables in all test boxes. Care shall be taken to accurately maintain the wire identities. The tags for all test cables shall be stamped with the District or Agency name, the pipeline size, the contents of the pipeline, and the direction of the connection point along the pipe, in accordance with the Standard Drawings. Copper sulfate reference electrode tags at cathodic test boxes shall be stamped "$CuSO_4$". The tags shall be securely attached to each wire with nylon fasteners prior to pipe backfilling operations.

3.12 FIELD TESTING

The Contractor shall engage the services of a Cathodic Protection firm to test the cathodic protection installations in the presence of the District Engineer. For final acceptance, the official testing of the cathodic protection installations shall be completed by a Certified NACE CP-1 tester or higher, and approved by a Cathodic Protection Engineer and /or a NACE Certified CP Specialist, as deemed necessary by the District Engineer. The Contractor shall notify District Engineer of proposed test dates and times a minimum of 48 hours in advance. As a practical approach, the Contractor may choose to verify pipe continuity and flange isolation (described in Items A and B below) prior to backfilling as an unofficial test. Official testing shall occur after the backfilling and installation of the test boxes.

A. Pipeline Electrical Continuity Testing: Test the electrical continuity of all sections of pipe to be monitored between each pair of adjacent corrosion monitoring test stations or between the ends of pipe sections less than 152.4m (500') apart. Each pipe section shall be considered electrically continuous when the measured longitudinal resistance of each pipe section is no greater than 20% higher than the theoretical resistance of that section of pipe. If testing indicates inadequate electrical continuity, the Contractor shall excavate to investigate and locate improperly bonded pipe joints and make repairs until electrical continuity is accomplished to the satisfaction of the District Engineer.

B. Insulated Pipe Flange Testing: Each insulated pipe flange will be tested for effective electrical isolation of the two mating pipe flanges. The insulated pipe flange shall be judged for effectiveness in accordance with NACE SP0286, Section 9, Field Testing and Maintenance." The Contractor shall replace or repair any insulated pipe flange assembly until electrical discontinuity is accomplished.

C. Initial Reference CP Potential Measurements: The entire metallic piping system shall be tested to establish the base CP Potential measurement readings. The base data will be used for comparative purposes with future monitoring data. The baseline data shall include voltage measurements (+/- 1mV) between any permanent copper sulfate reference electrodes (+ voltmeter correction) and a reliable portable copper sulfate reference electrode (- voltmeter correction) placed directly in the CP test box.

D. Sacrificial Anode Connectivity Testing: After installation of sacrificial anodes for copper tubing, the copper tubing and sacrificial anode lead wire shall be tested for connectivity to insure that the lead wire and the brass or copper clamp has been securely connected to the copper tubing. Test method shall be as directed by the District Engineer.

3.13 CATHODIC TESTING REPORT

At the completion of the testing, a report of the results will be prepared and presented to the District Engineer. The report shall be typed and shall include, at a minimum, test locations, date of tests, name of technician, testing methods, voltage measurements, and theoretical and calculated resistance.

END OF SECTION

SECTION 13110A ADDITIONS TO CATHODIC PROTECTION AND JOINT BONDING

This Section 13110A makes additions, deletions or revisions to Section 13110 Cathodic Protection and Joint Bonding. All parts of Section 13110A that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 CATHODIC PROTECTION

Cathodic protection will be paid at the Contract lump sum amount for “Cathodic Protection,” which amount will include full compensation for furnishing all labor, materials, equipment, tools, testing and inspection, incidentals and for doing the Work including preparation and implementation of the plan, as shown on the Plans and as specified in the Specifications and no additional compensation will be allowed.

Payment shall be made upon completion and acceptance of cathodic protection system.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15000 GENERAL PIPING SYSTEM AND APPURTENANCES

PART 1 GENERAL

1.01 DESCRIPTION

This section describes the requirements and procedures for piping systems (pressure pipe and gravity sewer pipe) and appurtenances that apply to a number of other complimentary Specification Sections. The items are listed in this section to avoid repetition in sections elsewhere. This section includes, but is not limited to, temporary pipelines, wet taps, flexible pipe couplings, grooved and shouldered end couplings, joint restraint systems, field touch up, bolts, nuts, polyethylene wrap, warning/identification tape, tracer wire, gate well and extension stems, meter boxes, abandonment and removal of existing facilities, salvage, and disposal.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C105	-	Polyethylene Encasement for Ductile-Iron Pipe Systems
AWWA C111	-	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C200	-	Steel Water Pipe – 6 In. (150mm) and Larger
AWWA C203	-	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines – Enamel and Tape – Hot-Applied
AWWA C213	-	Fusion-Bonded Epoxy Coating for Interior and Exterior of Steel Water Pipelines
AWWA C606	-	Grooved and Shouldered Joints
AWWA C900	-	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100mm Through 300mm), for Water Transmission and Distribution
AWWA M11	-	Steel Pipe - A Guide for Design and Installation
AWWA	-	Guidelines for Distribution of Non-Potable Water
ASTM A 36/A 36M	-	Standard Specification for Carbon Structural Steel
ASTM A 47/A 47M	-	Standard Specification for Ferritic Malleable Iron Castings
ASTM A 53	-	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 108	-	Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality
ASTM A 183	-	Standard Specification for Carbon Steel Track Bolts and Nuts
ASTM A 283/A 283M	-	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes and Bars
ASTM A 307	-	Standard Specification for Carbon Steel Bolts and Studs
ASTM A 325/A 325M	-	Standard Specification for High-Strength Bolts for Structural Steel Joints
ASTM A 510/A 510M	-	Standard Specification for General Requirements for Wire Rods and Course Round Wire, Carbon Steel

ASTM A 512	-	Standard Specification for Cold-Drawn Buttweld Carbon Steel Mechanical Tubing
ASTM A 536	-	Standard Specification for Ductile Iron Castings
ASTM A 568/A 568M	-	Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality and Cold Rolled
ASTM D 2000	-	Standard Classification System for Rubber Products in Automotive Applications
ASTM F 593	-	Specifications for Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 594	-	Specification for Stainless Steel Nuts
ANSI B1.1	-	Unified Inch Screw Threads
ANSI B1.2	-	Gages and Gauging for Unified Inch Screw Threads
NSF	-	National Sanitation Foundation
SSPWC	-	Standard Specifications for Public Works Construction ("Greenbook")

California Administrative Code, Title 22

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 13110, and all of Division 15.

1.04 LINING CONTAMINATION PREVENTION

Volatile organic compounds present in the linings of items in contact with potable water or recycled water shall not exceed concentrations allowed by the latest requirements of the State Office of Drinking Water and Department of Health Services. Some products and materials may also require proof of NSF certification on the lining materials to be used.

1.05 TEMPORARY PIPELINES

Temporary pipelines, where shown on the Approved Plans or required by the District Engineer, provide temporary service to customers during construction.

1.06 PIPE TAPPING (WET TAP)

All pipe tap (wet tap) connections to existing pipelines, whether for mainline extension or service laterals, shall be performed by the District. The Contractor shall provide materials and labor to excavate, pour thrust block, backfill, compact, and repair pavement as indicated in this Section. With specific prior approval of the District Engineer or when directed by the District Engineer, the Contractor may perform wet taps in accordance with Appendix D.

1.07 JOINT RESTRAINT SYSTEMS

Joint Restraint Systems may be used for PVC or ductile-iron pipe when shown on the Approved Plans or with prior approval of the District Engineer. Contractor shall submit shop drawings and catalog data for joint restraint systems in accordance with Section 01000.

1.08 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be used for all ferrous metal materials not otherwise protectively coated.

A. Polyethylene wrap or sleeves shall be used for the protection of buried ductile-iron pipe, appurtenances, and valves.

B. Purple-colored polyethylene wrap or sleeves may also be installed around buried pipe for recycled water identification.

1.09 WARNING/IDENTIFICATION TAPE

Warning/identification tape shall be installed to identify location of underground utilities and to act as a warning against accidental excavation of buried utilities. Warning/identification tape shall be used on all underground water and recycled water mains, potable and recycled water irrigation systems, sewer mains, and all related appurtenances. Warning/identification tape shall also be used on cathodic protection wiring systems and tracer wire brought into and out of access ports.

1.10 TRACER WIRE

Tracer wire shall be installed on all buried water and recycled water mains for the purpose of providing a continuous signal path used to determine pipe alignment after installation. Tracer wire is not required in installation of sewer mains.

1.11 GATE WELLS

Gate Wells shall be used for buried valves 50mm (2”) and larger, unless otherwise indicated on the Standard Drawings. Gate well lids shall be used on all gate wells.

1.12 VALVE STEM EXTENSIONS

Valves 100mm (4”) and larger require valve stem extensions to be installed when the valve-operating nut is more than 1.5m (5') below grade or as required by the District Engineer. All valves 50mm (2”) and smaller requiring the installation of a gate well shall include a valve stem extension in accordance with the Standard Drawings.

1.13 METER BOXES

Meter boxes shall be used for 25mm (1”) and 50mm (2”) water meters and other appurtenances as shown on the Standard Drawings.

1.14 RECYCLED WATER IDENTIFICATION

Facilities installed for the use of recycled water shall be identified with purple color coating, identification labels, or signs in accordance with Section 15151.

1.15 CURB IDENTIFICATION MARK FOR SERVICES

The Contractor shall mark the location of all potable water, recycled water and sewer laterals at the curb crossing by stamping the face of the curb in 50mm (2”) high letters as described below:

A. Potable water laterals shall be stamped with a letter “W”.

B. Recycled water laterals shall be stamped with the letters “RW”.

C. Sewer laterals be stamped with a letter “S”.

1.16 FIELD REPAIR OF DAMAGED COATINGS

All surfaces of metallic appurtenances in contact with potable water and not protected from corrosion by another system shall be shop-coated by the manufacturer. Appurtenances with damaged coatings shall be repaired or replaced as directed by the District Engineer. Touch-up of damaged surfaces, when allowed by the District Engineer, shall be performed in accordance with the manufacturer’s recommendations.

PART 2 MATERIALS

2.01 TEMPORARY PIPELINES

Temporary piping layout, materials and appurtenances shall be as indicated on the approved submittal.

2.02 FLEXIBLE PIPE COUPLINGS

Flexible pipe couplings shall be in accordance with the Approved Materials List and as described below:

A. Steel Couplings shall have middle rings made of steel conforming to ASTM A 36/A 36M, A 53 (Type E or S), or A 512 having a minimum yield strength of 207 MPa (30,000 psi). Follower rings shall be ductile-iron per ASTM A 536, or steel per ASTM A 108, Grade 1018 or ASTM A 510, Grade 1018. Minimum middle ring length shall be 175 mm (7") for pipe sized 150 mm (6") through 600 mm (24").

B. Sleeve bolts shall be made of stainless steel per ASTM A193 and shall have a minimum yield strength of 276 MPa (40,000 psi), an ultimate yield strength of 414 MPa (60,000 psi), and shall conform to AWWA C111.

2.03 GROOVED-END OR SHOULDERED COUPLINGS FOR DUCTILE IRON OR STEEL PIPE

Grooved-end or shouldered couplings shall be in accordance with the Approved Materials List and as described below:

A. Use square-cut shouldered or grooved ends per AWWA C606. Grooved-end couplings shall be malleable iron per ASTM A 47, or ductile iron per ASTM A 536. Gaskets shall be per ASTM D 2000.

B. Bolts for exposed service shall conform to ASTM A 183, 69 MPa (10,000 psi) tensile strength.

2.04 JOINT RESTRAINT SYSTEMS

Joint Restraint Systems shall be selected from the Approved Materials List.

A. A minimum pressure rating of 250psi of pipe is required for all engineered restraint systems. All approved restrain system products must meet a 2:1 safety factor.

B. Split ring style joint restraint rods and nuts shall be 304 stainless steel for all applications in accordance with AWWA/ANSI C111/A21.11 and provide a minimum 45,000 psi yield and 60,000 psi tensile strength or as approved by the District Engineer. Unless otherwise approved, all parts and hardware for the joint restraint systems are to be supplied by the restraint manufacturer. Clamping ring shall be manufactured of high strength ductile iron in accordance with ASTM A536, grade 65-45-12.

C. Gland style joint restraint rings and its wedging components shall be constructed of ductile iron conforming to ASTM A 536, Grade 65-45-12. The wedges shall be ductile iron, heat-treated to a minimum hardness of 370 - 470 BHN. Dimensions of the gland shall be such that it can be used with mechanical joint bells conforming to AWWA C111 and AWWA C153. The design shall use torque limiting twist-off nuts to provide actuation of the restraining wedges.

2.05 BOLTS AND NUTS

Bolts and nuts shall be as indicated below and shall be selected from the Approved Materials List.

A. Zinc-plated or fluoropolymer coated bolts and nuts shall be used for the installation of pipelines up to 500mm (20") diameter and shall be carbon steel. Bolts shall conform to ASTM A307, Grade A, and nuts shall conform to ASTM A563, Grade A, unless otherwise indicated on the approved drawings. Bolts and nuts shall have standard ANSI B1.1, Class 2A coarse threads.

B. Stainless steel bolts and nuts shall be used for the installation of pipelines 600mm (24") diameter and larger and for submerged flanges. Bolts and nuts shall be Type 316 stainless steel conforming to ASTM A193, Grade B8M for bolts, and Grade 8M for nuts.

C. All bolt heads and nuts shall be hexagonal, except where special shapes are required. Bolts shall be of such length that not less than 6.4mm (¼") or more than 12.7mm (½") shall project past the nut in tightened position.

2.06 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be as indicated below and shall be selected from the Approved Materials List. Polyethylene materials shall be kept out of direct sunlight exposure.

A. Polyethylene wrap and sleeves shall be a minimum 0.203mm (0.008” or 8 mil) thick linear low-density polyethylene film in accordance with AWWA C105.

B. Polyethylene wrap and sleeves shall be clear for use with potable water and purple for use with recycled water.

C. Polyethylene encasement shall be secured with 50mm (2”) wide polyethylene or vinyl adhesive tape or with plastic tie straps.

2.07 WARNING/IDENTIFICATION TAPE

Warning/identification tape shall be as indicated below and in accordance with the Approved Materials List.

A. Tape shall be an inert, non-metallic plastic film formulated for prolonged underground use that will not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil.

B. Tape shall be puncture-resistant and shall have an elongation of two times its original length before parting.

C. Tape shall be colored to identify the type of utility intended for identification. Printed message and tape color shall be as follows:

Printed Message	Tape Color
Caution: Waterline Buried Below	Blue
Caution: Recycled Waterline Buried Below	Purple
Caution: Sewerline Buried Below	Green
Caution: Cathodic Protection Cable Buried Below	Red
Caution: Electric Line Buried Below	Red

Ink used to print messages shall be permanently fixed to tape and shall be black in color with message printed continuously throughout.

D. Tape shall be minimum 0.102mm (0.004” or 4 mil) thick x 150mm (6") wide with a printed message on one side. Tape used with the installation of onsite potable and recycled water irrigation systems shall be a minimum of 75mm (3”) wide.

2.09 TRACER WIRE

Tracer wire shall be as indicated below and shall be selected from the Approved Materials List.

A. Tracer wire shall be #14 AWG solid copper UF type wire with cross-linked polyethylene insulation. The insulation shall be white or yellow in color.

B. Wire splices (at pipe tees, crosses and laterals) shall be accomplished using a direct bury silicone-filled capsule tube with standard wire nut or silicone-filled wire nut connectors of the appropriate size selected from the Approved Materials List.

2.10 GATE WELLS

A. Gate wells for valves 50mm (2”) and smaller shall be 100mm (4”) diameter SDR-35 PVC sewer pipe selected from the Approved Materials List.

B. Gate wells for valves larger than 50mm (2”) shall be 200mm (8”) diameter Class 305 C900 PVC pipe selected from the Approved Materials List.

C. Gate wells for use in potable water system applications shall be white or blue. Gate wells for use in recycled water system applications shall be purple or shall otherwise be identified in accordance with Section 15151.

D. Gate well lids shall be circular ductile-iron selected from the Approved Materials List and shall include a skirt for a close fit inside the upper portion of the gate well. Lids shall be cast with the District's name and the word "WATER" for use on potable water systems or the word "RECYCLED" for use on recycled water systems.

1. Gate well lids for valves 50mm (2") and smaller shall be 100mm (4") diameter with 64mm (2-1/2") long skirt.

2. Unless otherwise indicated on the Approved Plans or directed by the District Engineer, gate well lids for valves larger than 50mm (2") shall be Type I in accordance with Standard Drawing WV-01 and selected from the Approved Materials List.

3. When indicated on the Approved Plans or when directed by the District Engineer, gate well lids for valves larger than 50mm (2") shall be Type II in accordance with Standard Drawing WV-02 consisting of a two-piece machined ductile-iron frame and lid selected from the Approved Materials List.

2.11 VALVE STEM EXTENSIONS

Stem extensions shall be complete with operating nut, location ring, and lower socket to fit valve-operating nuts. The configuration of the extension stem socket shall match that of the valve it operates.

A. Valve stem extensions for valves 50mm (2") or smaller shall be in accordance with Standard Drawing WV-05.

B. Valve stem extensions for valves 100mm (4") or larger extensions may be round or square hot-dipped galvanized steel tubing of solid design (no pinned couplings permitted) with guides in accordance with Standard Drawing WV-04.

2.12 METER BOXES

Meter boxes shall be selected from the Approved Materials List.

A. Meter box sizes shall be as follows:

Meter box size	Meter box uses
250mm x 500mm (10" x 20")	25mm (1") water services
325mm x 600mm (13" x 24")	25mm (1") dual domestic/fire water services
425mm x 750mm (17" x 30")	50mm (2") water services and 50mm (2") through 150mm (6") blowoff assemblies

B. Meter box lids for use in potable water system applications shall be gray.

C. Meter box lids for use in recycled water system applications shall be purple.

2.13 RECYCLED WATER IDENTIFICATION

Pipe and appurtenances used for recycled water shall be manufactured in purple color or shall otherwise be identified in accordance with Section 15151.

PART 3 EXECUTION

3.01 TEMPORARY PIPELINES

A. All temporary piping, fittings, and service connections shall be furnished, installed, and maintained by the Contractor, and the Contractor shall make connections to a water source designated by the District Engineer.

B. All pipe, valves, fittings, hose and connections furnished by the Contractor shall be of good quality, clean, and suitable for conveying potable water in the opinion of the District Engineer.

C. The temporary pipe shall be installed in such a manner that it will not present a hazard to traffic and will not interfere with access to homes and driveways along its route.

D. Valves shall be installed at 60m (200') intervals or as directed by the District Engineer. The use of pressure reducing valves (PRV) may be required as directed by the District Engineer.

E. The Contractor shall be responsible for disinfecting all pipe, connections, flushing, and assisting the District in taking water samples for bacteriological testing in accordance with Section 15041.

F. Following disinfection and acceptance of the temporary pipe as a potable water system, the Contractor shall maintain continuous service through the temporary piping to all consumers normally served both directly and indirectly by the pipeline.

G. Upon completion of the work, the Contractor shall remove the temporary piping and appurtenances and shall restore all surfaces to the satisfaction of the District Engineer..

H. If repairs to temporary piping are necessary, Contractor shall make such repairs in a timely manner as directed by the District Engineer. If progress in making repairs is inadequate, or in the event of emergency, the District Engineer may take immediate corrective measures, which may include the performance of repair work by District forces or another contractor. All costs for corrective measures shall be borne by the Contractor.

3.02 CONNECTION TO EXISTING FACILITIES (WET TAPS AND CUT-IN INSTALLATIONS)

Unless otherwise indicated on the Approved Plans or specifically directed by the District Engineer, all connections to existing facilities, including wet taps on active pipelines and cut-in installations, shall be performed by District personnel. When the Approved Plans indicate wet taps or cut-in installations are to be performed by Contractor, or when Contractor has the specific written permission of the District Engineer to perform wet taps or cut-in installations, such work shall be performed in strict accordance with the following procedures. In addition, wet taps shall be performed in accordance with Appendix D. The District Engineer must approve all work performed by Contractor prior to allowing access to the work site by District personnel.

The Contractor shall furnish the tapping sleeve or tee, valves and all other materials as called for in the Standard Specifications in accordance with the Approved Materials List. The Contractor shall provide all equipment and labor required for the excavation and installation of the connection including but not limited to thrust blocks, backfill and pavement replacement. In certain circumstances the Contractor may be required to provide a water truck or temporary piping as part of the equipment for making the connections. In addition, the Contractor shall

assist the District in alleviating any hardship incurred during a shutdown for connections. Emergency standby equipment or materials may be required of the Contractor by the District Engineer.

Wet taps or cut-in tee and valve installations shall be performed as follows:

A. Prior to construction, Contractor shall pothole the existing pipe at the location of the proposed connection. The District Engineer shall inspect the pothole prior to Contractor's repair of trench. Refer to Section 01000 for protection of existing facilities. Contractor shall record the following information on as-built drawings:

1. Pipe size, outside diameter.

2. Pipe type such as ACP, PVC, Ductile-Iron or Steel.

3. Pipe class and/or pressure rating.

4. Elevation, grade, and alignment.

5. Location of collars, pipe bells, fittings or couplings, if found.

6. Potential conflicts with existing utilities.

B. To facilitate the proposed connection and allow for slight adjustments in alignment, the Contractor shall leave a minimum 3.0m (10') gap between the new pipe installation and the proposed connection point at the existing water main. The Contractor shall leave a gap longer than 3.0m (10') if conditions warrant, or if directed by the District Engineer.

C. The new pipeline shall have successfully passed pressure testing in accordance with Section 15044 and disinfection and bacteriological testing in accordance with Section 15041 prior to proceeding with the connection to the existing pipeline.

D. After the District Engineer has given approval to proceed with the connection, the Contractor shall schedule with the District Engineer for the wet tap or cut-in installation.

1. Shutdowns will be scheduled at the convenience of the District. Shutdowns may be scheduled for nights or weekends if required.

2. The Contractor shall give the District Engineer a minimum of five (5) working days notice prior to any proposed excavation or shutdown of existing mains or services. Scheduling shall be subject to approval by the District Engineer.

3. The District Engineer may postpone or reschedule any shutdown operation if, for any reason, the District Engineer believes that the Contractor is improperly prepared with competent personnel, equipment, or materials to proceed with the connection.

4. If progress in completing the connection within the time specified is inadequate, the District Engineer may order necessary corrective measures. Corrective measures may consist of directing District personnel or another contractor to complete the work. All costs for corrective measures shall be borne by the Contractor.

E. Contractor may proceed with excavation only when pothole has been completed, materials have been approved and delivered, wet tap or cut-in installation has been scheduled and a copy of the approved traffic control plan has been supplied to the District Engineer.

1. The Contractor shall saw-cut pavement, excavate and provide and install shoring and steel plating, when necessary, one day prior to the wet tap or cut-in installation.

2. The Contractor shall provide lights, barricades and traffic control in accordance with the agency of jurisdiction and as deemed necessary for the excavation by the District Engineer.

3. The Contractor shall de-water existing mains where cut-in installations are required in the presence of the District Engineer and in accordance with Section 15041 and 02223. The Contractor shall be prepared to deal with leaking valves and water from those valves to complete the shutdown. Only District personnel are authorized to operate existing valves. The Contractor shall be responsible for any and all damage resulting from unauthorized operation of existing District facilities.

4. In areas where cut-ins are to be performed the Contractor shall line the bottom of the trench with 300 to 450mm (12" to 18") of 19mm (¾") rock and install a 300 to 400mm (12" to 16") deep sump for dewatering the trench bottom.

5. The District shall perform the following work for wet taps and cut-in installations:

    a. Wet taps: Disinfect and install the tapping saddle and tapping valve and perform tapping operations in accordance with Appendix D.
    b. Cut-ins: Cut and remove portions of existing mains, and disinfect and install tees, valves, couplings, and appurtenances required to complete the closure. The Contractor shall discard pipe and appurtenances removed from service in accordance with this Section.

6. After the District has performed tapping or cut-in operations, and the District Engineer has given approval to proceed, the Contractor shall complete the installation as shown on the Approved Plans in accordance with the Standard Specifications including, but not limited to:

    a. Disinfecting and installing the pipe section(s) necessary to make the closure to the new system.

    b. Installing and setting the valve gate well(s) in accordance with the Standard Drawings.

    c. Installing thrust and anchor blocks in accordance with Section 03000.

    d. Completing all backfill and compaction of the trench in accordance with Section 02223.

    e. Repairing or replacing pavement as necessary in accordance with agency of jurisdiction requirements.

3.03 FLEXIBLE PIPE COUPLINGS

Flexible pipe couplings shall be installed in accordance with the manufacturers recommendations and as described below:

A. Use plain-end pipe with flexible couplings per AWWA C200. Provide joint harnesses per AWWA M11 for aboveground applications or where indicated on the Approved Plans.

B. Flexible couplings may be used only where indicated on the drawings

C. Clean oil, scale, rust, and dirt from the pipe ends and touch up the epoxy coating and allow time for curing before installing the coupling. Clean the gaskets before installing.

D. Follow the manufacturer's recommendations for installation and bolt torque using a properly calibrated torque wrench.

E. Lubricate the bolt threads with graphite prior to installation.

3.04 GROOVED-END OR SHOULDERED COUPLINGS FOR DUCTILE-IRON OR STEEL PIPE

Grooved-end or shouldered couplings shall be installed in accordance with the manufacturer's recommendations and as described below:

A. Grooved-end or shouldered joint couplings shall be installed per AWWA C606 and the manufacturer's recommendations.

B. Clean loose scale, rust, oil, grease, and dirt from the pipe or fitting groove and touch up the epoxy coating as necessary, allowing time for curing before installing the coupling.

C. Clean the gasket before installation. Apply a lubricant selected from the Approved Materials List to the gasket exterior including lips, pipe ends, and housing interiors.

D. Fasten the coupling alternately and evenly until the coupling halves are seated. Follow the manufacturer's recommendations for bolt torque using a properly calibrated torque wrench.

3.05 JOINT RESTRAINT SYSTEMS

Joint Restraint Systems shall be installed as shown on the Approved Drawings, in accordance with the manufacturers' recommendations and as described below:

A. Split ring joint restraint systems for bell and spigot joints shall be ductile-iron and shall consist of two split-ring restraints with machined (not cast) serrations on the inside diameter and connecting bolts, and shall be selected from the San Diego Water Agency Standards Approved Materials List. One clamping ring shall be installed on the spigot pipe, and with the necessary restraining rods and nuts, connected to a second clamping ring located on the pipe barrel immediately behind the gasket bell. Restraint devices may be installed prior to lowering pipe into the trench only with the approval of the District Engineer. All joint restraint devices shall be installed in accordance with the manufacturers' instructions

B. Split ring joint restraint for mechanical joints shall be ductile-iron and shall consist of two split-ring restraints with machined (not cast) serrations on the inside diameter and connecting bolts, and shall be selected from the San Diego Water Agency Standards Approved Materials List and installed per manufacturer specifications

C. Split ring joint restraint for push-on valves or push by flange adapter shall be ductile-iron and shall consist of two split-ring restraints with machined (not cast) serrations on the inside diameter and connecting bolts, and shall be selected from the San Diego Water Agency Standards Approved Materials List and installed per manufacturer specifications.

Split ring restraints for push-on valve or push by flange adapter shall not be used in applications larger than eight inches (8") in diameter.

D. Gland style restraining mechanisms for mechanical joints shall consist of a follower gland having a seal gasket and individually actuated wedges that increase their resistance to pullout as pressure or external forces increase. The system manufacturer shall provide all the components (follower ring, wedges, and gaskets) for the restraining device. Gland style restraints shall be installed at all ductile iron fittings or valves as required by District engineer. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial.

3.06 BOLTS AND NUTS

A. All bolts and nuts shall be new and unused. Bolts shall not be reused once tightened. Used bolts and nuts shall be discarded and removed from the job site.

B. Bolts and nuts shall be cleaned, if needed, by wire brushing and shall be lubricated prior to assembly.

C. Tighten nuts uniformly and progressively in a "star" pattern.

D. Buried bolts and nuts shall receive a heavy coat of protective grease selected from the Approved Materials List prior to being wrapped with polyethylene.

E. All stainless steel bolts shall be coated with an anti-seize compound selected from the Approved Materials List.

3.07 POLYETHYLENE ENCASEMENT

A. Polyethylene encasement shall completely encase and cover all metal surfaces.

Pipe and pipe-shaped appurtenances: All ductile-iron pipe and pipe-shaped appurtenances such as bends, reducers and offsets shall be encased with polyethylene sleeves in accordance with Method A described in AWWA C105, or with polyethylene wrap in accordance with Method C described in AWWA C105.

Odd-Shaped Appurtenances: Odd-Shaped Appurtenances such as tees and crosses shall be encased with polyethylene wrap in accordance with AWWA C105.

Valves: Valves shall be encased with polyethylene wrap in accordance with AWWA C105 such that only the stem and operating nut are exposed and the wrap shall be attached so that valve operation will not disturb the wrapping or break the seal.

B. Polyethylene sleeves shall be secured with polyethylene or vinyl adhesive tape or plastic tie straps at the ends and quarter points along the sleeve in a manner that will hold the sleeve securely in place during backfill. Polyethylene wrap shall be secured with polyethylene or vinyl adhesive tape or plastic tie straps in a manner that will hold the wrap securely in place during backfill.

3.08 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape shall be installed as described below and in accordance with the Standard Drawings.

A. Tape shall be placed at the top of the pipe zone 300mm (12") above and centered over the utility intended for identification. Tape used with onsite potable and recycled water irrigation systems shall be installed at 150mm (6") above the pipe.

B. Tape shall be installed with the printed side up and run continuously along the entire length of the utility intended for identification. Tape shall be installed on the main piping and all appurtenant laterals, including blowoffs, air valve assemblies, fire hydrants, and services. Tape splices shall overlap a minimum of 600mm (24") for continuous coverage.

C. Tape shall be installed prior to placement of the Trench Zone Backfill.

3.09 TRACER WIRE

Tracer wire shall be installed as described below and in accordance with the Standard Drawings.

A. Tracer wire shall be installed with all water and recycled water mains.

B. Wire shall be placed on the top centerline of the pipeline and shall run continuously along the entire length of pipe prior to placement of trench backfill. Wire shall be mechanically and electrically continuous throughout the pipeline, including within pipe casings.

C. Tracer wire shall be secured to the pipe at 1.8m (6') intervals with plastic adhesive tape, duct tape or plastic tie straps. The wire may alternately be secured to the pipe by looping the tracer wire around itself such that tracer wire remains continuous atop the pipe during backfill operations.

D. Tracer wire access ports shall be installed in accordance with the Standard Drawings within the concrete splash pad of all fire hydrants installed as a part of the work. In addition, tracer wire may terminate within meter boxes, blow off boxes, CP test boxes or air valve enclosures as shown on the Approved Drawings or as directed by the District Engineer at intervals of not more than 305m (1,000'). Locations of all tracer wire access ports installed shall be noted on the field record drawings.

E. Wire shall extend into the access port and shall terminate with a coiled 600mm (24") length of wire. All tracer wire not attached to piping shall be installed, without splices, within a conduit at a minimum depth of 600mm (24") in accordance with the Standard Drawings.

F. Splices shall be installed only when necessary and shall be made using wire connectors selected from the Approved Materials List.

G. The Contractor shall test tracer wire for electrical continuity in the presence of the District Engineer prior to the installation of any paving over atop pipelines or appurtenances. Testing shall be accomplished using a device capable of detecting improper connections or ground fault interruptions.

3.10 GATE WELLS

Gate wells shall be installed as shown on the Standard Drawings and as described below.

A. Gate wells shall be installed with lids flush with the final surface. No more than two 25mm (1") adjustment rings shall be used. Gate wells and adjustment rings shall be accurately cut perpendicular to the length of the piping used.

B. Gate wells shall be color-coded to identify the type and use of the valve installed.

1. The inside portion of the gate well lid and interior portion of PVC gate well shall be identified with a minimum 50mm (2") diameter painted identification marking. Paint color shall be as follows:

Color	Gate Well Lid and PVC Gate Well for:
Red	Normally Closed System Valves (NCV)
White	Resilient Wedge Gate Valves (RWGV)
Green	Butterfly Valves (BFV)

2. The top exterior portion of the gate well lid and ring shall be coated in accordance with Section 09910.

3.11 VALVE STEM EXTENSIONS

A. All valves 50mm (2") and smaller requiring the installation of a gate well shall include a valve stem extension fabricated and installed in accordance with the Standard Drawings. Stem extensions shall be of sufficient length to bring the operating nut to a point approximately 150mm (6") below the gate well lid.

B. Valves 100mm (4") and larger require valve stem extensions to be fabricated and installed in accordance with the Standard Drawings when the valve-operating nut is more than 1.5m (5') below grade. Valve stem extensions shall be of sufficient length to bring the operating nut to a point between 300mm (12") and 450mm (18") below the gate well lid.

3.12 METER BOX INSTALLATIONS

Meter boxes shall be installed at the elevations and locations shown on the Approved Plans and in accordance with the Standard Drawings. Near the completion of the project, a final meter box adjustment to finish grade may be required. Water meters shall not be installed until final adjustments are made to the meter box and are approved by the District Engineer.

3.13 INSTALLATION OF TEMPORARY END CAPS TO MAINTAIN SERVICE

Before excavating for new mains that are to replace existing pipes or services, it may be necessary to install temporary end caps on existing pipes that are later to be abandoned or connected to in order to maintain service to customers or fire protection during construction. When indicated on the Approved Plans or when directed by the District Engineer, Contractor shall install and maintain such temporary end caps as indicated below and in accordance with the Standard Drawings.

A. For existing water mains 350mm (14") or less in diameter, the existing pipe shall be cut cleanly and fitted with a rubber-gasketed ductile-iron solid end cap specifically designed for the size and type of pipe being temporarily capped. The temporary end cap shall be adequately braced with a concrete thrust block poured against undisturbed material or as otherwise required to insure that no movement or leakage occurs.

B. Temporary end caps shall be fitted with 50mm (2") tapped outlets in accordance with the Standard Drawings to provide temporary 50mm (2") blowoffs or connections to temporary water sources if indicated on the Approved Drawings or if directed by the District Engineer.

C. Existing pipes 400mm (16”) or larger shall not be fitted with temporary end caps.

3.14 PERMANENT ABANDONMENT OF PIPELINES AND APPURTENANCES

When indicated on the Approved Plans or when directed by the District Engineer, existing pipelines to be abandoned shall be disconnected from all source pipelines and shall remain in place in accordance with the Standard Drawings and the modifications and instructions listed below:

A. All above-ground appurtenances connected to pipelines to be abandoned shall be removed and disposed of or salvaged in accordance with this Section.

B. All piping and appurtenances buried at a depth of 600mm (24”) or less and connected to pipelines to be abandoned shall be removed and disposed of or salvaged in accordance with this Section. Remaining pipe ends, gate wells and other appurtenances cut at a depth of 600mm (24”) shall be removed entirely or filled with concrete. Excavated areas shall be replaced with compacted backfill and surfaces shall be repaired in accordance with these Standard Specifications.

C. Pipe 100mm (4”) and smaller to be abandoned shall be excavated at intervals of 60m (200’), short sections of pipe shall be removed, and pipe ends shall be encased in concrete.

D. Pipe 150mm (6”) through 350mm (14”) to be abandoned shall be excavated at intervals of 60m (200’), and pipe shall cut and plugged with concrete in accordance with the Standard Drawings or shall be entirely filled by pressure-grouting or with lightweight cellular concrete. The materials and method of filling pipeline(s) to be abandoned shall be submitted for approval by the District Engineer.

E. When existing pipe 350mm (14”) or less is excavated for abandonment, each excavation is considered as a single “cut-and-plug.”

F. Pipe 375mm (15”) and larger to be abandoned shall be entirely filled by pressure-grouting, by blown sand, or with lightweight cellular concrete. The materials and method of filling pipeline(s) to be abandoned shall be submitted for approval by the District Engineer.

G. Ends of all pipe segments to be abandoned shall be filled with concrete in accordance with the Standard Drawings.

H. All valves on pipelines to be abandoned shall be turned to the closed position.

I. Water services to be abandoned that are connected to pipelines that will remain in service shall be abandoned in-place and deactivated at the corp stop in accordance with the Standard Drawings. Water services connected to pipelines to be abandoned shall be abandoned in-place and cut ends shall be crimped.

J. Sewer laterals shall be cut and plugged with concrete at the main as directed by the District Engineer for the specific circumstance and material type identified.

K. Sewer manholes shall have the cover and frame, concrete ring, grade rings and cone section removed. Inlet and outlet piping shall be plugged with concrete, manhole void shall be filled with sand, and a 300mm (12") thick, reinforced concrete slab shall be poured over the top of remaining manhole. The Contractor shall backfill hole to ground surface with compacted select fill.

3.15 REMOVAL OF PIPELINES AND APPURTENANCES

A. Existing pipe and appurtenances shall be completely removed when indicated on the Approved Plans or as directed by the District Engineer. All materials removed during construction operations shall be salvaged or disposed of in accordance with this Section.

B. When fittings, appurtenances, or pipe segments are removed from pipelines that are to remain in service, the removed portions shall be replaced with straight segments of pipe and appropriate couplings selected from the Approved Materials List.

C. Contractor shall provide measures that allow for the removal of existing sewer mains and appurtenances with no leakage of raw sewage. Transportation of sewer mains and appurtenances removed from service shall be in waterproof trucks to prevent raw sewage from leaking on public streets.

D. Removal of asbestos-cement pipe (ACP) and sewer mains and appurtenances shall be in accordance with all applicable State and Federal requirements, and disposal shall be in accordance with the requirements of this Section.

E. Backfill, compaction, and surface repair of all excavations for removal of pipe and appurtenances shall be made in accordance with the Approved Plans, these Standard Specifications, and in accordance with the requirements of the agency of jurisdiction or as directed by the District Engineer.

3.16 RECONNECTIONS

Existing service laterals or appurtenances shall be connected to new pipelines as shown on the Approved Plans or as directed by the District Engineer. Contractor may encounter unused service laterals or piping appurtenant to an existing pipeline being replaced. Laterals and appurtenant piping that will not be connected to new pipelines shall be abandoned in accordance with the requirements of this Section.

3.17 SALVAGE

When the Contractor is required to remove existing pipe and appurtenances, such materials may, when shown on the Approved Plans or directed by the District Engineer, be considered salvage. All materials identified as salvage are considered property of the District. The Contractor shall temporarily stockpile all material identified as salvage in a location that will not disrupt traffic or otherwise create an unsafe condition and shall deliver such materials as directed by the District Engineer.

3.18 DISPOSAL

All materials removed during construction operations and not identified by the District Engineer as salvage shall be legally disposed of in accordance with all applicable Local, State, and Federal requirements.

Disposal of asbestos-cement pipe requires special handling and attention, including but not limited to, encapsulation within airtight packaging, submittal of certification letters and/or waste profile statements, and the use of a Cal-OSHA registered asbestos abatement contractor to transport and dispose of such wastes. The District Engineer shall be provided with copies of all applicable documentation regarding the transportation and disposal of asbestos-cement pipe. Contractor shall comply with all applicable regulations and all requirements of the disposal site. Contractor is responsible for all costs associated with disposal of materials, specifically including

any materials that may contain asbestos.

END OF SECTION

SECTION 15000A ADDITIONS TO GENERAL PIPING SYSTEM AND APPURTENANCES

This Section 15000A makes additions, deletions or revisions to Section 15000 General Piping System and Appurtenances. All parts of Section 15000 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 REMOVAL OR ABANDONMENT OF EXISTING WATER FACILITIES

The payment for removing, plugging, and abandoning existing water facilities and appurtenances outside the proposed trench limits as shown on the Plans shall be included in the Bid item for “Removal or Abandonment of Existing Water Facilities”.

4.2 HANDLING AND DISPOSAL OF NON-FRIABLE ASBESTOS MATERIAL

The payment for the handling and disposal of asbestos-containing materials shall be paid for as Extra Work unless a Bid item has been provided for “Handling and Disposal of Non-friable Asbestos Material”.

4.3 FURNISHED MATERIALS FOR CONTRACTOR HIGH-LINE WORK

The payment for temporary high-lining materials (fittings, valves, and hardware), including delivery and unloading, shall be paid for under the linear foot Bid item “Furnished Materials for Contractor High-line Work”.

4.4 HIGH-LINING INSTALLATION BY THE CONTRACTOR

The payment for temporary high-line installation Work by the Contractor as described in Section 15000 shall be paid for under the linear foot Bid item “High-lining Installation by the Contractor” and shall be full compensation for installing, maintaining, and repairing the high-lining system during normal working hours.

4.5 HIGH-LINING REMOVED BY THE CONTRACTOR

The payment for removal temporary high-line installation Work by the Contractor as described in Section 15000 shall be paid for under the linear foot Bid item “High-lining Removed by the Contractor.”

4.7 CUT AND PLUG BY CONTRACTOR

Cut and plug Work of the existing water system shall be performed as described in Section 15000 and paid under the Bid item for “Cut and Plug by the Contractor.” Payment shall include any scheduling impact costs, community outreach, furnishing and installing of materials, and traffic control. Potholing and protecting the water main while performing the Work shall be included in this payment.

4.8 CONNECTIONS TO THE EXISTING SYSTEM BY CONTRACTOR

The payment for connecting to the existing system shall be included under the Bid items for the connection and shall include the payment for the following:

a) Furnishing and installing all materials and labor to complete the Work
b) Potholing
c) Protecting the water main while performing the Work
d) Coordinating your Work with the District Engineer
e) Traffic Control

4.9 ADJUST EXISTING GATE VALVE COVER TO GRADE

The payment for adjusting existing gate valve covers to grade as shown on the Plans shall be included in the Bid item for “Adjust Existing Gate Valve Cover to Grade”.

END OF SECTION

SECTION 15010 – BURIED PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Installation

B. Alignment of Piping

C. Concrete Thrust Anchorage

D. Crossing of Water and Sewer Mains

E. Insulation of Connections

F. Product Delivery, Storage, and Handling

G. Maintaining Water Service

H. Shut Down of Existing Water Mains

I. Temporary Resurfacing

1.2 RELATED WORK DESCRIBED ELSEWHERE

The Contractor shall refer to the following Specification Section(s) for additional requirements:

A. Section 02223 – Trenching, Excavation, Backfill and Compaction

B. Section 15064 – Polyvinyl Chloride (PVC) Pressure Pipe

1.3 REFERENCES

A. ASTM D2321 - Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe

B. ASCE MOP No. 37 – Design and Construction of Sanitary and Storm Sewers

1.4 CONTRACTOR SUBMITTALS

A. Manufacturer's Product Data: Contractor shall submit according to Section 01300 - Submittals manufacturer's product data detailing material and dimensional data for all products to be incorporated into the new piping system, including, but not limited to:

1. All piping and fittings as required by this and any other sections of these specifications.

2. Supports, Restraints and Thrust Blocks.

3. All jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other items required to provide a complete and workable piping system.

1.5 QUALITY ASSURANCE

A. All pipe, fittings, valves, gaskets, and appurtenances shall be the product of a single manufacturer for that particular item (i.e., fittings by same manufacturer; valves by same manufacturer). Materials shall be compatible for the use intended and shall be in conformance with the appropriate sections of these specifications. Dissimilar materials shall be properly insulated to prevent galvanic action and so as to not cause any deterioration or failure of service.

B. Product Delivery, Storage, and Handling

1. Deliver materials to the site to ensure uninterrupted progress of the work.

2. Handle all pipe, fittings, specials and accessories carefully with approved handling devices. Do not drop or roll material off trucks. Do not otherwise drop, roll or skid piping. Materials cracked, gouged, chipped, dented or otherwise damaged will not be acceptable and shall be removed from the site immediately.

3. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interiors completely free from dirt and foreign material.

1.6 REQUIREMENT

The Contractor shall provide all labor, materials, equipment and incidentals as shown specified, or required to install and test all buried piping, fittings, and appurtenances. The work includes, but is not limited to, the following:

A. All types and sizes of buried piping except those specified under other sections

B. Supports, restraints, and thrust blocks

C. Pipe encasement

D. Work on or affecting existing piping

E. Testing

F. Cleaning and Disinfecting

G. All jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all work required for a complete and workable buried piping installation.

H. Incorporation of special items shown or specified into the piping system as required and as specified.

PART 2 - PRODUCTS

2.1 GENERAL

All piping, fittings, and appurtenances shall be of the types shown on the Contract Documents and shall conform to the applicable sections of these specifications and the WAS.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of buried piping shall conform to the provisions of the applicable sections of these specifications and the WAS.

B. All trench excavations shall be inspected by Engineer prior to laying of pipe. Engineer shall be notified in advance of excavation, bedding, and pipe laying operations.

C. All earthwork and trenching shall conform to Section 02223 – Trenching, Excavation, Backfill and Compaction of these specifications.

D. Minimum depth of cover over piping shall be 36 inches, except where shown or directed by Engineer.

E. Pipe, fittings, and appurtenances that are cracked, damaged, or in poor condition or have damaged linings or coatings will be rejected.

F. In order to prevent accumulations of air and to enable the pipeline to be drained, piping shall not have high or low points except where shown.

3.2 ALIGNMENT OF PIPING

A. Alignment shown on the Contract Documents shows the general alignment along which the pipelines are to be installed. The actual alignment may be varied in the field by the Engineer from this general alignment as required to clear all existing underground facilities. All variations in alignment shall be approved by the Engineer prior to construction.

B. The information shown on the Contract Documents as to location of existing water and utility lines represents the most accurate data available at the time of preparation of these Contract Documents, but in no case is to be construed as guaranteeing that the data shown is correct. The District does not expressively or by implication agree, represent, or imply that the actual locations conform exactly to that shown on the Contract Documents.

C. Prior to the start of construction, the Contractor will locate, to the extent possible without excavation, all conflicting water, private utility, storm drain and sewer lines. The contractor shall, at his expense, perform exploratory excavations and potholing sufficiently in advance of pipe laying operations to enable the alignment or profile to be revised to clear existing utilities such that delays or reconstruction will be avoided.

3.3 NOT USED

3.4 CROSSING OF WATER AND SEWER MAINS

Water and sewer main crossings, as shown on the Drawings, shall be constructed in accordance with the criteria established by the State of California - Department of Health Services for the separation of water mains and sanitary sewers.

3.5 CONCRETE THRUST ANCHORAGE

A. Concrete thrust blocks shall be constructed at all water pipeline fittings, valves and fire hydrants. Thrust blocks shall conform to the details shown on the Contract Documents and shall have a five square foot minimum bearing area. If special thrust block details are not

shown in the Contract Documents, thrust blocks shall conform to the details shown in the Water Agency Standards Drawings and Section 03000 with five square foot minimum bearing area.

B. Thrust blocks shall be placed against undisturbed soil and shall be placed in such a manner as not to disturb the joints, alignment or grade. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary and shall be removed prior to backfilling.

3.6 PREVENTION OF PIPE UPLIFT

All necessary precautions shall be taken to prevent uplift or floating of the pipe prior to the completion of the backfilling operation. The Contractor shall assume full responsibility for any damage due to this cause and shall, at his own expense, restore and replace the pipe to its specified conditions and grade if it is displaced due to floating

3.7 NOT USED

3.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site to ensure uninterrupted progress of the work.

B. Handle all pipe, fittings, specials, and accessories carefully with approved handling devices. Do not drop or roll material off trucks. Do not otherwise drop, roll, or skid piping. Materials cracked, gouged, chipped, dented, or otherwise damaged will not be acceptable and shall be removed from the site immediately.

C. Unload pipe, fittings, and specials opposite to or as close to the place where they are to be installed as is practical to avoid unnecessary handling. Keep pipe interior completely free from dirt and foreign material.

3.9 NOT USED

3.10 MAINTAINING WATER SERVICES

A. While installing a new pipeline to replace an existing pipeline providing water service to users along the line, the service to a given user shall not be interrupted except for the required period to transfer that service from the old line to the new line.

B. The Contractor shall make provisions necessary to keep the existing pipeline in service until the new pipeline has been completed and is ready for service transfers. Transfers shall not be made until the new line has been installed, disinfected, tested and placed in service. At the Contractor's option, highlines may be installed, maintained and removed to provide uninterrupted service to the users while the new pipeline is being constructed in lieu of making individual connections and shutting down one user at a time. If highlines are not used, the Contractor shall notify each user where service is to be connected at least 24 hours prior to cutting of the service line. The highline pipe shall be a minimum of 2 inches in diameter. The Contractor shall submit a plan of all proposed highline facilities for approval by the Engineer prior to installation. Proper disinfection practices shall be maintained at all times as required by the State Health Department. Adequate fire protection facilities shall be maintained at all times.

3.11 SHUT DOWN OF EXISTING WATER MAINS

A. GENERAL. All shut downs of existing water mains will be performed only by the District. The Contractor shall NOT shut down any existing water main. Should the Contractor wish to have an existing water main shut down, a formal written request will be made

to the District, one week in advance of the time of the requested shut down. The District will allow a shut down only when such shut down will cause a minimum of disturbance to the normal delivery of water to customers. The District will have the sole discretion as to approval of schedules for requested shut downs and may require rescheduling if in the District's opinion the requested time for shut down will adversely affect the proper functioning of the water distribution system.

B. NOTIFICATION OF SHUT DOWN. A minimum of 5 working days prior to initiating shut down of existing water mains, Owner will notify; Contractor will assist.

3.12 TEMPORARY RESURFACING

Immediately after placing the backfilling of any section of pipeline in a paved area, temporary resurfacing at least 2 inches in thickness shall be placed over the backfilled trench and maintained by the Contractor at his own expense in accordance with Section 01545 - Protection of the Work and Property. Finish grade of the temporary pavement should match the existing finish grade. Upon completion of substantial parts of the project, but not before the pipeline is tested, the temporary resurfacing shall be replaced with permanent resurfacing.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15041 DISINFECTION OF PIPING

PART 1 GENERAL

1.01 DESCRIPTION

This section describes requirements for disinfection by chlorination of potable and recycled water mains, services, pipe appurtenances and connections.

1.02 REFERENCED STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA B300	-	Hypochlorites
AWWA B301	-	Liquid Chlorine
AWWA C651	-	Disinfecting Water Mains

1.03 RELATED WORK SPECIFIED ELSEWHERE

AWWA Standard Methods for the Examination of Water and Waste Water
WAS Standard Specifications 15000, 15044, 15056, 15057, 15061, and 15064

1.04 SERVICE APPLICATION

A. All water mains and appurtenances taken out of service for inspection, repairs, or other activity that might lead to contamination shall be disinfected before they are returned to service.

B. All new water mains and temporary pipelines shall be disinfected prior to connection to the District's existing system.

C. All components incorporated into a connection to the District's existing system shall be disinfected prior to installation.

1.05 SUBMITTALS

A written disinfection and de-chlorination plan showing the design, equipment, methods, and sequencing intended for use shall be signed by the person responsible for performing the work and submitted to the District Engineer for approval prior to starting disinfection operations.

1.06 DELIVERY, STORAGE AND HANDLING

Chlorination and dechlorination shall be performed by competent individuals knowledgeable and experienced in the operation of the necessary application and safety equipment in accordance with applicable Federal, State and Local laws and regulations. The transport, storage and handling of these materials shall be performed in accordance with Code of Federal Regulations (CFR) 1910.120 Hazardous Waste Operations and Emergency Response, CFR 49.172 Hazardous Materials Regulations, and the General Industry Safety Orders of the California Code of Regulations, Title 8, Section 5194.

1.07 CONCURRENT DISINFECTION AND HYDROSTATIC TESTING

The specified disinfection of the pipelines may *not* be performed concurrently with the hydrostatic testing in accordance with Section 15044.

1.08 CONNECTION TO EXISTING MAINS

Prior to connection to existing mains, disinfection and bacteriological testing shall be performed in accordance with this specification, and hydrostatic testing shall be performed per Section 15044. District authorization for connection to the existing system shall be given only on the basis of acceptable hydrostatic, disinfection and bacteriological test results. Connection to existing mains shall be performed in accordance with Section 15000.

PART 2 MATERIALS

2.01 LIQUID CHLORINE (GAS)

A. Liquid chlorine contains 100-percent available chlorine and is packaged in steel containers in net weights of 68.1kg (150 lb.) or 907.2kg (1 ton).

B. Liquid chlorine shall be used with appropriate gas flow chlorinators, heaters, and injectors to provide a controlled, high-concentration solution feed to the water. The chlorinators and injectors shall be the vacuum-operated type.

2.02 SODIUM HYPOCHLORITE (LIQUID)

Sodium hypochlorite is available in liquid form in glass or plastic containers, ranging in size from 0.95 L (1 Qt.) to 18.93 L (5 Gal). The solution contains approximately 10% to 15% available chlorine.

2.03 TABLET OR GRANULAR HYPOCHLORITE

Tablet or granular hypochlorite shall not be used at any time.

PART 3 EXECUTION

3.01 GENERAL

A. Disinfection of pipelines shall not proceed until all appurtenances and any necessary sample ports have been installed and the District Engineer provides authorization.

B. Every effort shall be made to keep the water main and its appurtenances clean and dry during the installation process.

C. All piping, valves, fittings, and appurtenances which become contaminated during installation shall be cleaned, rinsed with potable water, and then sprayed or swabbed with a 5 percent sodium hypochlorite disinfecting solution prior to installation.

D. Water mains under construction that become flooded by storm water, runoff, or ground water shall be cleaned by draining and flushing with metered potable water until clear water is evident. Upon completion, the entire main shall be disinfected using a method approved by the District Engineer.

3.02 METHODS

A. Liquid Chorine (Gas)

1. Only vacuum-operated equipment shall be used. Direct-feed chlorinators, which operate solely from gas pressure in the chlorine cylinder, shall not be permitted. The equipment shall incorporate a backflow prevention device at the point of connection to the potable water source used to fill the line being tested.

2. The chlorinating agent shall be applied at the beginning of the system to be chlorinated and shall be injected through a corporation stop, a hydrant, or other approved connection to ensure treatment of the entire system being disinfected.

3. Only a certified, licensed chlorination and testing contractor shall perform gas chlorination work. The chlorination contractor must also possess a Grade II Treatment Plant Operator Certification from the State of California if required by the District Engineer.

B. Sodium Hypochlorite Solution (Liquid)

1. Sodium hypochlorite solution shall be used for cleaning and swabbing piping and appurtenances immediately prior to installation and for disinfecting all components of connections to the District's existing system.

2. Sodium hypochlorite solution may be used for the initial disinfection of newly installed water mains. The solution shall be applied at a terminus of the system to be chlorinated using an injector which can adjust the amount of solution being injected into the piping system. The solution shall be injected in the appropriate concentration to achieve the specified concentration range of chlorine throughout the entire piping system. Where pumping equipment is used in conjunction with an injector, an integral backflow prevention device shall be installed and connected to the potable water supply.

3. Water trucks, pumping equipment, piping, appurtenances and all other equipment in contact with potable water shall be disinfected prior to use.

4. Sodium hypochlorite solution may also be used to increase the total chlorine residual if the concentration from the initial chlorination of the system is found to be low. The solution shall be added to the system in sufficient amounts at appropriate locations to insure that the disinfecting solution is present at a concentration within the specified range throughout the piping system.

3.03 FLUSHING OF WATER MAINS AND APPURTENANCES

Prior to disinfection, new pipelines may be drained as directed by the District Engineer. The pipeline shall then be filled with potable water at a rate not to exceed 300 GPM or a velocity of 1 foot per second, whichever is less, and then flushed per AWWA C651. Flushing will continue until a minimum of three exchanges of the pipe volume are achieved and the turbidity level of the water in the new pipeline(s) is less than or equal to 0.5 NTU. If the source water turbidity is greater than 0.5 NTU, flushing shall continue until the pipeline turbidity is equal in turbidity to the source water.

Flushing of all pipelines shall be at a maximum of 2,000’ in length and flushed as one continuous run of pipe or as directed by the District Engineer.

Temporary end caps shall include a minimum 4” blow off on all pipe 8-12” in diameter and a 6” blow off on all pipe larger than 12” in diameter unless otherwise directed by the District Engineer.

A. Contractor shall provide a complete flushing plan and map including points of discharge to the District prior to the commencement of work.

3.04 HIGH PRESSURE WATER JETTING OF PIPING

Prior to testing and flushing, the Contractor shall be required to perform high pressure jetting to clean all piping prior to chlorination unless otherwise directed by the District Engineer.

A letter of certification is required for all equipment, which shall verify that the equipment has been used only in potable water systems.

A. Jetting equipment shall consist of the following: a high pressure water pump with a minimum 80 gallons per minute at 2,500 psi, cleaning nozzle with six rear facing jets at 30 degree angle, and a hydro cleaner tank holding a minimum of 1,000 gallons of minimum concentration of 10 ppm liquid chlorine solution.

B. Contractor shall provide all supplies necessary to perform this work and shall provide documentation that all supplies and equipment are designated for potable water use only. Prior to hydro cleaning, Contractor shall disinfect any equipment in contact with the interior of piping with a liquid chlorine solution in accordance with WAS, AWWA C651, and AWWA C652. All disinfection procedures shall be subject to inspection prior to acceptance and use.

C. Prior to jetting, excavation shall be lined with minimum 8 mil plastic and covered with 12” of ¾” rock to minimize trench erosion and discharging of mud.

D. The hydro cleaner must make a minimum of two (2) complete passes from access point to access point to remove sediment, rust, construction debris, pipe soap residue, and any foreign objects. The hydro cleaner shall make a minimum of two (2) passes from each access point with a minimum 100-foot overlap to ensure that the center of the pipe is cleaned. Contractor shall legally dispose of any debris found within pipe. Contractor shall be responsible for all costs associated with the access points and the physical limitations

of jetting.

E. Contractor shall ensure that water and debris that has been removed from the pipeline shall not flow back into the pipeline.

3.05 PROCEDURE FOR DISINFECTING WATER MAINS AND APPURTENANCES

A. Disinfection shall result in an initial free chlorine concentration of 50-mg/l or as otherwise directed by the District Engineer. This concentration shall be evenly distributed throughout the system to be disinfected. Disinfection of all pipelines shall be at a maximum of 2,000' in length and disinfected as one continuous run of pipe or as directed by the District Engineer.

B. All valves shall be operated with the disinfection solution present in the pipeline. All appurtenances such as air-vacuum relief valves, blowoffs, hydrants, backflow prevention devices, and water service laterals shall be flushed with the treated water a sufficient length of time to insure a free chlorine concentration within the specified range in all components of each appurtenance. (Note the limitations for discharge of chlorinated water outlined below.)

C. The District Engineer will verify the presence of the disinfection solution throughout the system by sampling and testing for acceptable free chlorine concentrations at the various appurtenances and/or at the test ports provided by the Contractor. Areas of the system found to be below the specified free chlorine concentration level shall receive additional flushing as noted above and/or additional disinfection solution as necessary. (Note the limitations for discharge of chlorinated water outlined below.) Addition of disinfection solution after the initial charging of the line shall be made by either the liquid chlorine (gas) method, or the sodium hypochlorite method as directed by the District Engineer.

D. The chlorinated water shall be retained in the system for a minimum of 24 hours. The District Engineer will test the free chlorine residual. The system shall contain a free chlorine residual of not less than 80% of the initial free chlorine residual before the 24-hour soaking period began. If the free chlorine residual has decreased more than 20%, the system shall be soaked for an additional 24-hour period. If the free chlorine residual has not decreased after this additional 24-hour period, the system shall be flushed in accordance with the procedure detailed herein. If the free chlorine residual has decreased, the system shall be flushed in accordance with the procedure detailed herein, and shall be re-disinfected.

E. Following a successful retention period as determined by the District Engineer, the chlorinated water shall be flushed from the system at its extremities and at each appurtenance, using potable water from a source designated by the District Engineer. The minimum water velocity during flushing shall be 3.0 feet per second (AWWA C651) or as directed by the District Engineer. Flushing shall continue until the replacement water in the new system is equal in chlorine residual to the potable source of supply and the turbidity level is 0.5 NTU's or less or as otherwise directed by the District Engineer. (Note the limitations for discharge of chlorinated water outlined below.)

F. The District Engineer will perform bacteriological sampling and testing as specified herein.

3.06 DISCHARGE OF CHLORINATED WATER

A. Indiscriminate onsite disposal or discharge to sewer systems, storm drains, drainage courses or surface waters is prohibited. It shall be the responsibility of the Developer to file a Notice of Intent and obtain a General Waste Discharge Requirements Permit for Discharges of Hydrostatic Test Water and Potable Water to Surface Waters, Storm Drains or Other Conveyance Systems, San Diego Region (Hydrostatic Test Permit) for any discharge of hydrostatic test water or other potable water. The Contractor shall be solely responsible to evaluate, obtain and comply with the provisions of the Hydrostatic Test Permit, including any monitoring and reporting as may be required. The Contractor shall comply with all requirements of the State Water Resources Control Board and the San Diego Regional Water Quality Control Board. The Contractor shall provide copies of all reports and monitoring information to the District Engineer.

Failure to comply with the Hydrostatic Test Permit is a violation of federal and state law. The Contractor hereby agrees to indemnify and hold harmless the District, its Board members, officers, agents, employees and authorized volunteers from and against any and all claims, demands, losses or liabilities of any kind or nature which District, its Board members, officers, agents, employees and authorized volunteers may sustain or incur for noncompliance with the Hydrostatic Test Permit arising out of or in connection with the Project.

B. The environment to which the chlorinated water is to be discharged shall be examined by the Developer and the Private Engineer. Where necessary, federal, state and local regulatory agencies should be contacted to determine special provisions for the disposal of chlorinated water. Any indication that the discharge of chlorinated water may cause damage to the environment shall require the neutralizing of the chlorine residual by means of a reducing agent in accordance with AWWA C651 and the requirements of this specification.

C. In locations where chlorine neutralization is required, the reducing agent shall be applied to the water as it exits the piping system. The Developer shall monitor the chlorine residual during the discharge operations. Total residual chlorine limits in these locations, and for the discharge of chlorinated water from the testing of pipelines to surface waters of the San Diego Region are as follows:

Total Residual Chlorine Effluent Limitations

30-Day Average	-	0.002 mg/l
Average Daily Maximum	-	0.008 mg/l
Instantaneous Maximum	-	0.02 mg/l

The various methods of dechlorination available can remove residual chlorine to concentrations below standard analytical methods of detection, 0.02 mg/l, which will assure compliance with the effluent limit. The Developer will perform all necessary tests to ensure that the total residual chlorine effluent limitations listed above are met.

D. In locations where no hazard to the environment is evident based on the joint examination described above, the chlorinated water may be broadcast for dust control on the surface of the immediate site. Care shall be exercised in broadcasting the water to prevent runoff.

3.07 BACTERIOLOGICAL TESTING

After disinfection has been performed as detailed herein, the District Engineer will perform bacteriological sampling and testing of all new system installations. The testing methodology employed by the District Engineer shall be as set forth in "Standard Methods for the Examination of Water and Waste Water" (current edition). Testing requirements are as set forth in the California Domestic Water Quality and Monitoring Regulations and in accordance with current requirements for surface water testing.

A. The District Engineer will take samples in accordance with method A or B of AWWA C-651-14. Sample method is at the sole discretion of the District Engineer. No flushing is allowed between samples. The days of the test shall be determined by the District Engineer.

B. Sample locations shall be determined by the District Engineer and shall be taken through the length of the new pipeline(s) at locations not more than 365m (1,200') apart. In addition, samples shall be taken at all branches and dead ends. No More than 2,000' of total system length may be tested at any given cycle or as otherwise directed by the District Engineer.

C. All samples must pass the following tests:

1. Coliform Bacteria Test: No positive samples allowed.

2. Heterotrophic Plate Count (HPC) Test: No more than 500 colony-forming units allowed in any sample. The requirement for HPC testing may be waived at the sole discretion of the District Engineer.

D. Samples with excessive turbidity at time of read may be deemed invalid and new samples taken at the discretion of the District Engineer.

E. Any alterations to already approved systems, I.E. lowering of lateral(s), fire hydrant elevation changes, ETC. may be subject to additional bacteriological testing as directed.

3.08 RE-DISINFECTION

A. If any samples fail the Coliform Bacteria or HPC Tests, the entire pipeline(s) will be re-flushed by the Contractor, as detailed in 3.03 of this section, and re-sampled per the initial sample method (A or B) required by the District Engineer as specified herein.

B. If, after the re-flushing procedures described above are performed, the new pipeline(s) continue to fail either the Coliform Bacteria or HPC Tests, the pipeline(s) shall be re-flushed, re-disinfected, and re-sampled, and may be subject to additional cleaning requirements such as those detailed in 3.04 of this section, at the discretion of the District Engineer. These procedures shall continue until satisfactory results are obtained.

C. All re-flushing, re-disinfection, and re-sampling required shall be at the Contractor's expense.

D. If 4 consecutive test cycles fail to yield passing results, the District Engineer may require the removal of the failed system components.

3.09 CONNECTING NEW PIPELINES TO EXISTING PIPELINES

A. Upon successful completion of Bacteriological Testing, Contractor shall schedule connections to existing pipelines within 10 working days or as otherwise required by the District Engineer. If the Contractor exceeds the 10 working day time frame to schedule connections to existing pipelines, additional sampling and testing may be required at the discretion of the District Engineer.

B. Upon completion of connections to existing pipelines, the District will activate and flush the pipeline and again take samples. If samples fail, the District will re-sample at the failed test location(s). If the re-sample does not produce satisfactory results, the newly-installed pipeline shall be disconnected from the existing pipeline(s) at the discretion of the District Engineer. The new pipeline shall then be re-disinfected, re-flushed and re-sampled as specified herein at the Contractor's expense.

3.10 DISINFECTION AT SHORT-LENGTH TIE-INS

Pipes, fittings, valves and all other components incorporated into connections to the District's existing system with an assembly length of 6m (20') or less shall be spray disinfected or swabbed with a liquid chlorine solution in accordance with AWWA C651 and as specified herein. Upon connection to the main, the line shall be flushed and tested as directed by the District Engineer. Failure to pass Bacteriological Testing will require that new facilities be adequately isolated from existing facilities and re-disinfected and re-tested until the new facilities pass the required tests. Costs for additional disinfection, sampling and testing shall be paid for by Contractor. Alternate methods such as "pre-disinfection" prior to installation in accordance with AWWA C651 may be required at the discretion of the District Engineer.

END OF SECTION

SECTION 15041A ADDITIONS TO DISINFECTION OF PIPING

This Section 15041A makes additions, deletions or revisions to Section 15041 Disinfection of Piping. All parts of Section 15041 that are not changed remain in full force and effect.

PART 3 EXECUTION

3.03 PROCEDURE FOR DISINFECTING WATER MAINS AND APPURTENANCES

Remove and replace Paragraph A with the following:

A. Prior to disinfection, new pipelines shall be drained as directed by the District Engineer. The pipeline shall then be filled with potable water at a rate not to exceed 300 GPM or a velocity of 1 foot per second, whichever is less, and then flushed at a minimum velocity of 3.0 feet per second. Flushing will continue until a minimum of three exchanges of the pipe volume are achieved and the turbidity level of the water in the new pipeline(s) is either: less than or equal to 0.5 NTU; or the pipeline turbidity is equal in turbidity to the source water if the source water turbidity is greater than 0.5 NTU.

   Flushing of all pipelines shall be at a maximum of 2,500' in length and flushed as one continuous run of pipe or as directed by the District Engineer.

   Recommended blow off sizing for temporary end caps are a 4" blow off be utilized on all pipe 8-12" in diameter and a 6" blow off used on all pipe larger than 12" in diameter.

Remove and replace Paragraph B with the following:

B. Disinfection shall result in an initial total chlorine concentration of 50-mg/l. This concentration shall be evenly distributed throughout the system to be disinfected. Disinfection of all pipelines shall be at a maximum of 2,500' in length and disinfected as one continuous run of pipe or as directed by the District Engineer.

Remove and replace Paragraph F with the following:

F. Following a successful retention period as determined by the District Engineer, the chlorinated water shall be flushed from the system at its extremities and at each appurtenance, using potable water from a source designated by the District Engineer. The minimum water velocity during flushing shall be 3.0 feet per second or as directed by the District Engineer. Flushing shall continue until the replacement water in the new system is equal in chlorine residual to the potable source of supply and the turbidity level is 0.5 NTU's or less or as otherwise directed by the District Engineer. (Note the limitations for discharge of chlorinated water outlined below.)

Add Paragraph H consisting of the following:

H. In addition to normal testing and flushing, the Contractor may use high pressure jetting to clean all piping prior to chlorination and performing the required bacterial testing or as directed by the District Engineer. Jetting will be required when there is a lack of sufficient area to discharge flushing water, drought conditions, introduction of contaminants into the newly constructed pipeline, or the Contractor has failed bacti's in two or more instances on the same line.

   Contractor shall submit a disinfection plan showing the design, equipment, and sequencing intended for use which shall be subject to Engineer's approval. A letter of certification is

required for all equipment, which shall verify that the equipment has been used only in potable water systems.

1. Jetting equipment shall consist of the following: a high pressure water pump with a minimum 80 gallons per minute at 2,500 psi, cleaning nozzle with six rear facing jets at 30 degree angle, and a hydro cleaner tank holding a minimum of 1,000 gallons of minimum concentration of 10 ppm liquid chlorine solution.

2. Contractor shall supply all supplies necessary to perform this work which shall be used solely in relation to this Project. Prior to hydro cleaning, Contractor shall disinfect any equipment in contact with the interior of piping with a liquid chlorine solution in accordance with WAS and AWWA C651. All disinfection procedures shall be subject to inspection prior to acceptance and use.

3. The hydro cleaner must make a minimum of two (2) complete passes from access point to access point to remove sediment, rust, construction debris, pipe soap residue, and any foreign objects. If the access points are more than 700 feet apart, the hydro cleaner shall make a minimum of two (2) passes from each access point with a minimum 100-foot overlap to ensure that the center of the pipe is cleaned. Contractor shall legally dispose of any debris found within pipe. Contractor shall be responsible for all costs associated with the access points and the physical limitations of jetting.

4. Contractor shall ensure that water and debris that has been removed from the pipeline shall not flow back into the pipeline.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15044 HYDROSTATIC TESTING OF PRESSURE PIPELINES

PART 1 GENERAL

1.01 DESCRIPTION

This section describes the requirements and procedures for pressure and leakage testing of all pressure mains.

1.02 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 15000, 15041, 15056, 15057, 15061, and 15064

1.03 REQUIREMENTS PRIOR TO TESTING

A. All piping, valves, fire hydrants, services, and related appurtenances shall be installed.

B. The pipe trench shall have trench zone backfill placed and compacted with a minimum of 600mm (24") of material over the pipe.

C. All concrete thrust block and anchor blocks shall be allowed to cure in accordance with Section 03000.

D. Pressure tests on exposed and aboveground piping shall be conducted only after the entire piping system has been installed and attached to pipe supports, hangers or anchors as shown on the Approved Plans.

E. Steel pipelines shall not be tested until factory-applied mortar linings and coatings on all pipe lengths have been in place for a minimum of fourteen (14) days. Steel pipelines with cement mortar field-applied to the interior of the pipeline shall not be filled with water until a minimum of eight (8) hours has elapsed after the final placement of cement mortar, unless otherwise approved by the District Engineer.

F. The Contractor is required to pre-test all pipelines before requesting a hydrostatic testing.

1.04 HYDROSTATIC TESTING AND DISINFECTION OF PIPELINES

Hydrostatic testing of pipelines shall be performed prior to disinfection operations in accordance with Section 15041. In the event repairs are necessary, as indicated by the hydrostatic test, the District Engineer may require additional flushing in accordance with Section 15041.

1.05 CONNECTION TO EXISTING MAINS

Hydrostatic testing shall be performed prior to connections to existing mains. District authorization for connection to the existing system shall be given only on the basis of acceptable hydrostatic, disinfection and bacteriological test results. Connection to existing mains shall be performed in accordance with Section 15000.

PART 2 MATERIALS

2.01 WATER

Potable water, supplied by a source approved by the District Engineer, shall be used for all hydrostatic testing of potable and recycled water mains.

2.02 CONNECTIONS

A. Testing water shall be supplied through a metered connection equipped with a backflow prevention device in accordance with Section 15112 at the point of connection to the potable water source used.

B. The Contractor shall provide any temporary piping needed to deliver potable water to the piping that is to be tested. Temporary piping shall be in accordance with Section 15000.

PART 3 EXECUTION

3.01 GENERAL

A. The Contractor shall provide the District Engineer with a minimum of 48 hours' notice prior to the requested date and time for hydrostatic tests.

B. The Contractor shall furnish all labor, materials, tools, and equipment for testing.

C. Temporary blocking during the tests will be permitted only at temporary plugs, caps or where otherwise directed by the District Engineer.

D. All valves and appurtenances shall be operated during the test period. The test shall be conducted with valves in the open position.

E. At the onset of testing, all valves, air vacuum assemblies, blowoffs, and services shall be monitored for possible leakage and repairs made, if necessary, before the test proceeds. The appurtenances shall be monitored through the duration of the testing.

F. Pipelines with cement-mortar lining shall be filled with water and placed under a minimum pressure of 172 KPa (25 psi) for at least forty-eight (48) hours prior to hydrostatic testing.

3.02 FIELD TEST PROCEDURE

A. Before applying the specified test pressure, care shall be taken to release all air within the pipe and appurtenances to be tested. Air shall be released through services, fire hydrants, air release valves, or other approved locations.

B. A five (5) hour hydrostatic pressure test shall be performed after the pipe and all appurtenances have been installed and after any trench backfill compaction with heavy-duty compaction equipment has been completed. The hydrostatic test pressure shall be 345 KPa (50 psi) above the class rating of the pipe, or 1,725 KPa (250 psi), whichever is less, or as otherwise directed by the District Engineer, at the lowest point in the section of pipe being tested. The hydrostatic test pressure at the highest point in the section of pipe being tested shall be within 345 KPa (50 psi) of the hydrostatic test pressure at the lowest point in the section of pipe being tested.

The test pressure shall be applied and continuously maintained by pumping for a period of four (4) hours. During the pumping phase of the test, the test pressure shall be maintained at not less than ninety-five percent (95%) of the specified test pressure at all times.

At the end of the fourth (4th) hour, the pressure shall meet the requirements stated above. Pumping shall then be discontinued for one hour. The pipeline is required to hold the specified test pressure with zero loss for one hour. Any pressure loss from the initial starting pressure will result in a failed test.

If pressure loss exists, the cause of the loss shall be located and repaired as required by the District Engineer. All defective pipe, fittings, valves and other appurtenances discovered shall be removed and replaced with sound material. The hydrostatic test shall be repeated until pressure loss does not occur. All visible leaks shall be similarly repaired.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15055 DUCTILE-IRON PIPE

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials and installation procedures for ductile-iron pipe for potable and recycled water systems.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

ASTM C 150 - Standard Specification for Portland Cement
AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
AWWA C110 - Ductile-Iron and Gray-Iron Fittings
AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C150 - Thickness Design of Ductile-Iron Pipe
AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast
AWWA C153 - Ductile-Iron Compact Fittings
AWWA C207 - Steel Pipe Flanges for Waterworks Service – Sizes 4 In. Through 144 In. (100mm
Through 3,600 mm)
AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances
AWWA C606 - Grooved and Shouldered Joints

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02223, 03000, 09910, 13110, 15000, 15041, 15044, 15056, 15057, 15061, 15064, 15108, 15112, and 15151.

1.04 SERVICE APPLICATION

Ductile-iron pipe shall be used to transport and distribute potable water or recycled water as indicated on the Approved Plans.

If ductile-iron pipe is to be used in the place of PVC pipe, a cathodic protection system may be required.

1.05 DESIGN REQUIREMENTS

A. General:

1. Ductile-iron pipe shall be manufactured per AWWA C111, C115, C150, and C151.

2. Ductile-iron pipe shall be provided in standard 5.49m (18') or 6.10m (20') lengths unless otherwise detailed or required on the Approved Plans. When deep trenches or shoring restrictions hinder the use of the standard length sections, shorter lengths shall be allowed with the concurrence of the District Engineer. Random lengths are not allowed.

3. The minimum length of ductile-iron pipe sections used for tie-ins and stub-outs shall be three (3) times the nominal pipe diameter or 1200mm (48"), whichever is longer, unless otherwise approved by the District Engineer.

4. Joints for ductile-iron pipe shall be mechanical, flanged, or push-on in accordance with AWWA C110, C111, and C153, unless otherwise indicated on the Approved Plans. Joints that are aboveground, within structures, or submerged shall be flanged unless otherwise shown on the Approved Plans.

5. Except as amended herein, or otherwise shown on the Approved Plans, joints for ductile-iron pipe shall have a pressure rating equal to or greater than the adjacent piping.

6. Horizontal Radius and Pipe Deflections: In locations where it is required to lay ductile-iron pipe along curves or install pipe deflections, ductile-iron pipe shall be deflected at joints in accordance with the requirements of AWWA C600. Pipe segments shall not be bent to form arcs.

B. Unless otherwise specified, ductile-iron pipe flanges shall be shop-threaded in accordance with AWWA C115, rated at a working pressure of 1,724 KPa (250 psi). Where required in order to connect to the flanges of 1,724 KPa (250 psi) butterfly valves, or as otherwise shown on the approved plans, ductile-iron flanges shall be compatible with AWWA C207, Class "F". Gray-iron, cast-iron, or hollow-back flanges are not permitted. Threading of flanges in the field is not permitted.

Pipe segments with threaded flanges shall be hydrostatically tested in the presence of the District Engineer prior to installation. The pipe section or spool piece shall be hydrostatically tested for 15 minutes at the pressure rating of the flanges. No leaks are permitted.

C. Plain ends of ductile-iron pipe shall conform to the requirements of AWWA C151 to accept mechanical or push-on joints, flanged coupling adaptors, flexible couplings, or grooved couplings.

D. All ductile-iron pipe shall be cement-mortar lined in accordance with AWWA C104. Cement-mortar shall be in accordance with ASTM C 150, Type II or Type V.

1.06 QUALITY ASSURANCE

A. The manufacturer of each shipment of pipe shall be required to supply a statement certifying that each lot or load of pipe has been subjected to and meets the tests specified for ductile-iron pipe required per AWWA C111, C115, C150, and C151, as applicable.

B. All ductile-iron pipe shall bear indelible identification markings as required by AWWA C151 and shall bear a “home” mark on the spigot end to indicate proper penetration when the joint is made.

1.07 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling of ductile-iron pipe shall follow the recommendations of AWWA C600 and as specified herein:

A. Handling of pipe shall be performed with lifts, cranes, or other suitable equipment and devices. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the pipe, linings, and coatings. Pipe shall not be dropped or dragged.

B. During transport, the pipe shall be supported and secured against movement using padded devices in such a manner to prevent damage.

C. Stored pipe shall be protected from damage and kept free from dirt and foreign materials by closing the ends of the pipe. Other pipeline materials shall be protected by appropriate packaging or wrapping. Gaskets shall be stored in a cool location out of direct sunlight. Bolts, nuts, and washers shall be handled and stored in a dry location.

D. Maintain plastic end caps on all pipe and fittings in good condition until the pipe is ready to be installed in the trench. Periodically open the plastic end caps and spray clean potable water inside the pipe for moisture control.

E. Under no circumstances shall ropes or other handling devices be attached through the interior of pipe or fittings.

1.08 SERVICE SADDLES FOR DUCTILE-IRON PIPE

Service saddles shall be used for the installation of pipe appurtenances 50mm (2”) and smaller in accordance with Section 15057.

1.09 FITTINGS

Ductile-iron fittings shall be used for the installation of pipe appurtenances 100mm (4”) and larger in accordance with Section 15056.

1.10 JOINT RESTRAINT

Joint restraint systems in accordance with Section 15000 shall be used where indicated on the Approved Plans or where concrete thrust blocks are not practical, with the prior approval of the District Engineer.

1.11 CATHODIC PROTECTION

Cathodic protection for ductile-iron pipe shall be installed as indicated on the Approved Plans.

1.12 POLYETHYLENE ENCASEMENT

All ductile-iron pipe shall be encased with polyethylene sleeves or polyethylene wrap in accordance with Section 15000.

1.13 TRACER WIRE

Tracer wire shall be installed for ductile-iron pipe in accordance with Section 15000.

1.14 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for ductile-iron pipe in accordance with Section 15000.

1.15 RECYCLED WATER IDENTIFICATION

Ductile-iron pipe for recycled water shall be identified with purple-colored coating, purple polyethylene sleeves, identification labels or signs in accordance with Section 15151.

PART 2 MATERIALS

2.01 DUCTILE-IRON PIPE

Ductile-iron pipe and appurtenant components and materials shall be selected from the Approved Materials List and in accordance with the Standard Drawings.

A. Minimum pressure class of ductile-iron pipe with push-on, mechanical joint or plain end connections shall be as shown in the following table unless otherwise shown on the Approved Plans:

Pipe Diameter	Pressure Class
Under 500mm (20”)	350
500mm to 600mm (20” to 24”)	300
750mm to 900mm (30” to 36”)	250
Over 900mm (36”)	200

B. Minimum thickness of ductile-iron pipe with threaded flanges or threaded shoulders shall be Special Thickness Class 53 unless otherwise shown on the Approved Plans.

C. Minimum thickness of ductile-iron pipe with grooved ends shall be as shown in the following table unless otherwise shown on the Approved Plans:

Pipe Diameter	Special Thickness Class
Under 500mm (20”)	53
500mm (20”)	54
Over 500mm (20”)	56

2.02 GASKETS

A. Mechanical joint rubber gasket configuration and materials shall comply with AWWA C111 and shall be in accordance with the applicable joint type and pressure rating of the piping system.

B. Flange gaskets shall be 3.2mm (1/8") thick aramid fibers bound with nitrile for all sizes of pipe. Gaskets shall be full-face type with pre-punched holes or ring-type extending to the inner edge of the bolt circumference of the flange. Ring-type gaskets may only be used as directed by the District Engineer.

C. Push-on joint rubber gaskets shall be per AWWA C111.

D. If soil contaminated with organic solvents or petroleum products is encountered during the course of the work, alternate gasket materials or joint treatment may be required by the District Engineer.

2.03 BOLTS AND NUTS FOR FLANGES

Bolts and nuts shall be in accordance with Section 15000 and shall be selected from the Approved Materials List.

2.04 JOINT BONDING AND CATHODIC PROTECTION

Joint bonding, flange insulation kits, internal epoxy linings, and cathodic protection materials shall be provided as indicated on the Approved Plans and in accordance with Section 13110.

2.05 PAINTING AND COATING

A. Buried ductile-iron pipe shall receive a shop-applied asphaltic coating in accordance with AWWA C151.

B. The District may require alternative coatings based on special conditions and the Corrosion Engineer's recommendations. Additional coating requirements, if any, shall be shown on the drawings.

C. Materials for coating of pipe and fittings located above ground and in structures shall be in accordance with Section 09910.

D. Materials for coating buried mechanical joints and hardware shall be in accordance Section 15000.

2.06 IMPORTED GRANULAR MATERIAL FOR PIPE AND TRENCH ZONES

Imported granular material for use in pipe and trench zones shall be in accordance with Section 02223.

2.07 CONCRETE

Concrete for thrust, anchor, and support blocks shall be in accordance with Section 03000.

2.08 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.09 TRACER WIRE

Tracer wire materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.10 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

PART 3 EXECUTION

3.01 GENERAL

A. At all times when the work of installing pipe is not in progress, including worker break times, ends of the pipe shall be closed with tight-fitting, vermin-proof and child-proof caps or plugs. Do not permit trench water to enter the pipe. Do not place tools, clothing, or other materials in the pipe. The Contractor shall maintain the interior of the pipe in a sanitary condition free from foreign materials at all times.

B. Proper care shall be used to prevent damage in handling, moving and placing the pipe. All pipe, fittings, valves, and other pipeline materials shall be lowered into the trench in a manner that prevents damage. The pipe shall not be dropped, dragged or handled in a manner that will cause bruises, cracks, or other damage. Ductile-iron pipe that has been gouged, scratched, or otherwise damaged shall be subject to rejection at the discretion of the District Engineer.

C. Where pipe lengths less than the standard 5.49m (18') or 6.10m (20') are required, the pipe sections shall be installed in accordance with the manufacturer's installation guide and shall only be used as specified herein or with the approval of the District Engineer. The minimum pipe length permitted is 1.52m (5'), except at tie-ins or stub-outs, where the minimum pipe length permitted is three (3) times the pipe diameter or 1.22m (4'), whichever is longer, unless otherwise approved by the District Engineer.

3.02 TRENCHING, BACKFILLING AND COMPACTING

Trenching, backfilling and compacting shall be performed in accordance with Section 02223.

3.03 DEWATERING

Dewatering of trench excavations shall be performed in accordance with Section 02223. If flooding of the trench does occur, the Contractor shall immediately dewater and restore the trench. Damaged or altered pipelines, appurtenances or trench materials shall be repaired or replaced as directed by the District Engineer.

3.04 PIPE INSTALLATION

When the work requires entry of personnel into the pipe, the Contractor shall comply with all Federal and State regulations for confined space entry. Work inside pipelines shall not be undertaken until all the tests and safety provisions of the Code of Federal Regulations 1910.146, and the General Industry Safety Orders of the California Code of Regulations, Title 8, Section 5159 for confined space entry have been performed and the area is verified as safe to enter.

The Contractor shall furnish and install all pipe, specials, fittings, closure pieces, valves, supports, bolts, nuts, gaskets, jointing materials, and all other appurtenances as shown on the Approved Plans and as required to provide a complete and workable installation. Install pipe in the trench as follows:

A. Lay pipe out for installation on earth berms or timber cradles adjacent to the trench in sequential order of installation.

B. Inspect each pipe segment and appurtenance before lowering the pipe segment or appurtenance into the trench. Inspect the interior and exterior protective coatings. Patch damaged areas in the field with material recommended by the protective coating manufacturer. Thoroughly clean the ends of the pipe. Remove foreign matter and dirt from inside of the pipe and keep pipe clean during and after installation.

C. Install pipe according to the manufacturer's approved order of installation. Install pipes uphill if the grade exceeds 10%. Lower the pipe onto the bedding at the proper lines and grades.

D. The manufacturer's printed installation guide outlining the radius of curvature that can be negotiated with pipe sections of various lengths shall be followed, except they shall not exceed the deflections allowed in AWWA C600 according to joint type. Combined deflections at rubber gasket or flexible coupling joints shall not exceed that recommended by the manufacturer.

E. The pipe shall have firm bearing along its full length, and bell holes shall be provided at each joint to permit visual inspection of the joint and prevent the pipe from being supported by the bell end or coupling.

F. Pipe Assembly:

1. Push-On Type: Assemble the pipe joint using a lubricant selected from the Approved Materials List. Insert the spigot end into the bell or coupling to the proper insertion mark. Check that the elastomeric ring has not left the groove during assembly by passing a feeler gauge around the completed joint. Drive spigot ends of the pipe into bell ends in accordance with the manufacturer’s recommendations. Stabbing shall not be permitted.

2. Mechanical Joint Type: Assembly of mechanical joint fittings shall be in accordance with the manufacturer's recommendations regarding installation.

3.05 FLANGED PIPE AND FITTINGS

Flanged connections shall be installed where indicated on the Approved Drawings.

A. Bolt holes shall straddle the vertical centerline.

B. The bolts, nuts and flange faces shall be thoroughly cleaned by wire brush prior to assembly.

C. Bolts and nuts shall be lubricated with a District-approved anti-seize compound.

D. Nuts shall be tightened in an alternating "star" pattern to the manufacturer's recommended torque.

E. Coat the exterior of exposed flanges, bolts and nuts located aboveground or within vaults in accordance with Section 09910.

3.06 MECHANICAL JOINT CONNECTIONS

A. Install mechanical joint connections per AWWA C600 and the manufacturer's recommendations.

B. Prior to installation of the mechanical joint, clean the socket and plain end of the pipe. Lubricate both the gasket and plain end of the pipe with an approved lubricant per AWWA C111 immediately prior to slipping the gasket onto the plain end of the pipe.

C. Tighten the bolts to the normal range of bolt torque per the manufacturer's recommendations and AWWA C600, Table 3, as follows:

Pipe Diameter	Bolt Size	Range of Torque
75 mm (3")	16 mm (5/8")	61-81 N-M (45-60 ft.-lb.)
100-600 mm (4” - 24")	19 mm (3/4")	102-122 N-M (75-90 ft.-lb.)
750-900 mm (30” - 36")	25 mm (1")	136-163 N-M (100-120 ft.-lb.)

3.07 JOINT BONDING AND CATHODIC PROTECTION

Joint bonding to provide continuity, flange insulation kits, internal epoxy linings, and other cathodic protection items and materials shall be installed where shown on the Approved Plans in accordance with the Standard Drawings and Section 13110.

3.08 COUPLINGS FOR DUCTILE-IRON PIPE

A. Grooved-joint couplings shall be used within vaults, above ground, or where indicated on the Approved Plans and shall be installed in accordance with AWWA C606 and Section 15000.

B. Flanged coupling adapters shall be used where indicated on the Approved Plans and shall be installed per the manufacturer's recommendations.

C. Flexible couplings shall be used below ground or where indicated on the Approved Plans and shall be installed per Section 15000 and the manufacturer's recommendations.

3.09 CONCRETE

Concrete thrust and anchor blocks shall be installed in accordance with Section 03000 and the Standards Drawings. Prior to filling the pipeline with water, refer to Section 03000 for the minimum concrete curing time required.

3.10 POLYETHYLENE ENCASEMENT

Polyethylene encasement shall be used for the buried installation of ductile-iron pipe and shall be installed in accordance with Section 15000.

3.11 THRUST AND ANCHOR BLOCKS

Concrete thrust and anchor blocks shall be installed in accordance with Section 03000 and the Standard Drawings.

3.12 JOINT RESTRAINT SYSTEMS

Joint restraint systems shall be installed in accordance with Section 15000. Joint restraint lengths along new pipelines shall be as shown on the Approved Plans. If the installation of concrete thrust blocks is not practical and use of joint restraint systems are approved by the District Engineer, calculations indicating joint restraint lengths along new pipelines shall be submitted to the District Engineer for approval.

3.13 TRACER WIRE

Tracer Wire shall be installed in accordance with Section 15000 and the Standard Drawings.

3.14 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.15 DISINFECTION AND BACTERIOLOGICAL TESTING

Disinfection, bacteriological testing, and flushing shall be performed in accordance with Section 15041.

3.16 HYDROSTATIC TESTING

Field hydrostatic testing shall be performed in accordance with Section 15044.

END OF SECTION

SECTION 15055A ADDITIONS TO DUCTILE-IRON PIPE

This Section 15064A makes additions, deletions or revisions to Section 15055 Ductile-Iron Pipe. All parts of Section 15055 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 DUCTILE-IRON PIPE

The payment for pipe and conduit Work shall be included under the linear foot Bid items and shall include the payment for the following:

a) All wyes, tees, bends, joint restraints, monolithic catch basin connections, and specials as shown on the Plans
b) Removal of interfering portions of existing pipelines, sewers, storm drains, and improvements
c) Closing or removing of abandoned conduit and structures
d) Trench excavation
e) Disposal of excess excavation
f) Control of surface waters
g) Preparation of subgrade
h) Placing and joining pipe
i) Temporary end caps, thrust blocks, and blow-off valves
j) Erection and removal of forms
k) Reinforcing steel
l) Pressure testing
m) Disinfection sample collection and delivery
n) Backfilling the trench
o) Permanent resurfacing
p) Trench shoring and plans, excluding engineered shoring and engineered shoring plans
q) All other Work (excluding temporary resurfacing) necessary to install the pipe or conduit, complete in-place.

No separate or additional payment shall be made for additional bedding or a higher strength of pipe necessitated by you exceeding the maximum trench width, unless a bid item has been provided.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15056 DUCTILE-IRON FITTINGS

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials and installation procedures for ductile-iron fittings for potable and recycled water systems.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

ASTM C 150	-	Standard Specification for Portland Cement
AWWA C104	-	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
AWWA C110	-	Ductile-Iron and Gray-Iron Fittings
AWWA C111	-	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151	-	Ductile-Iron Pipe, Centrifugally Cast
AWWA C153	-	Ductile-Iron Compact Fittings
AWWA C600	-	Installation of Ductile-Iron Mains and Their Appurtenances

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02223, 03000, 09910, 13110, 15000, 15041, 15044, 15055, 15061, 15064, 15108, 15112, and 15151.

1.04 SERVICE APPLICATION

Ductile-iron fittings shall be used as needed in conjunction with the installation of PVC pipe and ductile-iron pipe in locations shown on the Approved Plans.

1.05 DESIGN REQUIREMENTS

A. General:

1. Ductile-iron fittings shall be manufactured per AWWA C110 and C153. Gray-iron or cast-iron fittings shall not be used. Gray iron or cast-iron flanges shall not be used.

2. Ductile-iron fittings shall be mechanical, flanged, or push-on joints in accordance with AWWA C110, and C153.

3. Except as amended herein, or otherwise shown on the Approved Plans, joints for ductile-iron fittings shall have a pressure rating equal to or greater than the adjacent piping.

B. Unless otherwise specified, ductile-iron flanged fittings shall be integrally cast in accordance with AWWA C110, rated at a working pressure of 1,724 KPa (250 psi). Gray-iron or cast-iron flanged fittings are not permitted.

C. The exterior surfaces of all ductile-iron fittings shall be factory-coated with a minimum one (1) mil thick petroleum asphaltic material per AWWA C110 and C153.

D. All ductile-iron fittings shall be cement-mortar lined and seal-coated in accordance with AWWA C104. Cement-mortar shall be in accordance with ASTM C 150, Type II or Type V.

1.06 QUALITY ASSURANCE

The manufacturer of each shipment of ductile-iron fittings shall be required to supply a statement certifying that each lot or load of fittings has been subjected to and met the tests specified for ductile-iron fittings per AWWA C110 and C153, as applicable.

1.07 DELIVERY, STORAGE, AND HANDLING

Delivery, storage, and handling of ductile-iron fittings shall follow the recommendations of AWWA C600 and shall also be as specified herein:

A. Handling of fittings shall be performed with lifts, cranes, or other suitable equipment and devices. Slings, hooks, or pipe tongs shall be padded and used in such a manner as to prevent damage to the fittings, linings, and coatings. The fittings shall not be dropped or dragged.

B. During transport, fittings shall be supported and secured against movement using padded devices in such a manner to prevent damage.

C. Stored fittings shall be protected from damage and kept free from dirt and foreign materials by closing the ends of the pipe. Other pipeline materials shall be protected by appropriate packaging or wrapping. Gaskets shall be stored in a cool location out of direct sunlight. Bolts, nuts, and washers shall be handled and stored in a dry location.

D. Maintain plastic end caps on all fittings in good condition until the pipe is ready to be installed in the trench. Periodically open the plastic end caps and spray clean potable water inside fittings for moisture control.

E. Under no circumstances shall ropes or other handling devices be attached through the interior of fittings.

1.08 POLYETHYLENE WRAP

Polyethylene wrap shall be installed for buried ductile-iron fittings in accordance with Section 15000.

1.09 TRACER WIRE

Tracer wire shall be installed for ductile-iron fittings in accordance with Section 15000.

1.10 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for ductile-iron fittings in accordance with Section 15000.

1.11 RECYCLED WATER IDENTIFICATION

Ductile-iron fittings for recycled water shall be identified with purple-colored coating, purple polyethylene sleeves, identification labels or signs in accordance with Section 15151.

PART 2 MATERIALS

2.01 DUCTILE-IRON FITTINGS

Ductile-iron fittings and appurtenant components and materials shall be selected from the Approved Materials List and in accordance with the Standard Drawings.

2.02 GASKETS

A. Mechanical-joint rubber gasket configuration and materials shall comply with AWWA C111 and shall be in accordance with the applicable joint type and pressure rating of the piping system.

B. Flange gaskets shall be 3.2mm (1/8") thick aramid fiber bound with nitrile for all sizes of pipe. Gaskets shall be full-face type with pre-punched holes or ring-type extending to the inner edge of the bolt circumference of the flange. Ring-type gaskets may only be used as directed by the District Engineer.

C. Push-on joint rubber gaskets shall be per AWWA C111.

D. If soil contaminated with organic solvents or petroleum products are encountered during the course of the work, alternate gasket materials or joint treatment may be required by the District Engineer.

2.03 BOLTS AND NUTS FOR FLANGES

Bolts and nuts shall be in accordance with Section 15000 and shall be selected from the Approved Materials List.

2.04 PAINTING AND COATING

A. Buried ductile-iron fittings shall receive a shop-applied asphaltic coating in accordance with AWWA C151.

B. The District may require alternative coatings based on special conditions and the Corrosion Engineer's recommendations. Additional coating requirements shall be shown on the drawings.

C. Materials for coating of ductile-iron fittings located above ground and in structures shall be in accordance with Section 09910.

D. Materials for coating buried mechanical joints and hardware shall be in accordance Section 15000.

2.05 IMPORTED GRANULAR MATERIAL FOR PIPE AND TRENCH ZONES

Imported granular material for use in pipe and trench zones shall be in accordance with Section 02223.

2.06 CONCRETE

Concrete for thrust, anchor, and support blocks shall be in accordance with Section 03000.

2.07 POLYETHYLENE WRAP

Polyethylene wrap shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.08 TRACER WIRE

Tracer wire materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.09 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

PART 3 EXECUTION

3.01 GENERAL

Ductile-iron fittings shall be installed in accordance with Section 01500 and the manufacturer's recommendations.

3.02 TRENCHING, BACKFILLING AND COMPACTING

Trenching, backfilling and compacting shall be performed in accordance with Section 02223.

3.03 POLYETHYLENE WRAP

Polyethylene wrap shall be used for the buried installation of ductile iron fittings and shall be installed in accordance with Section 15000.

3.04 FLANGED FITTINGS

Flanged fittings shall be installed where indicated on the Approved Drawings.

A. Bolt holes shall straddle the vertical centerline.

B. The bolts, nuts and flange faces shall be thoroughly cleaned by wire brush prior to assembly.

C. Bolts and nuts shall be lubricated with a District-approved anti-seize compound.

D. Nuts shall be tightened in an alternating "star" pattern to the manufacturer's recommended torque.

E. Coat the exterior of exposed flanges, bolts and nuts located aboveground or within vaults in accordance with Section 09910.

3.05 FLANGED CROSSES AND TEES

A. Flanged ductile-iron crosses shall be installed with flanged ductile-iron pipe spools between the crosses and adjacent gate valves or butterfly valves.

B. Flanged tees shall be installed with flanged ductile-iron pipe spools between the tees and adjacent butterfly valves.

C. Spools are required to position valves a sufficient distance from crosses and tees to allow for the installation of thrust blocks without conflicting with valve actuators. Spools shall be 450mm (18”) long for pipe sizes 200mm (8”) through 300mm (12”), and 600mm (24”) long for pipe sizes 350mm (14”) and larger.

D. The pressure class of the spools shall be equal to or greater than that of adjacent piping.

3.06 MECHANICAL-JOINT FITTINGS

A. Install mechanical-joint fittings per AWWA C600 and the manufacturer's recommendations.

B. Prior to installation of the mechanical joint, clean the socket and plain end of the pipe. Lubricate both the gasket and plain end of the pipe with an approved lubricant per AWWA C111 immediately prior to slipping the gasket onto the plain end of the pipe.

C. Tighten the bolts to the normal range of bolt torque per the manufacturer's recommendations and AWWA C600, Table 3, as follows:

Pipe Diameter	Bolt Size	Range of Torque
75 mm (3")	16 mm (5/8")	61-81 N-M (45-60 ft.-lb.)
100-600 mm (4-24")	19 mm (3/4")	102-122 N-M (75-90 ft.-lb.)
750-900 mm (30-36")	25 mm (1")	136-163 N-M (100-120 ft.-lb.)

3.07 SUPPORT FOR DUCTIRE–IRON FITTINGS

All ductile-iron fittings require concrete support blocks in accordance with Section 15000 to prevent the fitting's weight from being carried by the adjacent pipe.

3.08 THRUST AND ANCHOR BLOCKS

Concrete thrust and anchor blocks shall be installed in accordance with the Approved Plans, Section 03000 and the Standard Drawings.

3.09 JOINT RESTRAINT SYSTEMS

Joint restraint systems shall be installed on ductile-iron fittings in accordance with Section 15000. Joint restraint lengths along new pipelines shall be as shown on the Approved Plans. If the installation of concrete thrust blocks is not practical and the use of joint restraint systems are approved by the District Engineer, calculations indicating joint restraint lengths along new pipelines shall be submitted to the District Engineer for approval.

3.10 TRACER WIRE

Tracer Wire shall be installed in accordance with Section 15000 and the Standard Drawings.

3.11 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.12 DISINFECTION AND BACTERIOLOGICAL TESTING

Disinfection, bacteriological testing, and flushing shall be performed in accordance with Section 15041.

3.13 HYDROSTATIC TESTING

Field hydrostatic testing shall be performed in accordance with Section 15044.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15057 COPPER TUBING, BRASS AND BRONZE PIPE FITTINGS

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials and installation of copper tubing, brass and bronze pipe fittings and appurtenances.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

ANSI B1.1	-	Unified Inch Screw Threads
ANSI B1.2	-	Gages and Gaging for Unified Inch Screw Threads
ANSI B1.20.1	-	Pipe Threads, General Purpose (Inch)
ASTM B 43	-	Seamless Red Brass Pipe, Standard Sizes
ASTM B 62	-	Composition Bronze or Ounce Metal Castings
ASTM B 88	-	Seamless Copper Water Tube
ASTM B 88M	-	Seamless Copper Water Tube [Metric]

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 01000, 02222, 02223, 09910, 13110, 15000, 15041, 15044, 15056, 15061, 15064, and 15151.

1.04 SERVICE SADDLES

All connections to new PVC and ductile-iron pipelines for services and other appurtenances sized 50mm (2") or smaller require the installation of service saddles.

1.05 RECYCLED WATER IDENTIFICATION

Copper Tubing, Brass, and Bronze Pipe Fittings for recycled water shall be identified with purple color coating, purple polyethylene sleeves, identification labels and/or signs in accordance with Section 15151.

1.06 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape in accordance with Section 15000 shall be used for all copper tubing,

except that which is bored or jacked.

1.07 SACRIFICIAL ANODES FOR COPPER TUBING

Sacrificial anodes shall be connected to copper tubing where indicated on the Approved Plans in accordance with Section 13110.

PART 2 MATERIALS

2.01 COPPER TUBING

Copper tubing shall conform to the requirements of ASTM B88 Type K or ASTM B88 M (Metric) Type A seamless copper water tube. Copper tubing shall be soft and shall be selected from the Approved Materials List.

2.02 BRASS PIPE, NIPPLES, AND FITTINGS

Brass pipe, nipples, and fittings shall conform to ASTM B 43, regular wall thickness. Threads shall conform to ANSI B1.20.1.

2.03 BRONZE APPURTENANCES

A. All bronze appurtenances specified herein shall conform to ASTM B 62.

B. Corporation stops, curb stops, meter and angle meter stops, and meter flange adapters shall be selected from the Approved Materials List.

C. Bronze appurtenances shall be threaded or compression-type in accordance with the Standard Drawings.

2.04 SERVICE SADDLES

Service saddles shall be compatible with the size and type of pipe receiving the saddle in accordance with the manufacturer's recommendations and shall be selected from the Approved Materials List.

2.05 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape materials shall be in accordance with Section 15000 and shall be selected from the Approved Materials List.

2.06 SACRIFICIAL ANODES FOR COPPER TUBING

Sacrificial anodes shall be in accordance with Section 13110 and shall be selected from the Approved Materials List.

PART 3 EXECUTION

3.01 COPPER TUBING AND FITTINGS

A. Trenching, bedding, backfilling and compacting shall be performed in accordance with Section 02223 and the Standard Drawings. Provide a minimum cover of 750mm (30") below finished street grade.

B. Cut tubing true and square and remove burrs.

C. Copper tubing shall be installed perpendicular to water mains. Horizontal bends or curves in copper tubing are not allowed. Vertical bends shall be in accordance with the Standard Drawings. Shape vertical bends with shaping tools and form bends without flattening, buckling, or thinning the tubing wall at any point.

D. Assemble copper tubing and fittings per the manufacturer's recommendations.

3.02 SERVICE SADDLES

A. Service saddles shall be located a minimum of 600mm (24”) from any pipe joint, fitting, or other service saddle(s).

B. Multiple service saddles installed on the same side of a single pipe spool shall be alternated at 10° and 30° above horizontal to prevent a weak plane in the pipe.

C. Prior to installation of service saddles, the surface of the pipe shall be cleaned to remove all dirt and debris.

D. Service saddles shall be tightened in accordance with the manufacturer's recommendations to ensure a tight seal, using care to prevent damage or distortion of the service saddle or corporation stop due to over-tightening.

E. Pipe taps shall be made in accordance with the pipe manufacturer's recommendations. Tapping tools and shell cutters with internal teeth or double slots that will retain the coupon shall be used.

3.03 WARNING/IDENTIFICATION TAPE

Install warning/identification tape in accordance with Section 15000 and the Standard Drawings.

3.04 SACRIFICIAL ANODES FOR COPPER TUBING

Install sacrificial anodes where indicated on the Approved Plans in accordance with Section 13110.

3.05 DISINFECTION AND BACTERIOLOGICAL TESTING

Disinfection, bacteriological testing, and flushing shall be performed in accordance with Section 15041.

3.06 HYDROSTATIC TESTING

Field hydrostatic testing shall be performed in accordance with Section 15044.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15064 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials and installation procedures for polyvinyl chloride (PVC) pressure pipe. Generally, this section refers to the materials and procedures for installing pipe and appurtenances for potable and recycled water systems.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C900	-	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100mm Through 300mm), for Water Transmission and Distribution
AWWA C905	-	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350mm Through 1,200mm), for Water Transmission and Distribution
AWWA M23	-	PVC Pipe - Design and Installation
Uni-Bell	-	Handbook of PVC Pipe Design and Construction

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15057, 15074, 15100, 15102, 15108, and 15300

1.04 SERVICE APPLICATION

A. PVC pipe will be used to transport and distribute potable water or recycled water as indicated on the Approved Plans.

B. In accordance with their AWWA designations PVC pipe shall be used for pipe sizes as follows:

1. 100mm (4") C900 PVC pipe shall be used for the installation of appurtenances such as air valves, blowoffs and fire services.

2. C900 PVC pipe shall be used for mains and related appurtenances sized 150mm (6") through 300mm (12").

3. C905 PVC pipe shall be used for mains sized 350mm (14") through 900mm

(36”).

1.05 DESIGN REQUIREMENTS

A. PVC pipe shall be provided in standard 6.10m (20') lengths, unless otherwise detailed or required on the Approved Plans. When deep trenches or shoring restrictions hinder the use of the standard length sections, the use of 3.05m (10') and 4.57m (15') lengths shall be allowed. Random lengths are not allowed.

B. The minimum length of PVC pipe sections used for tie-ins and stub-outs shall be three (3) times the pipe diameter or 1200mm (48”), whichever is longer, unless otherwise approved by the District Engineer.

C. Horizontal Radius: In areas where it is required to lay the pipe along a curve, the use of deflection couplings will be used to form the arc. The pipe shall not be bent to form the arc, nor shall the pipe be deflected within integral bells or ductile-iron fittings. Unless otherwise approved by the District Engineer, PVC pipe shall be installed using 5° deflection couplings (2½° at each bell) to form arcs with radii no less than the minimums noted below:

Pipe Length Used	Minimum Radius
6.10m (20')	69.80m (229')
3.05m (10')	35.05m (115')
Combination (refer to Section 3)	23.16m (76')

1.06 QUALITY ASSURANCE

A. The manufacturer of each shipment of pipe shall be required to supply a statement certifying that each lot or load of pipe has been subjected to the tests specified for PVC pipe, and has been found to meet all the requirements of AWWA C900 and/or C905 as applicable.

B. PVC pipe shall carry a current certification of the National Sanitation Foundation (NSF) as acceptable to use in the transport of potable water.

C. PVC pipe and couplings shall bear indelible identification markings as required by AWWA C900 and C905. In addition, all pipe shall bear a “home” mark on the spigot end to indicate proper penetration when the joint is made. The pipe markings for PVC pipe for recycled water systems shall include the designation “RECYCLED WATER” in addition to the identification markings required by AWWA.

1.07 DELIVERY, STORAGE, AND HANDLING

A. PVC pipe shall be stored in suppliers' yards and on the job site in accordance with AWWA M23 and the manufacturer's recommendations. Store PVC pipe in the field by supporting the pipe uniformly in accordance with AWWA M23. Pipe shall not be stacked higher that 1.22m (4’) or with weight on the bell ends.

B. Cover stored PVC pipe with an opaque material to protect it from the sun's ultraviolet radiation. PVC pipe that has been subjected to excess ultraviolet radiation as identified by color fading or chalking shall not be used. The determination as to the acceptability of PVC pipe shall rest solely with the District Engineer.

C. PVC pipe that has been contaminated in any way with petroleum products (on the inside

or outside of the pipe) shall not be used.

1.08 SERVICE SADDLES FOR PVC PIPE

Service saddles shall be used for the installation of pipe appurtenances 50mm (2") and smaller in accordance with Section 15057.

1.09 FITTINGS

Ductile-iron fittings shall be used for the installation of pipe appurtenances 100mm (4") and larger in accordance with Section 15056.

1.10 JOINT RESTRAINT

Joint restraint systems in accordance with Section 15000 shall be used where indicated on the Approved Plans or where concrete thrust blocks are not practical, with the prior approval of the District Engineer.

1.11 TRACER WIRE

Tracer wire shall be installed for all PVC water mains, whether potable or recycled, in accordance with Section 15000.

1.12 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for all PVC water mains, whether potable or recycled, in accordance with Section 15000.

1.13 RECYCLED WATER IDENTIFICATION

PVC pipe for recycled water system applications shall be purple. Fittings and pipe appurtenances installed with PVC mains for recycled water shall be identified with purple-colored coating, purple polyethylene sleeves, identification labels, or signs in accordance with Section 15151.

PART 2 MATERIALS

2.01 POLYVINYL CHLORIDE PIPE

A. PVC pressure pipe and appurtenant components and materials shall be selected from the Approved Materials List. Provide pipe with cast-iron equivalent outside diameter, and integral wall-thickened bell and spigot ends.

B. PVC pipe in sizes 100mm (4") through 300mm (12") shall comply with the requirements of AWWA C900, Class 305 (DR14).

C. PVC pipe in sizes 350mm (14") through 900mm (36") shall comply with the requirements of AWWA C905, Class 165 (DR 25) or Class 235 (DR18), as shown on the Approved Plans.

2.02 DEFLECTION COUPLINGS

PVC deflection couplings that allow for 2½° deflection at each bell for a maximum of 5° total deflection shall be selected from the Approved Materials List.

2.03 FITTINGS

Ductile-iron fittings shall be in accordance with Section 15056 and selected from the Approved Materials List. The fittings shall have mechanical joint type or push-on type joints manufactured specifically for PVC pipe.

2.04 CONCRETE

Concrete used for thrust, anchor, and support blocks shall be in accordance with Section 03000.

2.05 JOINT RESTRAINT

Joint restraint systems shall be in accordance with Section 15000 and shall be selected from the Approved Materials List.

2.06 IMPORTED GRANULAR MATERIAL FOR PIPE AND TRENCH ZONES

Imported granular material for use in pipe and trench zones shall be in accordance with Section 02223.

2.07 TRACER WIRE

Tracer wire materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.08 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

PART 3 EXECUTION

3.01 GENERAL

A. At all times when the work of installing pipe is not in progress, including worker break times, the ends of the pipe shall be closed with tight-fitting, vermin-proof and child-proof caps or plugs. Do not permit trench water to enter the pipe. Do not place tools, clothing, or other materials in the pipe. The Contractor shall maintain the interior of the pipe in a sanitary condition free from foreign materials at all times.

B. Proper care shall be used to prevent damage in handling, moving and placing the pipe. All pipe, fittings, valves, and other pipeline materials shall be lowered into the trench in a manner that prevents damage. The pipe shall not be dropped, dragged or handled in a manner that will cause bruises, cracks, or other damage. PVC pipe that has been gouged, scratched, or otherwise damaged shall be subject to rejection at the discretion of the District Engineer.

C. Where pipe lengths less than the standard 6.10m (20') are required, the pipe sections shall be installed in accordance with the manufacturer's installation guide (with the exception of deflection at the bell and spigot, which is not allowed) and shall only be used as specified herein or with the approval of the District Engineer. The minimum pipe length permitted is 1.52m (5'), except at tie-ins and stub-outs, where the minimum pipe length permitted is three (3) times the pipe diameter or 1.22m (4'), whichever is longer, unless otherwise approved by the District Engineer.

3.02 TRENCHING, BACKFILLING AND COMPACTION

Trenching, bedding, backfilling and compaction operations shall be performed in accordance with Section 02223.

3.03 DEWATERING

Dewatering of trench excavations shall be performed in accordance with Section 02223. If flooding of the trench does occur, the Contractor shall immediately dewater and restore the trench. Damaged or altered pipelines, appurtenances, or trench materials shall be repaired or replaced as directed by the District Engineer.

3.04 PIPE INSTALLATION

When the work requires and the size of the pipe allows entry of personnel into the pipe, the Contractor shall comply with all Federal and State regulations for confined space entry. Work inside pipelines shall not be undertaken until all the tests and safety provisions of the Code of Federal Regulations 1910.146, and the General Industry Safety Orders of the California Code of Regulations, Title 8, Section 5159 for confined space entry have been performed and the area is verified as safe to enter.

The Contractor shall furnish and install all pipe, specials, fittings, closure pieces, valves, supports, bolts, nuts, gaskets, jointing materials, and all other appurtenances as shown on the Approved Plans and as required to provide a complete and workable installation. Install pipe in the trench as follows:

A. Inspect each section of pipe prior to lowering the pipe into the trench. Thoroughly clean the ends of the pipe. Remove foreign matter and dirt from inside of the pipe and keep clean during and after installation.

B. Install pipe according to the manufacturer's approved order of installation to the proper lines and grades in accordance with the Approved Plans and as follows:

1. Install pipe uphill if the grade exceeds ten percent (10%).

2. Installation tolerances for the pipe shall not vary more than 50mm (2") horizontally or 25mm (1") vertically from the alignment and elevations shown on the Approved Plans.

3. Install the pipe such that the identification markings on each pipe section are continuously aligned for the total length of the pipeline alignment. Orient the strip marking upward to the 12 o'clock position (top) of the trench opening.

C. The pipe shall have firm bearing along its full length, and bell holes shall be provided at each joint to permit visual inspection of the joint and prevent the pipe from being supported by the bell end or coupling.

D. The beveled end of the pipe shall be removed prior to insertion into a mechanical joint fitting.

E. Field cutting and milling shall be performed in accordance with the manufacturer's written instructions to equal the quality of shop-fabricated ends.

F. Pipe Assembly:

1. Push-On Type: Assemble the pipe joint using a lubricant selected from the Approved Materials List. Insert the spigot end into the bell or coupling to the proper insertion mark. Check that the elastomeric ring has not left the groove during assembly by passing a feeler gauge around the completed joint. Drive spigot ends of the pipe into bell ends in accordance with the manufacturer's recommendations. Stabbing shall not be permitted.

2. Mechanical-Joint Type: Assembly of mechanical joint fittings shall be in accordance with the manufacturer's recommendations regarding installation.

G. PVC pipe shall not be bent, nor shall PVC pipe be deflected at pipe connections other than deflection couplings. Install deflection couplings selected from the Approved Materials List for horizontal and vertical changes in direction not greater than 5°, and for installation of pipe through curves. Pipe sections of differing lengths may be used as follows to facilitate the installation of pipelines through curves:

1. Allowable lengths of pipe sections through curves are 6.10m (20'), 3.05m (10'), or 1.52m (5') only.

2. No more than two 1.52m (5') pipe sections may be used in succession without being separated by a 6.10m (20') or 3.05m (10') section. Pipe layout through curves is subject to approval by the District Engineer. In no case shall the minimum radius be less than 23.16m (76').

3.05 SUPPORT FOR DUCTILE-IRON FITTINGS AND VALVES

All ductile-iron fittings and valves require concrete support blocks in accordance with Sections 15056, 15100 and 15102 to prevent the fitting or valve weight from being carried by the PVC pipe.

3.06 THRUST AND ANCHOR BLOCKS

Concrete thrust and anchor blocks shall be installed in accordance with Section 03000 and the Standard Drawings.

3.07 JOINT RESTRAINT SYSTEMS

Joint restraint systems shall be installed in accordance with Section 15000. Joint restraint lengths along new pipelines shall be as shown on the Approved Plans. If the installation of concrete thrust blocks is not practical and use of joint restraint systems are approved by the District Engineer, calculations indicating joint restraint lengths along new pipelines shall be submitted to the District Engineer for approval.

3.08 TRACER WIRE

Tracer wire shall be installed in accordance with Section 15000 and the Standard Drawings.

3.09 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.10 DISINFECTION AND BACTERIOLOGICAL TESTING

Disinfection, bacteriological testing and flushing shall be performed in accordance with Section 15041.

3.11 HYDROSTATIC TESTING

Field hydrostatic testing shall be performed in accordance with Section 15044.

END OF SECTION

SECTION 15064A ADDITIONS TO POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

This Section 15064A makes additions, deletions or revisions to Section 15604 Polyvinyl Chloride (PVC) Pressure Pipe. All parts of Section 15604 that are not changed remain in full force and effect.

PART 1 - GENERAL

1.02 REFERENCE STANDARDS

Delete the reference to AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100mm Through 300mm), for Water Transmission and Distribution and Replace it with AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)

Delete the reference to AWWA C905 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350mm Through 1,200mm), for Water Transmission and Distribution

1.04 SERVICE APPLICATION

Paragraph B.

Subparagraph 2. Delete and replace with C900 PVC pipe shall be used for mains and related appurtenances sized 150mm (6”) through 1,500mm (60”)

Subparagraph 3. Delete in its entirety.

1.06 QUALITY ASSURANCE

Paragraph A, 3rd line. Delete “and/or C905”.

Paragraph C, 2nd line. Delete “and C905”.

PART 2 - MATERIALS

2.01 POLYVINYL CHLORIDE PIPE AND FITTINGS

Paragraph B. Delete and replace with “PVC pipe in sizes 100mm (4”) through 1,500mm (60”) shall comply with the requirements of AWWA C900, Class 305 (DR14).

Paragraph C. Delete in its entirety.

PART 4 PAYMENT

4.1 PRESSURE PIPE

The payment for pipe and conduit Work shall be included under the linear foot Bid items and shall include the payment for the following:

a) All wyes, tees, bends, joint restraints, monolithic catch basin connections, and specials as shown on the Plans
b) Removal of interfering portions of existing pipelines, sewers, storm drains, and improvements
c) Temporary end caps, thrust blocks, and blow-off valves

d) Closing or removing of abandoned conduit and structures
e) Trench excavation
f) Disposal of excess excavation
g) Control of surface waters
h) Preparation of subgrade
i) Placing and joining pipe
j) Erection and removal of forms
k) Reinforcing steel
l) Pressure testing
m) Disinfection sample collection and delivery
n) Backfilling the trench
o) Permanent resurfacing
p) Trench shoring and plans, excluding engineered shoring and engineered shoring plans
q) All other Work (excluding temporary resurfacing) necessary to install the pipe or conduit, complete in-place.

No separate or additional payment shall be made for additional bedding or a higher strength of pipe necessitated by you exceeding the maximum trench width, unless a bid item has been provided.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15074 BLOWOFF ASSEMBLIES

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of blowoff assemblies.

1.02 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15057, 15061, 15064, and 15100

1.03 SERVICE APPLICATION

A. Blowoff assemblies shall be installed on potable and recycled water mains.

B. Blowoff assemblies shall be sized and located as shown on the Approved Plans. In general, blowoff assemblies will be installed at the ends and at low points of pipelines as shown below:

1. 50mm (2") blowoff assemblies will be required on pipelines for temporary use, when shown on the Approved Plans, or as otherwise directed by the District Engineer.

2. 100mm (4") blowoff assemblies will be required on pipeline sizes 400mm (16") and smaller.

3. 150mm (6") blowoff assembly will be required on pipeline sizes 450mm (18") and larger.

1.04 RECYCLED WATER IDENTIFICATION

Blowoff assemblies for recycled water shall be identified with purple-colored coating, identification labels or signs in accordance with Section 15151.

1.05 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for blowoff assemblies in accordance with Section 15000.

PART 2 MATERIALS

2.01 GENERAL

Blowoff assemblies and appurtenant components and materials shall be selected from the Approved Materials List.

2.02 CONCRETE

Concrete used for thrust or anchor blocks shall be in accordance with Section 03000.

2.03 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and the Approved Materials List.

2.04 FIELD PAINTING AND COATING

Field painting and coating materials shall be in accordance with Section 09910 and the Approved Materials List.

PART 3 EXECUTION

3.01 INSTALLATION

A. Blowoff assemblies shall be installed at locations shown on the Approved Plans or as directed by the District Engineer in accordance with the Standard Drawings.

B. Blowoff assemblies shall be connected to water mains no closer than 600mm (24”) to a bell, coupling, joint or fitting.

C. Locations of blowoff assembly meter boxes or valve boxes shall be in accordance with the Standard Drawings.

3.02 CONCRETE

Concrete thrust and anchor blocks shall be installed in accordance with Section 03000 and the Standard Drawings. Refer to Section 03000 for the minimum concrete curing time required.

3.03 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.04 DISINFECTION OF BLOWOFF ASSEMBLIES

Blowoff assemblies shall be disinfected in accordance with Section 15041 in conjunction with disinfecting the main to which it is connected. Blowoff assembly valves shall be operated and the assembly shall be flushed to completely disinfect all internal parts.

3.05 HYDROSTATIC TESTING

Blowoff assemblies shall be hydrostatically tested in accordance with Section 15044 in conjunction with hydrostatically testing the pipeline to which it is connected.

3.06 FIELD PAINTING AND COATING

Blowoff assembly appurtenances shall be field-painted in accordance with Section 09910.

END OF SECTION

SECTION 15074A ADDITIONS TO BLOWOFF ASSEMBLIES

This Section 15074A makes additions, deletions or revisions to Section 15074 Blowoff Assemblies. All parts of Section 15074 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 BLOWOFF ASSEMBLIES

The payment for installation of permanent blowoff valves shall be paid for at the Bid items per each and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

The payment for temporary blow-off valves shall be included in the Bid item for the water main.

4.2 RELOCATE EXISTING 4" BLOWOFF

The payment for relocating of existing blowoff valves shall be paid for at the Bid items per each and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

4.3 ADJUST EXISTING BLOWOFF TO GRADE

The payment for adjusting existing blowoff valves to grade as shown on the Plans shall be included in the Bid item for "Adjust Existing Blowoff to Grade".

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15100 RESILIENT WEDGE GATE VALVES (RWGV's)

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of manually-operated Resilient Wedge Gate Valves (RWGV's).

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C210	-	Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
AWWA C213	-	Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
AWWA C509	-	Resilient-Seated Gate Valves for Water Supply Service
AWWA C515	-	Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service
AWWA C550	-	Protective Interior Coatings for Valves and Hydrants
SSPC	-	Steel Structures Painting Council

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15057, 15061, 15064, 15074, 15108, 15112, and 15300

1.04 SERVICE APPLICATION

A. RWGV's shall be installed on potable and recycled water mains and appurtenances in accordance with the Approved Plans and the Standard Drawings.

B. RWGV's shall be used to isolate and depressurize pipeline segments for repairs, modifications, inspections or maintenance.

C. In general, RWGV's shall be used when valves are required on pipelines and appurtenances sized 100mm (4") through 300mm (12").

D. Valves for pipelines sized 350mm (14") and larger generally require the use of butterfly valves (BFV's) in accordance with Section 15102.

1.05 SUBMITTALS

A. RWGV's 300mm (12") and smaller shall be selected from the Approved Materials List.

B. RWGV's 350mm (14") and larger require District Approval. Submittals shall include catalog data showing conformance to AWWA C509, size(s) proposed for use, valve dimensions, pressure rating, and materials of construction, and such valves shall also conform to all other requirements specified herein.

1.06 SIZING OF VALVES

Valves shall be the same size as the line in which they are installed unless otherwise noted on the Approved Plans.

1.07 VALVE ENDS

Valve ends shall be compatible with the piping system in which they are being installed in accordance with the Approved Plans or directed by the District Engineer.

Ductile-iron flanges shall be in accordance with Section 15056.

1.08 VALVE TESTING

RWGV's shall be hydrostatically tested and valve coatings shall be holiday detected prior to shipment to the field in accordance with the testing procedures shown in Appendix A. Valves delivered to the site prior to successful hydrostatic testing and holiday detection shall be rejected.

1.09 DELIVERY, STORAGE AND HANDLING

Valves shall be delivered and stored in accordance with AWWA C550. The port openings shall be covered with plastic, cardboard or wood while in transit and during storage in the field. These covers shall remain in place until valves are ready to be installed. Valves shall not be stored in contact with bare ground. Valves shall not be stacked.

1.10 RECYCLED WATER IDENTIFICATION

RWGV's used for recycled water shall be identified with purple-colored coating, identification labels and/or signs in accordance with Section 15151.

1.11 POLYETHYLENE ENCASEMENT

Polyethylene wrap shall be used for the buried installation of resilient wedge gate valves in accordance with Section 15000.

PART 2 MATERIALS

2.01 RESILIENT WEDGE GATE VALVES (RWGV's)

A. RWGV's shall be ductile-iron in accordance with AWWA C509 and C515 except as modified herein.

B. RWGV's shall have smooth unobstructed waterways free from any sediment pockets.

C. RWGV's shall be leak-tight at their rated pressure.

D. RWGV's shall have a non-rising low-zinc bronze or stainless steel stem, opened by turning left (counterclockwise).

E. Stem seals shall be the O-ring type incorporating a minimum of two rings as required by AWWA C509.

F. Low-friction torque-reduction thrust washers or bearings shall be provided on the stem collar.

G. Wedge (gate) shall be fully encapsulated with a bonded-in-place Ethylene Propylene Diene Monomer (EPDM) elastomeric covering. Minimum thickness of the rubber seating area shall be 6.35mm (¼").

H. Valves for buried applications shall be provided with a 50mm (2") square operating nut, and valves located above ground or in structures shall be equipped with a minimum 300mm (12") diameter hand wheel in accordance with AWWA C509 unless otherwise indicated on the Approved Plans or required by the District Engineer.

I. RWGV interior and exterior surfaces (except for the encapsulated disc) shall be coated as described below.

J. All bolts and nuts used in the construction of RWGV's shall be Type 316 stainless steel.

2.02 EPOXY LINING AND COATING

Epoxy linings and coatings for valves shall be provided in accordance with AWWA C210, C213 and C550, with the following modifications:

A. Epoxy lining and coating of valve surfaces shall be performed by the valve manufacturer by qualified personnel in a facility where the environment can be controlled. Epoxy lining and coating of valves in the field is prohibited.

1. Surface preparation shall be as detailed in SSPC-SP10, Near White Blast Cleaning.

2. Liquid epoxy lining materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact for potable water.

3. The minimum dry film thickness for epoxy linings shall be 0.203mm (0.008" or 8 mils). Liquid epoxy lining shall be applied in two (2) coats in accordance with AWWA C210 and application shall conform to the coating manufacturer's recommendations.

B. Powder epoxy lining and coating materials shall contain one hundred percent (100%) solids in accordance with AWWA C213, shall be applied in one or more coats, and shall conform to the coating manufacturer's recommendations.

C. Repairs made to manufacturer's applied linings shall be performed by a company approved by the valve manufacturer, by qualified personnel, and in a facility where the environment can be controlled.

2.03 GATE WELLS AND EXTENSION STEMS

Gate wells and extension stems for buried valves shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.04 CONCRETE

Concrete used for thrust, anchor, and support blocks shall be in accordance with Section 03000.

2.05 POLYETHYLENE ENCASEMENT

Polyethylene wrap shall be in accordance with Section 15000 and shall be selected from the Approved Materials List.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install valves with the bolt holes straddling the vertical centerline of pipe and the operating nut in the vertical position unless otherwise noted on the Approved Plans.

B. Valves shall be installed in accordance with the manufacturer's recommendations and the applicable section of these specifications for the piping material and joint type being used.

C. Joints shall be prepared for installation in accordance with Section 15056.

3.02 POLYETHYLENE ENCASEMENT

Install polyethylene wrap for buried valves in accordance with Section 15000.

3.03 CONCRETE

Concrete thrust, anchor, and support blocks shall be installed in accordance with Section 03000 and the Standard Drawings. The concrete shall be placed so that valves and valve operators will be accessible for repairs or replacement. Prior to filling the pipeline with water, refer to Section 03000 for the minimum concrete curing time required.

3.04 GATE WELLS AND EXTENSION STEMS

Gate wells and extension stems for buried valves shall be installed in accordance with Section 15000 and the Standard Drawings.

3.05 DISINFECTION OF VALVES

Disinfection and flushing of valves shall be in accordance with Section 15041, as part of the process of disinfecting the main pipeline. Valves shall be operated during the disinfection period to completely disinfect all internal parts.

3.06 HYDROSTATIC TESTING

Valves shall be hydrostatically tested in conjunction with the pipeline in which they are installed in accordance with Section 15044.

3.07 FIELD PAINTING AND COATING

The exterior of valves installed above ground or exposed in vaults or enclosures shall be field painted in accordance with Section 09910.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15102 BUTTERFLY VALVES (BFV's)

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of manually operated butterfly valves (BFV).

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. References shall be made to the latest edition of said standards unless otherwise called for.

AWWA C210	Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
AWWA C213	Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
AWWA C504	Rubber-Seated Butterfly Valves
AWWA C550	Protective Epoxy Interior Coatings for Valves and Hydrants
SSPC	Steel Structures Painting Council

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15061 and 15064

1.04 SERVICE APPLICATION

A. Butterfly valves (BFV) shall be installed on potable and recycled water mains and appurtenances where shown on the Approved Plans and in accordance with the Standard Drawings.

B. Butterfly valves shall be used for open/closed operations and throttling service and frequent operation after long periods of inactivity.

C. In general butterfly valves shall be used when valves are required on pipelines 350mm (14") and larger and where the use of a motor-operated valve is required as shown on the Approved Plans. Butterfly valves smaller than 350mm (14") shall only be used as indicated on the Approved Plans or with the prior approval of the District Engineer.

D. Valves for pipelines sized 300mm (12") and smaller generally require resilient wedge gate valves (RWGV's) in accordance with Section 15100.

1.05 SUBMITTALS

The following items shall be submitted for review and approval by the District Engineer prior to ordering or delivery of butterfly valves.

A. An affidavit from the valve manufacturer showing the following:

1. Actuators used were furnished and installed by the valve manufacturer.

2. Valves have successfully passed hydrostatic testing per AWWA C504 and coatings testing by the valve manufacturer.

B. The valve manufacturer's catalog data showing the size to be used, valve dimensions, pressure rating and materials of construction.

C. Actuator manufacturer's catalog data and detail construction sheets showing the dimensions, materials, number of turns, and required torque input of the actuator to be used.

D. Manufacturer's catalog data and proof of NSF certification on the lining materials to be used.

1.06 SIZING OF VALVES

Valves shall be the same size as the line in which they are installed unless otherwise shown on the Approved Plans.

1.07 VALVE ENDS

Valve ends shall be flanged ductile-iron unless otherwise called for on the Approved Plans or as directed by the District Engineer.

Ductile-iron flanges shall generally be in accordance with AWWA C115, rated at a working pressure of 1,724 KPa (250 psi). When Class 250 butterfly valves are shown on the Approved Plans or are otherwise required, ductile-iron flanges shall be compatible with AWWA C207, Class "F".

Maximum working pressure of the flange shall as specified in AWWA or ASME/ANSI. Flanges shall be integrally cast per AWWA C110.

1.08 VALVE TESTING

Butterfly valves shall be hydrostatically tested and coatings shall be holiday detected prior to shipment to the field per testing procedures shown in Appendix A. Valves delivered to the site prior to successful hydrostatic testing and holiday detection will be subject to rejection.

1.09 DELIVERY, STORAGE AND HANDLING

Valves shall be delivered and stored in accordance with AWWA C504 and AWWA C550. The port openings shall be covered with plastic, cardboard or wood while in transit and during storage in the field. These covers shall remain in place until the valve is ready to be installed. Valves shall not be stored in contact with bare ground. Valves shall not be stacked.

1.10 RECYCLED WATER IDENTIFICATION

Butterfly valves for recycled water shall be identified with purple-colored coating, identification labels or signs in accordance with Section 15151.

1.11 POLYETHYLENE WRAP

Polyethylene wrap shall be used for buried installation of butterfly valves in accordance with Section 15000.

PART 2 MATERIALS

2.01 BUTTERFLY VALVES (BFV)

A. Butterfly valves and appurtenant components and materials shall be selected from the Approved Materials List.

B. Butterfly valves shall be short body, leak-tight closing, and rubber-seated in accordance with AWWA C504 except as modified herein.

C. Butterfly valve bodies shall be ductile-iron as defined within AWWA C504.

D. Except as modified below, BFV's shall be Class 150B in accordance with AWWA C504, rated for a flow velocity of 4.9m/s (16ft/s).

E. Where the static pressure of the pipeline in which the BFV is to be installed exceeds 1.03 Pa (150psi), a Class 250B butterfly valve in general conformance with AWWA C504 shall be required. Class 250B butterfly valves shall be submitted to the Engineer for approval prior to ordering or delivery.

F. Butterfly valves shall open by turning left (counterclockwise). Valve disc shall rotate ninety degrees (90°) from the full open position to the tight shut position.

G. Butterfly valve interior and exterior surfaces shall be coated as described below.

2.02 MANUAL VALVE ACTUATORS

A. General:

1. All valve actuators shall be watertight, designed for buried or submerged uses. Actuators shall be fully gasketed, sealed, and factory-packed with grease.

2. As directed by the District Engineer, actuators for valves located above ground or in vaults and structures may have hand wheels or chain wheels. Minimum hand wheel diameter shall be 300mm (12"). The actuator shall be equipped with a dial indicator, which shows the position of the valve disc. The District Engineer may require the use of a 50mm (2") square operating nut in some cases.

3. Actuators for valves shall be provided with a 50mm (2") square operating nut when buried or when indicated on the Approved Plans.

4. Actuators shall have travel stops, which can be adjusted in the field without having to remove the actuator from the valve.

5. Actuators shall be sized for opening and closing the valve at the valve's full rated working pressure and at a flow velocity of 4.9m/s (16 ft/s).

6. Actuators shall accept a minimum of 407Nm (300 foot-pounds) of input torque at the full open and full closed positions without damage to the actuator or the valve.

7. Actuators equipped with 50mm (2") operator nuts shall require a maximum input torque of 203Nm (150 foot-pounds) to operate the valve. A maximum input torque of 108Nm (80 foot-pounds) shall be required to operate valves with hand wheels.

8. Actuators shall be of the same manufacturer as the valve where possible or as directed by the District Engineer.

9. Actuators shall be installed, adjusted, tested and certified by the valve manufacture prior to shipping.

10. Actuators shall require a maximum of one hundred (100) input turns for the complete ninety-degree (90°) movement of the disc.

11. Actuators shall receive an epoxy coating on the exterior surface as described below.

B. Traveling Nut Actuators:

1. Actuators for butterfly valves sizes 350mm (14") through 600mm (24") may be the manual traveling nut type. Traveling nut actuators shall not be used on valves requiring motor driven actuators or where the District has specified a worm gear type actuator.

2. Actuators shall be capable of producing the below listed output torque at the closed position:

Valve Size in mm (inches)	Output Torque Nm (foot-pounds)
350 (14")	2779 (2050)
400 (16")	2779 (2050)
450 (18")	3729 (2750)
500 (20")	3729 (2750)
600 (24")	6372 (4700)

C. Worm Gear Type Actuators:

1. Actuators for butterfly valves 750mm (30") or larger shall be the worm gear type. In addition, worm gear type actuators shall be used on butterfly valves requiring motor driven actuators or where the District has specified a worm gear actuator.

2. Worm gear actuators shall be totally enclosed and self-locking.

2.03 EPOXY LINING AND COATING

Epoxy linings and coatings for valves and actuators shall be provided in accordance with AWWA C210, C213 and C550, with the following modifications:

A. Epoxy lining and coating of valve surfaces shall be performed by the manufacturer in a facility with qualified personnel, where the environment can be controlled. Epoxy lining and coating of valves in the field is prohibited.

B. Repairs made to shop-applied coatings shall be performed in a facility with qualified personnel, where the environment can be controlled. The facility shall be one that is approved by the valve manufacturer.

C. Surface preparation shall be as detailed in SSPC-SP10 Near White Blast Cleaning.

D. Liquid epoxy lining and coating materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact with potable water.

E. The minimum dry film thickness for epoxy linings shall be 0.203mm (0.008" or 8 mils). Liquid epoxy lining shall be applied in two (2) coats in accordance with AWWA C210 and application shall conform to the coating manufacturer's recommendations.

2.04 GATE WELLS AND EXTENSION STEMS

Gate wells and extension stems for buried valves shall be in accordance with Section 15000 and the Approved Materials List.

2.05 CONCRETE

Concrete used for anchor, thrust, or support blocks shall be in accordance with Section 03000.

2.06 POLYETHYLENE WRAP

Polyethylene wrap shall be in accordance with Section 15000 and the Approved Materials List.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install valves with the bolt holes straddling the vertical and horizontal centerlines of pipe, with the operating nut in the vertical position, unless otherwise noted on the Approved Plans.

B. Valves shall be installed per the manufacturer's recommendation in accordance with the applicable specification for the piping material and joint type being used for the valve and the water main.

C. Joints shall be cleaned and installed in accordance with Section 15056.

3.02 FLANGE INSULATING KITS

Flange insulating kits shall be installed only where shown on the Approved Plans in accordance with Section 13110.

3.03 WAX TAPE COATINGS

Wax tape coatings shall be installed only where shown on the Approved Plans or as directed by the District Engineer in accordance with Section 13110.

3.04 POLYETHYLENE WRAP

Installation of polyethylene wrap for buried valves shall be performed in accordance with Section 15000.

3.05 CONCRETE

Concrete thrust, anchor, and support blocks shall be installed as called for in Section 03000 in accordance with the Standard Drawings. The concrete shall be placed so that valves and valve operators will be accessible for repairs or replacement. Prior to filling the pipeline with water, refer to Section 03000 for minimum concrete curing time required.

3.06 GATE WELLS AND EXTENSION STEMS

Gate wells and extension stems for buried valves shall be installed in accordance with Section 15000 and the Standard Drawings.

3.07 DISINFECTION OF THE VALVES

Disinfection and flushing shall be performed in accordance with Section 15041, as part of the process of disinfecting the main pipeline. The valves shall be operated during the disinfection period to completely disinfect all internal parts.

3.08 HYDROSTATIC TESTING

Valves shall be hydrostatically tested in conjunction with the pipeline in which it is connected in accordance with Section 15044 and Appendix “A”.

3.09 FIELD PAINTING AND COATING

The exterior of valves installed above ground or exposed in vaults or enclosures shall be field painted in accordance with Section 09910.

END OF SECTION

SECTION 15102A ADDITIONS TO BUTTERFLY VALVES

This Section 15102A makes additions, deletions, or revisions to Section 15102 Butterfly Valves. All parts of Section 15102 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 BUTTERFLY VALVES

The payment for installation of butterfly valves shall be paid for at the Bid items per each and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

END OF SECTION

SECTION 15102A ADDITIONS TO BUTTERFLY VALVES

This Section 15102A makes additions, deletions, or revisions to Section 15102 Butterfly Valves. All parts of Section 15102 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 BUTTERFLY VALVES

The payment for installation of butterfly valves shall be paid for at the Bid items per each and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

END OF SECTION

SECTION 15103 – BUTTERFLY AND RESILIENT WEDGE GATE VALVE TESTING PROCEDURE

PART 1 GENERAL

1.1 PURPOSE

This section describes requirements and procedures for the mil thickness testing, holiday testing and hydrotesting of butterfly valves (BFV) and the hydrotesting of resilient wedge gate valves (RWGV).

1.2 REFERENCE STANDARDS

The publications listed below form part of this section to the extent referenced and are referred to in the text by basic designation only. References shall be made to the latest edition of said standards unless otherwise indicated.

AWWA C210	-	Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
AWWA C504	-	Rubber-Seated Butterfly Valves
AWWA C509	-	Resilient-Seated Gate Valves for Water Supply Service
AWWA C515	-	Reduced-Wall Resilient-Seated Gate Valves for Water Supply Service
AWWA C550	-	Protective Epoxy Coatings for Valves and Hydrants
NACE SPO188	-	Discontinuity (Holiday) Testing of Protective Coatings
SSPC	-	Steel Structures Painting Council

1.3 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Specifications 15000 and 15100.

1.4 MANUFACTURER FACTORY TESTING REQUIREMENTS

A. The manufacturer shall test each BFV in accordance with AWWA C504 and each RWGV in accordance with AWWA C509 or AWWA C515, and this section, prior to shipping the valve.

B. Each BFV and RWGV shall be hydrotested by the manufacturer after the interior and exterior coatings have been applied and cured.

C. Each BFV shall be hydrotested by the manufacturer after the actuator has been mounted and adjusted.

D. Each BFV and RWGV shall be dry film thickness tested and holiday detection tested by the manufacturer prior to the valve being shipped.

E. Each BFV and RWGV shall be operated from the fully closed to fully open to fully closed positions prior to the completed valve being shipped.

F. Prior to shipment, the manufacturer shall provide notarized certification that each BFV and RWGV supplied has successfully completed the tests required by AWWA, ANSI, ASTM and this section.

G. Each valve shall be shipped with end seals and shall be wrapped in shipping plastic.

1.5 TESTING REQUIREMENTS PRIOR TO INSTALLATION

A. Valve testing shall be provided by the either the supplier or the contractor at no cost to the

District. Valves failing to pass the testing regimen specified by this section shall be either replaced or repaired at no cost to the District. Replaced or repaired valves shall be tested as specified in this section.

B. Testing of valves shall not be scheduled until a submittal has been processed and approved by the District.

C. Valves shall be tested within a 50-mile radius of the District office.

D. Valves shall be tested in the presence of a District Representative. It is the responsibility of the either the supplier or the contractor to schedule the witnessing of the testing with the District Representative assigned to the project. Requests for valve testing shall be made to the District a minimum of five (5) working days in advance of the desired testing date.

E. All BFV's shall be mil thickness tested, holiday detection tested and hydrotested by the either the supplier or the contractor prior to installation in the field. Generally, the valves will be tested at the supplier's facility prior to shipment to the field.

F. A representative sample of RWGV's on a project may be selected for testing by the District Engineer. The District Engineer shall indicate on the approved submittal when RWGV's have been selected for testing.

G. The procedures and requirements for the testing of valves shall be as described in Part 3 of this section. Butterfly valves shall be required to pass all the tests described in Part 3 of this section prior to being incorporated into the project. When selected for testing, RWGV's shall be required to pass the hydrotesting phase in accordance with Part 3 of this section.

H. Valves not passing the tests required shall be replaced or repaired at the discretion of the District Engineer. Replaced valves shall be in accordance with this section. Repaired valves shall repeat the phase of the required testing previously failed in addition to the phases not yet completed. Repaired valves may be rejected and required to be replaced if they repeatedly fail any phase of the testing.

1.6 SUBMITTALS

A. Submittals for BFV's and RWGV's are to be made in accordance with the requirements of Section 15100 and 15102.

PART 2 MATERIALS

2.1 TESTING MEDIA

The testing media for hydrostatic testing shall be an approved source of potable water. Testing with a gaseous media is prohibited.

2.2 TESTING EQUIPMENT FURNISHED BY THE SUPPLIER OR CONTRACTOR

The supplier or the Contractor shall furnish all necessary personnel and hydrotesting equipment, including test pump, hoses, gages, blind flanges and a safe means of turning the valves over. Insufficient personnel or substandard or unsafe equipment shall be grounds for the District Representative to cancel the testing until adequate personnel and acceptable equipment have been provided.

PART 3 EXECUTION

3.1 GENERAL

The following paragraphs provide clarification of specific tasks and procedures involved in the

testing of valves.

A. Testing of valves shall be in the following order:

1. Pre-Testing Inspection

2. Dry Film Thickness Test

3. Holiday Detection Test

4. Hydrostatic Test

3.2 PRE-TESTING INSPECTION

A. On the date and time agreed the District Representative shall travel to the testing site. The testing site must be within a 50-mile radius of the District Office.

B. The District Representative responsible for the project will receive one copy of the approved valve submittal. The District Representative shall take the submittal to the testing site to verify the valves to be tested correspond to those on the approved submittal.

C. Upon arrival at the testing site, the District Representative shall assess the readiness of the tester's personnel and equipment to perform the testing. If there is not sufficient personnel and equipment present to perform the tests in a timely manner, the District Representative will cancel the testing scheduled for that day. The District Representative will inform the tester of the reason(s) for canceling the test and instruct the tester to reschedule the testing.

D. When the testing is being performed in conjunction with a CIP Project, the District Representative shall notify the PM when either testing has been cancelled or there are testing failures. The PM may back charge the Contractor for the time the District Representative has spent.

E. District Representative will visually inspect each valve (class and configuration), operation of valve, and actuator for compliance with the submittal. Valves not in compliance with the approved submittal shall be rejected.

F. District Representative will visually inspect each valve for obvious damage or substandard construction. Valves found to be damaged or of substandard construction shall be rejected.

G. District Representative will record the model and serial number of each valve and its actuator on the Valve Test Sheet (Exhibit A).

3.3 HYDROSTATIC TESTING PROCEDURES

A. Each valve shall be tested on both sides at its rated pressure. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed.

B. The testing medium shall be water. Under no circumstances is a gas to be used as the test medium.

C. The test duration on each side of the valve is 15 minutes. The test equipment will be disconnected during this time.

D. Valves require careful handling when turning them over. The District Representative shall stop the testing activity if the manner used by the tester to handle the valves is unsafe or will result in damage to the valve. The flange faces are especially susceptible to damage if the

valve is not properly handled.

E. Valves exhibiting no visible leakage, no decrease in the initial test pressure or no deformation shall be considered passed.

F. Valves exhibiting visible leakage, a decrease in the initial test pressure, or deformation shall be considered rejected. Valves which fail the hydrostatic test shall be repaired or replaced at the District's discretion.

G. Only personnel authorized by the valve manufacturer shall repair valves when repairs are permitted by the District Engineer. Unless the valve manufacturer has provided authorization, supplier or contractor personnel shall not perform repairs.

H. Indicate the results of the hydrostatic test on the Valve Test Sheet (Exhibit A).

3.4 DRY FILM THICKNESS TESTING PROCEDURE

A. The dry film thickness gage shall be calibrated prior to beginning the taking of the mil readings and periodically during the testing. Use plastic shims or standardized plates and follow the instructions provided with the instrument.

B. A minimum of four readings should be taken on each side of the disc and a minimum of three readings should be taken on each side of the interior of the valve body. Additional readings should be taken near edges and around intricate assemblies and where the coating is likely to be thin.

C. Mark the spot and mil reading at each location where the reading were taken with a felt tip pen. More readings may be taken at the discretion of the District Representative.

D. The minimum dry film thickness of any reading shall be 8 mils. Mark with a felt tip pen any location where the coating thickness is less than the minimum dry film thickness required.

E. Valves with adequate coating thickness shall be considered passed and the results shall be indicated on the Valve Test Sheet (Exhibit A). Proceed to the Holiday Detection phase of the testing.

F. Valves with inadequate coating thickness in any location shall be rejected. Qualified personnel approved by the valve manufacturer shall repair valves with unacceptable coating thickness at a qualified facility in accordance with the valve manufacturer's recommendations.

3.5 HOLIDAY DETECTION TESTING PROCEDURE

A. The interior surface of each valve shall be tested in accordance with the most current revisions of NACE Standard SPO188, except as modified below.

B. Assure the instruments to be used are properly calibrated, with batteries charged, and in proper working order prior to use.

C. High-Voltage Holiday Detector set-up:

1. Set the output voltage on the detector to 100 volts per mil of average applied thickness.

2. Connect the ground wire to the valve to be tested. Assure a sound metallic contact is achieved. Plug the ground wire into the detector.

3. Select the appropriate powerpack, wand length, and electrode (stainless brush or rubber paddle) to be used. Assemble the powerpack, wand electrode and plug the assembly into the high voltage port on the detector.

4. Turn the detector switch on. An audible tone will be heard if the instrument is ready to use. Verify the working of the instrument by running wand across the ground bare metallic surface of the valve. A buzz tone will be heard.

D. The surface to be detected should be dry. A wet surface will “carry over” a holiday in an area.

E. Cover all surface area with the electrode in a slow thorough motion, testing all interior coated surfaces. Most holidays are found on or around casting numbers, nuts, bolts, and sharp edges. When a holiday is detected, circle area with a black permanent felt pen.

F. Valves with no holidays in the coating shall be considered passed and the results indicated on the Valve Testing Sheet (Exhibit A). Proceed to the Hydrotesting phase of the testing.

G. Valves with holiday(s) in the coating in any location shall be rejected. Qualified personnel approved by the valve manufacturer shall repair valves with unacceptable coating at a qualified facility in accordance with the valve manufacturer’s recommendations. Indicate on the Valve Test Sheet (Exhibit A) that the valve failed this portion of the test.

3.6 REPORTING AND MARKING

A. The District Representative shall record the results of each phase of the testing of each valve on the Valve Test Sheet (Exhibit A).

B. The District Representative shall mark the flange of each side of the valve to indicate the results of the test. The required marking convention is shown in Exhibit B.

1. Marking shall be made using a white metal marker.

2. The markings should be made on the portion of the valve flange that will be readily visible in the field. For valves to be used in buried service, the markings should be oriented toward the top of the trench.

C. The District Representative shall visually check each valve in the field for proper markings prior to installation. Any valve not displaying the proper markings shall be immediately rejected and the contractor shall be instructed to remove it from the site.

END OF SECTION

EXHIBIT A

VALVE TEST SHEET

WO **PROJECT:**

							TEST RESULTS			
NO	**DATE**	**SIZE**	**MGFR**	**SERIAL**	**TYPE**	**ACTUATOR**	**MILS**	**HOLIDAY**	**HYDRO**	**COMMENT**
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
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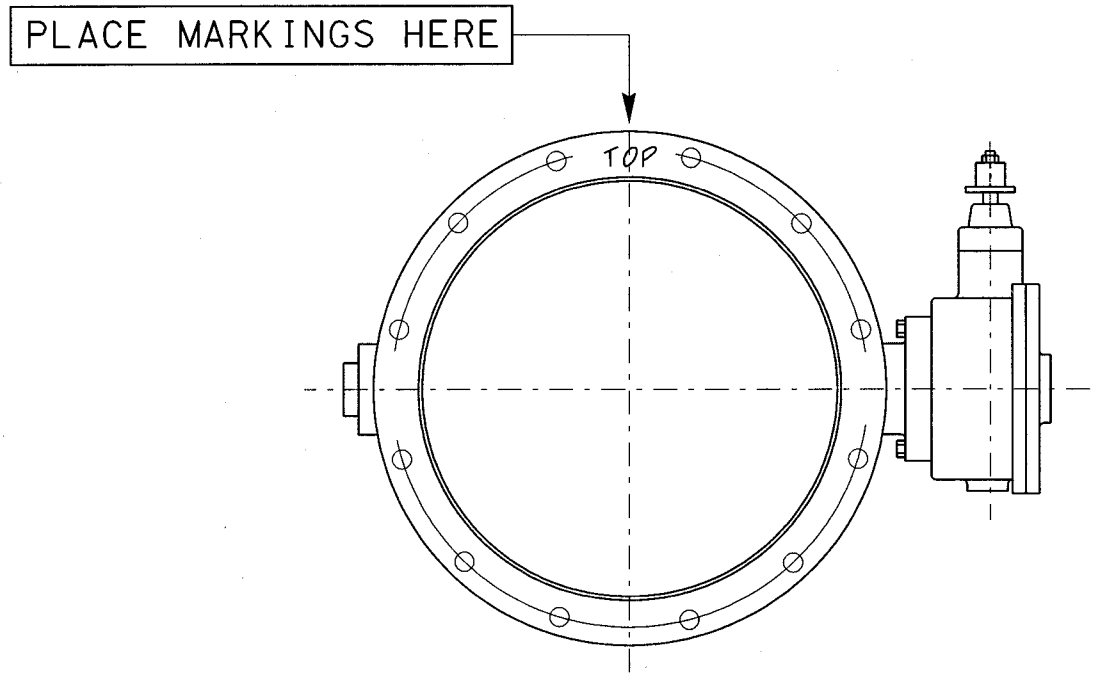
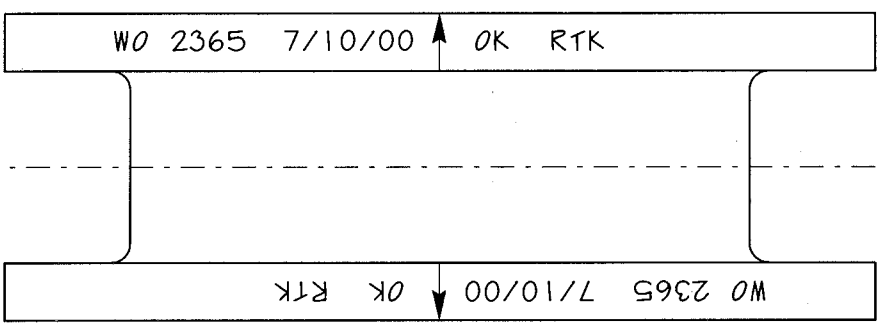
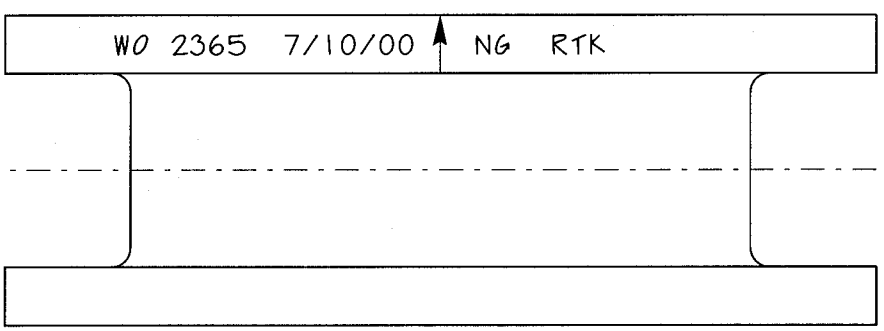




PASSING MARKINGS



FAILING MARKINGS

VALVE TEST MARKING

WATER AGENCIES STANDARDS

COMMITTEE APPROVAL: 03/01/2001

DRAWING NUMBER: EXHIBIT B

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WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15108 AIR RELEASE VALVE, AIR AND VACUUM VALVE, COMBINATION AIR VALVE AND MANUAL AIR VALVE ASSEMBLIES

PART 1 GENERAL

1.01 DESCRIPTION

This section includes the materials and installation instructions for above ground air release valves, air and vacuum valves, and combination air valve assemblies and for below ground manual air valves.

The term "air valve" is used generically in this specification to refer to requirements common to all of the specified air release valves, air and vacuum valves, and combination air valves. Otherwise, the various types of air valves are addressed by the individual designations commonly used in AWWA and industry standards.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C512	-	Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
AWWA C550	-	Protective Interior Coatings for Valves and Hydrants

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15057, 15061, 15064, 15100, 16640

1.04 SERVICE APPLICATION

A. Combination air valves are generally installed on all potable and recycled water mains where shown on the Approved Plans and in accordance with the Standard Drawings.

B. Unless otherwise directed by the District Engineer, combination air valves will be required as indicated below:

1. 50mm (2") combination air valve assemblies shall be installed on pipeline sizes 150mm (6") through 350mm (14").

2. 100mm (4") combination air valve assemblies shall be installed on pipeline sizes 400mm (16") and 500mm (20").

3. 150mm (6”) combination air valve assemblies shall be installed on pipeline sizes 600mm (24”) through 900mm (36”).

C. Air release valves, air and vacuum valves, and manual air valves shall be installed in accordance with the Approved Plans or as directed by the District Engineer.

1.05 DELIVERY, STORAGE, AND HANDLING

Valves shall be delivered and stored in accordance with AWWA C550. The port openings shall be covered with plastic, cardboard, or wood while in transit and during storage in the field. These covers shall remain in place until the valve is ready to be installed. Valves shall not be stored in contact with bare ground. Valves shall not be stacked.

1.06 RECYCLED WATER IDENTIFICATION

Air valve assemblies and enclosures used for recycled water shall be identified with purple-colored coating, identification labels or signs in accordance with Section 15151.

1.07 TRACER WIRE

Tracer wire shall be installed for air valve assemblies in accordance with Section 15000 and the Standard Drawings.

1.08 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for air valve assemblies in accordance with Section 15000.

PART 2 MATERIALS

2.01 COMBINATION AIR VALVES

A. Combination air valves and appurtenant components and materials suitable for the system pressure shall be selected from the Approved Materials List.

B. Combination air valves shall comply with AWWA C512 except as modified herein.

C. 50mm (2”) combination air valves shall be the single-body type incorporating stainless steel internal components and suction screen. National Pipe Threaded (NPT) inlet and outlet configurations.

D. 100mm (4”) and 150mm (6”) combination air valves shall be the single-body type incorporating stainless steel internal components, protective hood, suction screen and flanged inlet.

E. Internal protective epoxy coatings shall be provided in accordance with AWWA C550.

2.02 AIR RELEASE VALVES AND AIR AND VACUUM VALVES

A. Air release valves and air and vacuum valves shall be provided only as specifically shown on the Approved Plans. Air release valves, air and vacuum valves and appurtenant components and materials suitable for the system pressure, shall be selected from the Approved Materials List.

B. Air release valves and air and vacuum valves shall comply with AWWA C512 except as modified herein.

C. 50mm (2") air release valves and air and vacuum valves shall be the single-body type incorporating stainless steel internal components and suction screen. National Pipe Threaded (NPT) inlet and outlet configurations.

D. 100mm (4") and 150mm (6") air release valves and air and vacuum valves shall be the single-body style. Valves shall incorporate stainless steel internal components, suction screen, protective hood and flanged inlet.

E. Epoxy linings and coatings for valves shall be provided in accordance with AWWA C550.

1. Liquid epoxy lining and coating materials shall be listed in the NSF Listing for Drinking Water Additives, Standard 61, certified for use in contact with potable water.

2. The minimum dry film thickness for epoxy linings shall be 0.203mm (0.008" or 8 mils). Liquid epoxy lining shall be applied in two (2) coats in accordance with AWWA C210.

2.03 MANUAL AIR VALVES

Manual air valves shall be provided only as specifically shown on the Approved Plans. Materials shall be in accordance with the Standard Drawings and selected from the Approved Materials List.

2.04 ENCLOSURES

Air Valve Enclosures shall be selected from the Approved Materials List.

2.05 CONCRETE

Concrete used for anchor or thrust blocks and equipment pads shall be in accordance with Section 03000.

2.06 BOLTS AND NUTS

A. Combination air valves, air release valves and air and vacuum valves sized 100mm (4") and larger shall be installed with bolts and nuts in accordance with the Standard Drawings and selected from the Approved Materials List.

B. Bolts and nuts shall be zinc-plated A307 carbon steel in accordance with section 15000.

2.07 TRACER WIRE

Tracer wire materials shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.08 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape shall be in accordance with Section 15000 and selected from the Approved Materials List.

2.09 FIELD PAINTING AND COATING

Field painting and coating materials shall be in accordance with Section 09910 and 09915 and selected from the Approved Materials List.

PART 3 EXECUTION

3.01 INSTALLATION

A. Air valve assemblies shall be provided as shown on the Approved Plans. Additional air valve assemblies may be required in areas of potential air entrapment, at the discretion of the District Engineer.

B. Air valve assemblies shall be installed relative to street improvements in accordance with the Standard Drawings.

C. Connections for the air valve assemblies shall be made within a section of the main line no closer than 600mm (24") to a bell, coupling, joint or fitting.

3.02 CONCRETE

Concrete thrust or anchor blocks and equipment pads shall be installed in accordance with Section 03000 and the Standard Drawings. Refer to Section 03000 for the minimum concrete curing time required.

3.03 TRACER WIRE

Tracer Wire shall be installed in accordance with Section 15000 and the Standard Drawings.

3.04 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.05 DISINFECTION

Air valve assemblies shall be disinfected in accordance with Section 15041 in conjunction with disinfecting the main to which it is connected. The assembly valves shall be operated and the assembly flushed to completely disinfect all internal parts.

3.06 HYDROSTATIC TESTING

Air valve assemblies shall be hydrostatically tested in accordance with Section 15044 in conjunction with the pipeline to which they are connected.

3.07 FIELD PAINTING AND COATINGS

A. Air valve assemblies shall be color coded, if required, in accordance with Section 09910.

B. Field repairs to the enclosure shall not be permitted. Enclosures requiring repairs to the coating shall be returned to the supplier or coating vendor for repairs or recoating in accordance with Section 09915.

END OF SECTION

SECTION 15108A AIR RELEASE VALVE, AIR AND VACUUM VALVE, COMBINATION AIR VALVE AND MANUAL AIR VALVE ASSEMBLIES

This Section 15108A makes additions, deletions or revisions to Section 15108 Air Release Valve, Air and Vacuum Valve, Combination Air Valve and Manual Air Valve Assemblies. All parts of Section 15108 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 COMBINATION AIR VALVE AND MANUAL AIR VALVE ASSEMBLIES

The payment for installation of permanent combination air valve and manual air valve assemblies shall be paid for at the Bid items per each and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

END OF SECTION

WATER AGENCIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15121 OPEN TRENCH PIPE CASING

PART 1 GENERAL

1.01 DESCRIPTION

This section includes materials for and installation of open trench pipe casings. Jacked casings or specially-installed pipe casings shall be installed as detailed in Section 15125.

1.02 REFERENCE STANDARD

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. References shall be made to the latest edition of said standards unless otherwise called for.

ASTM A 36/A 36M	-	Standard Specification for Carbon Structural Steel
ASTM A 283/A 283M	-	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 568/A 568M	-	Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, and Structural Quality Cold Rolled
AWWA C 905	-	Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, 350 mm (14" through 900 mm (36")

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 15000, 15056, 15061, and 15064

1.04 SERVICE APPLICATION

Generally, pipe casings are used for protection of utilities (carrier pipes) and may be installed for future utility installations. Pipe casings shall be used for the installation of potable water, reclaimed water, and sewer mains where shown on the Approved Drawings or as required by the District.

1.05 DESIGN REQUIREMENTS

A. Pipe casings shall be provided for carrier piping where shown on the Approved Drawings or as required by the District. The sizes and material type for pipe casing shall be as detailed in Part 2 of this Section.

B. The District Engineer may select a greater steel thickness and diameter as appropriate for the intended application.

1.06 SUBMITTALS

The following items shall be submitted for review and approval by the District Engineer prior to the start of the casing work:

A. Casing pipe.

B. Casing spacers and end seals.

C. Installation procedure.

D. Method of restraint to be used for the casing and carrier pipes.

E. Welding procedure.

F. Cathodic Protection.

1.07 DELIVERY, STORAGE AND HANDLING

A. PVC pipe casing shall be stored in suppliers' yards and on the job site in accordance AWWA M23 and the manufacturer's recommendations. PVC pipe casing which has been subjected to excessive ultraviolet radiation from the sun shall not be used. The determination as to the acceptability of PVC pipe casing faded by the sun's radiation shall rest solely with the District.

B. Store PVC pipe casing in the field by the supporting the pipe uniformly per AWWA M23. Do not stack pipe higher than 1.22m (4') high or stack the pipe with weight on the bell ends. Cover stored PVC pipe casing to protect it from the sun's ultraviolet radiation. Pipe which has been contaminated with any petroleum products (inside or outside) shall not be installed.

C. Proper care shall be used to prevent damage in handling, moving and placing the pipe casing. All pipe casing materials shall be lowered into the trench in a manner that prevents damage. The pipe casing shall not be dropped, dragged or handled in a manner that will cause bruises, cracks, or other damage.

1.08 CASING SPACERS AND END SEALS

Casing spacers and end seals shall be used for all carrier pipe installations within casings.

1.09 TRACER WIRE

Tracer wire shall be installed atop all potable and recycled water carrier pipe in accordance with Section 15000.

1.10 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape shall be installed in accordance with Section 15000.

1.11 RECYCLED WATER IDENTIFICATION

A. PVC pipe casing for recycled water system applications shall be purple. The pipe markings shall include the designation "RECYCLED WATER" in addition to the standard factory labels required by AWWA.

B. Fittings and pipe appurtenances installed with PVC mains for recycled water shall be identified with purple-colored coating, purple polyethylene sleeve, identification labels or signs in accordance with Section 15151.

PART 2 MATERIALS

2.01 PIPE CASING

Pipe casing materials shall be as indicated below and shall be selected from the Approved Materials List. The size of the pipe casings required for the various sizes of carrier pipe is as follows:

Carrier Pipe Size	Minimum Casing Size
150mm (6”)	350mm (14”)
200mm (8”)	400mm (16”)
250mm (10”)	450mm (18”)
300mm (12”)	500mm (20”)
400mm(16”)	750mm (30”)
500mm (20”)	900mm (36”)
600mm (24”)	1,050mm (42”)

Pipe Casing for Carrier Pipe larger than 600mm (24”) shall be as determined by the District Engineer.

A. Polyvinyl Chloride Pipe (PVC) casings shall be as follows:

1. Casing pipe sizes 350mm (14") through 900mm (36") shall be in accordance with AWWA C905, pressure rated 235 (DR18).

2. The color for PVC casing pipe be shall be blue or white for potable water carrier pipe and purple for recycled water carrier pipe.

B. Steel Pipe casings shall be as follows:

1. Steel pipe casings, unless otherwise approved by the District, shall be butt-welded sheets (spiral welding of pipe not allowed) conforming to ASTM A 36/A 36M, ASTM A 283/ A 283M, Grade D, or ASTM A 568/A 568M, Grade 33. Other steel grades may be used upon approval of the District. Steel casings sized 500mm (20”) or smaller shall have a minimum wall thickness of 9.53mm (3/8”). Steel casings sized larger than 500mm (20”) shall have a minimum wall thickness of 12.70mm (1/2”).

2. Steel pipe casings shall not be lined or coated with any material unless otherwise directed by the District Engineer.

If required, steel pipe casing shall be lined and coated with liquid epoxy paint per

AWWA C210. Liquid epoxy shall be applied in three coats to a minimum thickness of 0.305mm (0.012" or 12 mils). The final coat of the liquid epoxy shall be blue for potable water and purple for recycled water steel casing pipe.

3. Steel pipe casings shall include the installation of an anode in accordance with the Standard Drawings, unless otherwise directed by the District Engineer.

2.02 CASING SPACERS

Casing spacers shall be stainless steel, centered-position type with PVC liner and non-metallic anti-friction runners selected from the Approved Materials List.

2.03 CASING END SEALS

Casing end seals, selected from the Approved Materials List, shall wrap around the casing and carrier pipe to provide a barrier to backfill material and seepage. The casing end seal shall be a minimum 6.25mm (¼") thick styrene butadiene rubber sheet attached to the carrier pipe and casing with 25mm (1") wide stainless steel bands. Zippered casing end seals with stainless steel bands may also be used.

2.04 TRACER WIRE

Tracer wire materials shall be in accordance with Section 15000 and the Approved Materials List.

2.05 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and the Approved Materials List.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION, BACKFILL AND COMPACTION

Trenching, bedding, backfilling and compaction operations shall be performed in accordance with Section 02223.

3.02 DEWATERING

The Contractor shall provide, and maintain at all times during construction, ample means and devices to promptly remove and dispose all water from any source entering trench excavations or other parts of the work in accordance with Section 02223. Any damage caused by flooding of the trench shall be the Contractor's responsibility.

Dewatering shall be performed by methods that will maintain a dry excavation, preservation of the final lines and grades and protection of all utilities. If flooding of the trench does occur, the Contractor shall immediately dewater and restore the trench. Damaged or altered pipeline appurtenances or trench materials shall be repaired or replaced as directed by the Engineer.

3.03 PIPE CASING INSTALLATION

Installation of pipe casing and carrier pipe shall be as described below and in accordance with the Standard Drawings.

A. Pipe casing shall be installed in an open trench type excavation.

B. Pipe casings shall be lowered onto the bedding of the proper lines and grades called for on the Approved Plans.

C. Pipe casings shall have firm bearing along their full length.

D. Pipe casing sections shall be bell and spigot joint connection for PVC. PVC casing sections shall be restrained by mechanical means or by the use of splined gaskets. Steel casing sections shall be jointed by full-circumference butt welding in the field. Steel casing shall have all areas of damaged coating repaired.

E. Carrier pipe shall be pushed into the casing incorporating the use of casing spacers as described below.

F. PVC or ductile-iron carrier pipe joints shall be restrained either by mechanical means or by use of splined gaskets.

G. Steel carrier pipe sections shall be lap joint welded per Section 15061.

H. Upstream and downstream elevations of the carrier pipe shall be verified prior to installing the end seals.

I. The portion of carrier pipes installed within casings shall have pressure, leakage, and infiltration testing completed in accordance with Sections 15043 and 15044 prior to installation of the end seals.

J. The annular space between the carrier pipe and casing shall not be filled with any material unless otherwise noted on the Approved Plans.

3.04 CASING SPACERS

Casing spacers shall be used to prevent the carrier pipe bell from touching the casing and to maintain a uniform space between the carrier pipe and casing interior. A minimum of three casing spacers shall be installed, equally spaced, on each pipe section at intervals recommended by the manufacturer.

3.05 CASING END SEALS

Casing end seals shall be installed in accordance with the manufacturer's recommendations.

Carrier pipe shall pass hydrostatic or leakage tests in accordance with Sections 15044 or Section 15043 prior to the installation of casing end seals or backfilling operations.

3.06 TRACER WIRE

Tracer wire shall be installed on the carrier pipe in accordance with Section 15000 and the Standard Drawings.

3.07 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed above the casing pipe in accordance with Section 15000 and the Standard Drawings.

END OF SECTION

SECTION 15121A ADDITIONS TO OPEN TRENCH PIPE CASING

This Section 15121A makes additions, deletions or revisions to Section 15121 Open Trench Pipe Casing. All parts of Section 15121 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 WELDED STEEL CASING

The payment for welded steel casing for water mains shall be included at the linear foot Bid items and shall include the payment for casing installation, casing spacers, casing end seals, and all other Work necessary to install the casing, complete-in-place.

END OF SECTION

WATER AGENGIES' STANDARDS

STANDARD SPECIFICATIONS

SECTION 15300 FIRE HYDRANTS

PART 1 GENERAL

1.01 DESCRIPTION

This section includes the materials for and installation of fire hydrant assemblies.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA C502 - Dry-Barrel Fire Hydrants
AWWA C503 - Wet-Barrel Fire Hydrants
AWWA C550 - Protective Epoxy Interior Coatings For Valves and Hydrants

1.03 RELATED WORK SPECIFIED ELSEWHERE

WAS Standard Drawings
WAS Standard Specifications 02223, 03000, 09910, 15000, 15041, 15044, 15056, 15061, 15064, and 15100

1.04 SYSTEM DESCRIPTION

A. Hydrant outlet sizes and configuration shall be as shown on the Approved Plans or as directed by the fire department of jurisdiction.

B. Hydrants shall generally have the following number and size of outlets as directed by the fire department of jurisdiction:

1. Residential: One 64mm (2½") outlet and one 100mm (4") outlet

2. Commercial: Two 64mm (2½") outlets and one 100mm (4") outlet.

3. Industrial: One 64mm (2½") outlet and two 100mm (4") outlets.

1.05 SERVICE APPLICATION

A. Fire hydrants shall be installed on potable water mains only. Fire hydrants shall not be installed on recycled water mains.

B. Wet-barrel hydrants shall generally be used for pressures up to 1.38MPa (200 PSI). System pressures up to and including 1.03MPa (150 PSI) require standard wet-barrel hydrants, and pressures up to 1.38MPa (200 PSI) require high-pressure wet-barrel hydrants in accordance with the Approved Materials List.

C. Dry-barrel hydrants shall generally be used for pressure ranges in excess of 1.38MPa (200 PSI), up to 1.72MPa (250 PSI) as specifically shown on the approved drawings.

1.06 DELIVERY, STORAGE AND HANDLING

Fire hydrants shall be delivered and stored in accordance with AWWA C210, AWWA C213, and AWWA C550. The port openings shall be covered with plastic, cardboard or wood while in transit and during storage in the field. These covers shall remain in place until the valve is ready to be installed. Fire hydrants shall not be stored in contact with bare ground. Fire hydrants shall not be stacked.

1.07 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed for fire hydrant assemblies in accordance with Section 15000.

PART 2 MATERIALS

2.01 HYDRANTS

A. Fire hydrants and appurtenances shall be selected from the Approved Materials List.

B. Dry-barrel fire hydrants shall comply with AWWA C502 and these specifications unless otherwise indicated on the Approved Drawings.

C. Wet-barrel fire hydrants shall comply with AWWA C503 and these specifications unless otherwise indicated on the Approved Drawings.

D. The interior of ductile-iron hydrants shall be fusion-epoxy lined per AWWA C550.

E. All outlets shall be provided with National Standard Fire-Hose Threads. Outlets shall be equipped with brass or ductile iron caps with chains.

F. Wet-barrel fire hydrant flanges and appurtenant bury ells and spools shall incorporate a six-hole bolt pattern.

G. Fire hydrant break-off check valves shall be in accordance with the Approved Materials List.

2.02 BOLTS AND NUTS

A. Fire Hydrants shall be installed with bolts and nuts in accordance with the Standard Drawings and selected from the Approved Materials List.

B. Bolts and nuts shall be zinc-plated A307 carbon steel in accordance with Section 15000.

2.03 CONCRETE

Concrete used for splash pads, thrust or anchor blocks shall be in accordance with Section 03000.

2.04 WARNING/IDENTIFICATION TAPE

Warning/Identification tape materials shall be in accordance with Section 15000 and the Approved Materials List.

2.05 FIELD PAINTING AND COATING

Field painting and coating materials shall be in accordance with Section 09910 in accordance with the Approved Materials List.

PART 3 EXECUTION

3.01 GENERAL

A. Fire hydrant assemblies shall be installed at locations shown on the Approved Plans or as directed by the fire department of jurisdiction in accordance with the Standard Drawings.

B. The location and port orientation of the Fire Hydrant shall be in accordance with the Standard Drawings.

C. Fire hydrant flange bolts shall be set with nuts on top. Torque nuts uniformly and progressively in accordance with the manufacturer's recommendations.. Fill the hollow bolt shafts of break-away bolts with silicone sealant.

D. Depending on location, fire hydrant assemblies may require protection posts or concrete retaining walls. When required by the District Engineer, or when shown on the Approved Plans, protection posts or retaining walls shall be installed in accordance with the Standard Drawings.

3.02 CONCRETE

Concrete thrust and anchor blocks shall be installed in accordance with Section 03000 and the Standard Drawings. Refer to Section 03000 for the minimum concrete curing time required.

3.03 WARNING/IDENTIFICATION TAPE

Warning/Identification tape shall be installed in accordance with Section 15000 and the Standard Drawings.

3.04 DISINFECTION OF FIRE HYDRANT

The fire hydrant assembly shall be disinfected in accordance with Section 15041, as part of the process of disinfecting the main pipeline. The assembly valves shall be operated and the assembly flushed to completely disinfect all internal parts.

3.05 HYDROSTATIC TESTING

Fire hydrant assemblies shall be hydrostatically tested in accordance with Section 15044 in conjunction with the pipeline to which it is connected.

3.06 FIELD PAINTING AND COATING

The fire hydrant exterior shall be field painted in accordance with Section 09910.

END OF SECTION

SECTION 15300A ADDITIONS TO FIRE HYDRANTS

This Section 15300A makes additions, deletions or revisions to Section 15300 Fire Hydrants. All parts of Section 15300 that are not changed remain in full force and effect.

PART 4 PAYMENT

4.1 FIRE HYDRANTS

The payment for installation of fire hydrant assembly and markers shall be paid for at the Bid item for “Fire Hydrant Assembly and Marker (6-Inch)” and shall include all the work, labor, materials, tools, and equipment to complete the Work, as shown on the Plans and Specifications.

END OF SECTION

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

SITE DEVELOPMENT PERMIT, ADDENDUM TO EIR, CEQA RESOLUTION AND NOTICE OF DETERMINATION

For the above report refer to this link:
https://drive.google.com/drive/folders/1aPZgu7p0LBTDDhjlwoEGY5iqYDq-AUQh

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

Application for Fire Hydrant Meter (EXHIBIT A)

City of San Diego PUBLIC UTILITIES Water & Wastewater

(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

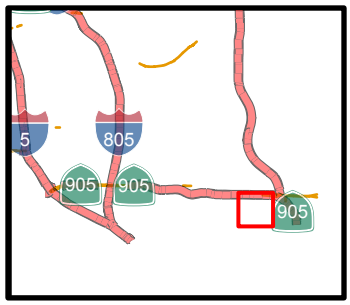
Construction Cash Flow Forecast

"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



Engineering & Capital Projects

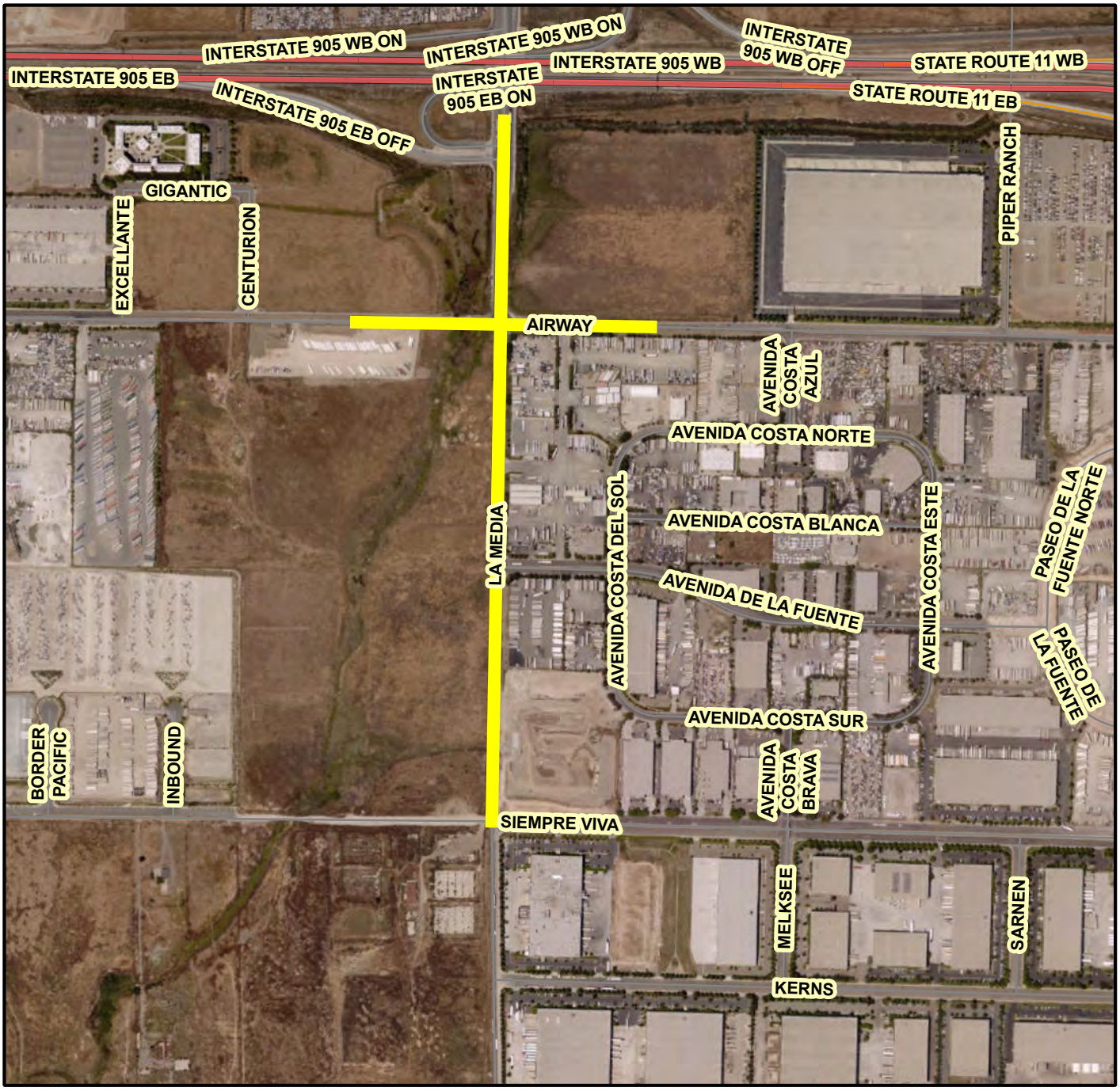
LA MEDIA ROAD IMPROVEMENTS

SENIOR ENGINEER
MASTANEH ASHRAFZADEH
619-533-3781

PROJECT MANAGER
DORAN AIVATI
619-533-5227

PROJECT ENGINEER
LEAMARIE DIAZ
619-533-5210

FOR QUESTIONS
Call: (619) 533-4207
Email: engineering@sandiego.gov



Legend

S15018 La Media

N
W
E
S

COMMUNITY NAME: OTAY MESA
COUNCIL DISTRICT: 8
SAP ID: S-15018

Date: November 16, 2021

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

SanGIS

APPENDIX F

CONTRACTOR'S DAILY QUALITY CONTROL INSPECTION REPORT

Appendix F

City of San Diego
Asphalt Concrete Overlay
Contractor's Daily Quality Control Inspection Report

Project Title:_____ Date: _____

Locations: 1._____

2._____

3._____

Asphalt Mix Specification: Attached Supplier:_____

Dig out Locations: 1._____

2._____

3._____

Tack Coat Application Rate @ Locations:

1._____

2._____

3._____

Asphalt Temperature at Placement @ Locations:

1._____

2._____

3._____

Asphalt Depth @Locations:

1._____

2._____

3._____

Compaction Test Result @Locations:

1._____

2._____

3._____

Location and nature of defects:

1._____

2._____

3._____

Remedial and Corrective Actions taken or proposed for Engineer's approval:

1._____

2._____

3._____

Date's City Laboratory representative was present:

1._____

2._____

3._____

Verified the following:	Initials:
1. Proper Storage of Materials & Equipment	_____
2. Proper Operation of Equipment	_____
3. Adherence to Plans and Specs	_____
4. Review of QC Tests	_____
5. Safety Inspection	_____

Deviations from QCP_____ (see attached)

Quality Control Plan Administrator's Signature: Date Signed:

_____ _____

APPENDIX G

MONTHLY DRINKING WATER DISCHARGE MONITORING FORM

DRINKING WATER DISCHARGE MONITORING FORM

(Use for All Discharges to the Storm Drain)

All discharge activities related to this project comply with the State Water Resources Control Board ORDER WQ 2014-0194-DWQ, STATEWIDE GENERAL NPDES PERMIT FOR DRINKING WATER SYSTEMS DISCHARGES as referenced by (http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf), and as follows:

Project Name:		WBS No.:		Watershed No.	
Qualified Person Conducting Tests:		signature			

BMPs MUST BE IN PLACE PRIOR TO ANY SCHEDULED DISCHARGE

By signing, I certify that all of the statements and conditions for drinking water discharge events are correct.

Event #1

Discharge Location[1]	Catergory[2] (Select one)	Notification[3] (Select all that apply)	BMPs in Place[4] (Select all that apply)	Volume[5] (gal)	Sampling[6] (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence[7]			Notes
					Measure	Unit	Time	Result	Limit	No	Yes	Report exceedence to RE & complete page 2 of 2
Inlet Location	☐ Superchlorinated (Chlorine added for disinfection)	☐ TSW (All Categories)	☐ Sweep flow path (gutter, street, etc.)	**Total**	*Chlorine*	mg/L			0.1 mg/L= Exceedance			
	☐ Large Volume (≥ 325,850 gal)	☐ PUD (All Categories)	☐ Dechlorination (diffusers, chemicals, etc.)	**Reused** (if any)								
Start Date: Time:	☐ Well Dev/Rehab (Not Typical)	☐ Water Board (Large Volume Only)	☐ Inlet Protection		*Turbidity*	NTU			20 NTU= Exceedance 225 NTU= Exceedance for Ocean			
			☐ Erosion Controls									
End Date: Time:	☐ Small Volume/Other (No Sampling Required)	☐ County (≥100,000 gal & within ¼ mile of ocean/bay; or if enters the County's MS4)	☐ Sediment Controls		*pH*	Unit			Range 6.5 to 8.5			

Event #2

Discharge Location[1]	Catergory[2] (Select one)	Notification[3] (Select all that apply)	BMPs in Place[4] (Select all that apply)	Volume[5] (gal)	Sampling[6] (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence[7]			Notes
					Measure	Unit	Time	Result	Limit	No	Yes	Report exceedence to RE & complete page 2 of 2
Inlet Location	☐ Superchlorinated (Chlorine added for disinfection)	☐ TSW (All Categories)	☐ Sweep flow path (gutter, street, etc.)	**Total**	*Chlorine*	mg/L			0.1 mg/L= Exceedance			
	☐ Large Volume (≥ 325,850 gal)	☐ PUD (All Categories)	☐ Dechlorination (diffusers, chemicals, etc.)	**Reused** (if any)								
Start Date: Time:	☐ Well Dev/Rehab (Not Typical)	☐ Water Board (Large Volume Only)	☐ Inlet Protection		*Turbidity*	NTU			20 NTU= Exceedance 225 NTU= Exceedance for Ocean			
			☐ Erosion Controls									
End Date: Time:	☐ Small Volume/Other (No Sampling Required)	☐ County (≥100,000 gal & within ¼ mile of ocean/bay; or if enters the County's MS4)	☐ Sediment Controls		*pH*	Unit			Range 6.5 to 8.5			

Instructional Notes found on the Page 2 of 2

Submit completed Form to RE

Receiving Water Monitoring

(Complete only if limits exceed on Page 1 of 2)

Event #1		
1) Go to the location where the discharge enters the receiving water.		
☐ Accessible ☐ Unable to Determine ☐ No Safe Access		
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.		
3) Visual Monitoring: Is the discharge into the receiving water…		
…causing erosion	☐ Yes	☐ No
…carrying floating or suspended matter	☐ Yes	☐ No
…causing discoloration	☐ Yes	☐ No
…causing and impact to the aquatic life present	☐ Yes	☐ No
…observed with visible film	☐ Yes	☐ No
…observed with an sheen or coating	☐ Yes	☐ No
…causing potential nuisance conditions	☐ Yes	☐ No
3) If all answers are NO, stop here.		
4) If any answers are YES, Notify the RE immediately for further action		

Event #2		
1) Go to the location where the discharge enters the receiving water.		
☐ Accessible ☐ Unable to Determine ☐ No Safe Access		
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.		
3) Visual Monitoring: Is the discharge into the receiving water…		
…causing erosion	☐ Yes	☐ No
…carrying floating or suspended matter	☐ Yes	☐ No
…causing discoloration	☐ Yes	☐ No
…causing and impact to the aquatic life present	☐ Yes	☐ No
…observed with visible film	☐ Yes	☐ No
…observed with an sheen or coating	☐ Yes	☐ No
…causing potential nuisance conditions	☐ Yes	☐ No
3) If all answers are NO, stop here.		
4) If any answers are YES, Notify the RE immediately for further action		

Instructional Notes

1) Log the location of the inlet or discharge point. For example: Albatross St & 5th Av. Log the start date and time and the end date and time of the discharge.
2) Log the discharge category. "Superchlorinated" are discharges where additional chlorine is added in order to adequately disinfect and sanitize drinking water system facilities. This does NOT include potable water containing residual chlorine from the water treatment process. "Large Volume" discharges are greater than 325,850 gallons of total volume for one event. "Well Dev/Rehab" are discharges of potable ground water from a well. This is not typical. If none of these categories apply, then select "Small Volume/Other."
3) Notifications of the location, date, time, category, and estimated volume of discharge must be made to the contacts and per the requirements below:

Contact	When to Notify	Email
TSW	3 days prior to all discharges	SWPPP@SanDiego.gov
PUD	3 days prior to all discharges	CompReports@SanDiego.gov Rdavenport@SanDiego.gov
San Diego Water Board	3 days prior to Large Volume discharges	SanDiego@WaterBoards.ca.gov Ben.Neill@WaterBoards.ca.gov
County of San Diego	3 days prior if 100,000 gal and within 1/4 mile of ocean/bay	DEH: Joseph.Palmer@SDCounty.ca.gov Dominique.Edwards@SDCounty.ca.gov
	3 days prior if enter county MS4 or unincorporated County	WPP:Nicholas.DeValle@SDCounty.ca.gov LUEG.Watersheds@sdcounty.ca.gov

4) At a minimum, sweep gutters prior to starting discharge and use dechlorination BMPs. The contractor and RE must monitor and determine if BMPs need to be removed or modified. For example if inlet protection is causing flooding at a storm drain inlet, contractor may elect to remove BMPs. Document any modification to BMPs in the notes
5) Total volume must be logged for all discharges. If discharge water is reused for other purposes such as watering a golf course, log that volume under "Reused"
6) Sampling is required for categories per the following table:

Category	Measure	Sample Frequency
Superchlorinated	Chlorine, Turbidity, pH	first 10 min, 50-60 min, last 10 min
Large Volume	Chlorine Turbidity	first 10 min, 50-60 min, last 10 min
Well Dev/Rehab	Chlorine Turbidity	first 10 min, 50-60 min, last 10 min
Small Volume/Other	None required	N/A

7) Effluent limitations must be monitored not to exceed per the following table:

Measure	Method	Limit
Chlorine	Field Measure	0.10 mg/L-Cl
Turbidity	Visual Estimate	20 NTU for inland waters 225 NTU for ocean 100 NTU for wells
pH	Field Meausre	6.5 - 8.5

APPENDIX H

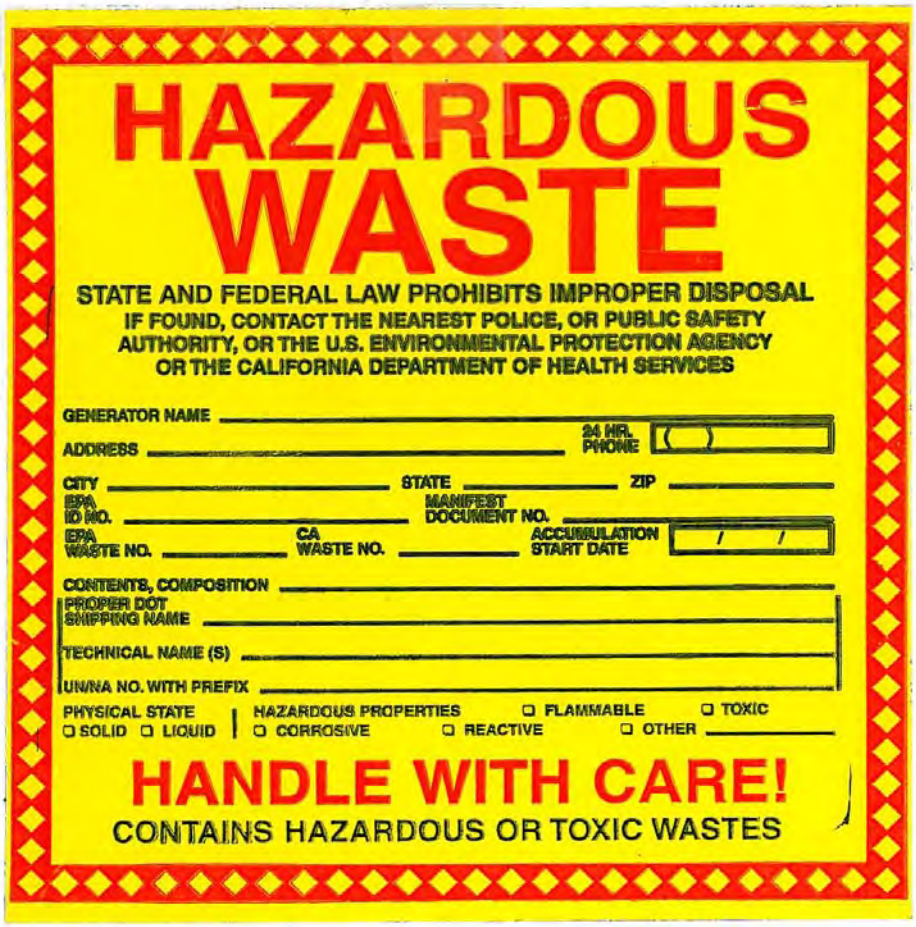
CALTRANS PERMIT

The Caltrans Encroachment Permit is available for review at the following link:

https://drive.google.com/drive/folders/1rGvzkXpSn5FgTbStdU6tVuZJkHfKXxbn

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.

APPENIDX J

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 K

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT – LANDSCAPING AND EROSION CONTROL

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT – LANDSCAPING AND EROSION CONTROL

This **32-Month Long-Term Maintenance and Monitoring Agreement (LTMMA)** is made and entered into by and between the City of San Diego (City), a municipal corporation, and TC Construction Company, Inc. (Contractor), who may be individually or collectively referred to herein as a "Party" or the "Parties."

RECITALS

A. Concurrent with execution of this LTMMA, the Parties entered into a general contract (Construction Contract) for the construction of **La Media Road Improvements (Project), WBS number S-15018, Bid No. K-23-2060-DBB-3.**

B. In accordance with the Construction Contract, the Contractor shall enter into this LTMMA with the City for the purpose of implementing and fulfilling long-term maintenance requirements in accordance with the City of San Diego Municipal Code and the Contract Documents for the specified elopement(s) of **La Media Road Improvements** (Maintenance Requirements).

C. The Contractor is ready and willing to fulfill its maintenance requirements in accordance with the terms of this LTMMA.

NOW, THEREFORE, in consideration of the above recitals and the mutual covenants and conditions set forth herein, and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby set forth their mutual covenants and understandings as follows:

INTRODUCTORY PROVISIONS

A. **Recitals Incorporated.** The above referenced Recitals are true and correct and are incorporated into this LTMMA by this reference.

B. **Exhibits Incorporated.** All Exhibits and Attachments referenced in this LTMMA are incorporated into this LTMMA by this reference.

C. **Contract Term.** This LTMMA shall be effective upon completion of the Plant Establishment Period (PEP) as described in **Section 6-1.1** of **ATTACHMENT E – Supplementary Special Provisions** and **Section 802** of the 2021 GREENBOOK AND WHITEBOOK and it shall be effective until the completion of the Work as described below.

D. **Terms and Conditions.** This LTMMA is subject to the terms and conditions of the Construction Contract included in the 2021 GREENBOOK, and WHITEBOOK, Part 1 and Part 8, and Special Provisions **(Contract Document-Attachment C)** except as otherwise stated in this LTMMA.

E. Partial Release of Payment Bond and Performance Bond.

1. Performance of Contract in Two Phases. There are two separate phases of Work to be performed by the Contractor under this Contract. The first phase covers the Work involved in the original agreement as described in this agreement ("Phase 1 Work"). The second phase covers the work involved in the long-term maintenance of the Re-vegetation/Restoration Area after Phase 1 Work has been completed ("Phase 2 Work").

2. Bond Handling for Contract Phases. The Payment Bond and the Performance Bond covering Phase 1 Work on this Contract shall remain in full force and effort until completion of that phase is certified. The original Payment Bond and the original Performance Bond covering Phase 1 Work on this Contract shall continue in full force and effort for Phase 2 Work, however the value of each bond may be reduced as follows:

i. Completion by the Contractor of all Phase 1 Work shall be evidenced solely by the City Engineer affirming in writing that to the best of their knowledge that all Phase 1 Work has been completed by the Contractor in strict conformity with all City-approved plans and revisions, and that the Phase 1 Work completed by the Contractor meets all applicable standards ("Notice of Completion").

ii. Upon issuance by the City Engineer of the Notice of Completion for Phase 1 Work, the Payment Bond for this Project, and the Performance Bond for this Project, may be partially released, and thereby reduced for the Work performed under Phase1. The remaining payment and performance bond will cover the full cost of Phase 2 Work on this Project, which will be the amount specified in "Section 4: COMPENSATION" in Section 4.1 of this LTMMA.

3. No Partial Release Upon Default. No Partial Performance Bond Release and Reduction shall be given to the Contractor if the Performance Bond and/or this Agreement is in default on Phase 1 Work.

SECTION 1 - MAINTENANCE CONTRACT SUMMARY

1.1. General. The Contractor shall fulfill the Project's Maintenance Requirements (Work) as identified in the scope of work attached as **Exhibit A** in a manner satisfactory to the City.

The Contractor shall provide all equipment, labor, and materials necessary to perform the **Work** as described in **Exhibit A**, at the direction of the City.

1.2. Schedule of Work.

After receiving notification from the City, the Contractor shall create a comprehensive Schedule of Work (Schedule) for performance of this LTMMA for the City's approval. The Schedule shall include routine work, inspection, and infrequent operations such as repairs, fertilization, , watering, and pruning.

The City will approve the Schedule prior to the commencement of the Work. The City may require the Contractor to revise the Schedule. The Contractor shall not revise the Schedule unless the revisions have received the prior written approval of the City.

1.3. Commencement of Work & Maintenance Period. This LTMMA shall commence when the City approves of the Work of the Plant Establishment Period and sends notice of the approval to the Contractor in accordance with **Part 8, Section 802** of the Construction Contract and shall continue for **32** months. A copy of the approval form is attached as **Exhibit B**.

1.4. License. The Contractor shall hold the following licenses in good standing:

1.4.1. **C-27** State Contractor's License.

1.4.1.1. Alternatively, the Contractor shall retain the services of a Subcontractor with a **C-27** State Contractor's License.

1.4.2. Pest Control Advisor's License.

1.4.2.1. Alternatively, the Contractor shall retain the services of a licensed Pest Control Advisor.

1.4.3. Registration with the County Agriculture Commission.

1.4.4. Qualified Applicator's Certificate for Category B. This shall apply to any person supervising the use of pesticides, herbicides, or rodenticides.

1.4.5. City of San Diego Business License.

Prior to performing the Work, the Contractor shall complete and submit to the City the License Data Sheet. **See Exhibit C**.

1.5. Hours of Performance. The Contractor shall perform the Work between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday (Working Hours). The City may, in its sole discretion, grant permission to the Contractor to perform Work during non-Working Hours. Maintenance functions that generate excess noise (operations of power equipment which would cause annoyance to area residents for example) shall not begin before 7:00 a.m.

SECTION 2 - ADMINISTRATION

2.1. **Contract Administrator. PURCHASING & CONTRACTING DEPARTMENT, PUBLIC WORKS DIVISION (PWD)** is the Contract Administrator for the LTMMA. The Contractor shall perform the Work under the direction of a designated representative of Purchasing & Contracting Department, Public Works Division. The City will communicate with the Contractor on all matters related to the administration of this LTMMA and the Contractor's performance of the Work rendered hereunder. When this LTMMA refers to communications to or with the City, those communications shall be with the City, unless the City or this LTMMA specifies otherwise. Further, when this LTMMA requires an act or approval by City, that act or approval will be performed by the City.

2.2. **Local Office.** The Contractor shall maintain a local office with a company representative who is authorized to discuss matters pertaining to this LTMMA with the City and shall promptly respond and be available during Normal Working Hours. A local office is one located in San Diego County that can be reached by telephone and facsimile. An answering service in conjunction with a company email address for the designated company representative may fulfill this requirement. A mobile telephone shall not fulfill the requirement for a local office. All calls to the Contractor from the City shall be returned within a 1-hour period.

2.3. **Emergency Calls.** The Contractor shall have the capability to receive and to respond immediately to calls of an emergency nature. The City shall refer emergency calls to the Contractor for immediate disposition. The Contractor shall provide the City with a 24 hour emergency telephone number for this purpose.

2.4. **Staffing.** The Contractor shall furnish supervisory and working personnel capable of promptly accomplishing all Work required under this LTMMA on schedule and to the satisfaction of the City.

2.5. **Contractor Inspections.** The Contractor shall perform inspections of the Work site and shall prepare and submit to the City a Punchlist and dates of correction. The Punchlist shall include a comprehensive report of Work performed at the Work site to ensure 100% cover.

SECTION 3: WORK SITE MAINTENANCE

3.1. **Use of Chemicals.** The Contractor shall submit to the City for approval sample labels and MSDS for all chemical herbicides, rodenticides, and pesticides proposed for use under this LTRMC. Materials included shall be limited to chemicals approved by the State of California Department of Agriculture.

The use of any chemical shall be based on the recommendations of a licensed pest control advisor. Annual PCA Pesticide Recommendations are required for each pesticide proposed to be used for the Work site covered by this LTRMC. The use of chemicals shall conform to the current San Diego County Department of Agriculture regulations.

No chemical herbicide, rodenticide, or pesticide shall be applied until its use is approved, in writing, by City as appropriate for the purpose and area proposed.

The Contractor shall submit a monthly pesticide use report to the City along with the Contractor's invoices for payment. This report shall include a statement of all applications of herbicides, rodenticides, and pesticides, detailing the chemical used, undiluted quantity, rate of application, applicator's name, and the date and purpose of the application. For months in which no pesticides are applied, state "No Pesticide Used" on the report.

3.2. Irrigation Water. The Contractor shall diligently practice water conservation. There are no irrigation plans for this project. Contractor shall hand water by use of water truck sourcing in order to establish and maintain all plant material in good condition. The Contractor's failure to properly manage and conserve water may result in deductions from the monthly payment to be made to the Contractor or other penalties under this LTMMA.

If the Contractor causes excessive use or waste of irrigation water, the estimated cost of that water shall be deducted from the monthly payment. Further, any monetary fines or other damages assessed to City for the Contractor's failure to follow water conservation regulations imposed by the City, the Public Utilities Department of the City of San Diego, and, where appropriate, the State of California, the County Water Authority, or other legal entities shall be solely the responsibility of the Contractor and may be deducted from the monthly payment to be made to the Contractor under this LTMMA.

3.3. Payment for Water. The Contractor shall pay for the water used in the maintenance of the Work site and this cost is included in the price of this LTMMA.

3.4. Satisfactory Progression. If the Revegetation/Restoration Area is not progressing towards the required performance criteria, as defined in the Scope of Work, in accordance with the Work Schedule, and as determined by City, the City may accordingly adjust monthly payments to the Contractor.

SECTION 4: COMPENSATION

4.1. Maximum Compensation. The compensation for this LTMMA shall not exceed $190,000.00 Contract Price).

4.2. Method of Payment and Reports. The payments will be made monthly in direct proportion that each month bears to the total value of the Contract Price. As conditions precedent to payment, the Contractor shall submit a detailed invoice and report of maintenance Work performed every month. The Contractor's failure to submit the required reports or certified payrolls as described in the Construction Contract shall constitute a basis for withholding payment by the City.

4.3. Final Payment. The Contractor shall not receive final payment until the following conditions have been completed to the City's satisfaction:

1.3.1. The item(s) of the Work subject to this maintenance coverage as specified in **Exhibit A** (Maintenance Items) have been determined to be in compliance with the Construction Contract and this LTMMA.

1.3.2. The Contractor has provided to the City a signed and notarized Affidavit of Disposal, a copy of which is attached to the Construction Contract, stating that all brush, trash, debris, and surplus materials resulting from the Work have been disposed of in a legal manner.

1.3.3. The Contractor has provided a final work summary report to the City.

1.3.4. The Contractor has performed comprehensive and successful testing and checks of the Maintenance Items.

SECTION 5: BONDS AND INSURANCE

5.1. Contract Bonds. Prior to the commencement of Work, the Contractor, at its sole cost and expense, shall provide the following bonds issued by a surety authorized to issue bonds in California satisfactory to the City:

1.1.1. A Payment Bond (Material and Labor Bond) in an amount not less than the Contract Price for this Bid item, to satisfy claims of material suppliers and mechanics and laborers employed by it on the Work. The Payment Bond shall be maintained by the Contractor in full force and effect until the Work is accepted by City and until all claims for materials and labor are paid, and shall otherwise comply with the California Civil Code.

1.1.2. A Performance Bond in an amount not less than the Contract Price for this bid item to guarantee the faithful performance of all Work within the time prescribed in a manner satisfactory to the City and to guarantee all materials and workmanship will be free from original or developed defects. The Performance Bond shall remain in full force and effect until performance of the Work is completed as set forth in this LTMMA.

5.2. Insurance. The Contractor shall maintain insurance coverage as specified in **Section 5-4, "INSURANCE"** of the Construction Contract at all times during the term of this LTMMA.

The Contractor shall not begin the Work under this LTMMA until they have complied with the following:

1.2.1. Obtain insurance certificates reflecting evidence of insurance:

1. Commercial General Liability
2. Commercial Automobile Liability
3. Worker's Compensation

1.2.2. Confirm that all policies contain the specific provisions required in **Section 5-4, "INSURANCE"**.

The Contractor shall submit copies of any policy upon request by the City.

The Contractor shall not modify any policy or endorsement thereto which increases the City's exposure to loss for the duration of this LTMMA.

SECTION 6: MISCELLANOUS

6.1. **Illness and Injury Prevention Program.** The Contractor shall comply with all the mandates of Senate Bill 198 and shall specifically have a written Injury Prevention Program on file with the City in accordance with all applicable standards, orders, or requirements of California Labor Code, Section 6401.7. This Program shall be on file prior to the performance of any Work.

6.2. **City Standard Provisions.** This LTMMA is subject to the same standard provisions and Contractor Certification requirements as the Construction Contract.

6.3. **Taxpayer Identification Number.** I.R.S. regulations require the City to have the correct name, address, and Taxpayer Identification Number (TIN) or Social Security Number (SSN) on file for businesses or persons who provide services or products to the City. This information is necessary to complete Form 1099 at the end of each tax year. As such, the Contractor shall provide the City with a Form W-9 upon execution of this LTMMA.

6.4. **Assignment.** The Contractor shall not assign the obligations under this LTMMA, whether by express assignment or by sale of the company, nor any monies due or to become due, without the City's prior written approval. Any assignment in violation of this section shall constitute a Default and is grounds for immediate termination of this LTMMA, at the sole discretion of City. In no event shall any putative assignment create a contractual relationship between the City and any putative assignee.

6.5. **Independent Contractors.** The Contractor and any Subcontractors employed by Contractor shall be independent contractors and not agents of the City. Any provisions of this LTMMA that may appear to give the City any right to direct the Contractor concerning the details of performing the Work, or to exercise any control over such performance, shall mean only that the Contractor shall follow the direction of the City concerning the end results of the performance.

6.6. **Covenants and Conditions.** All provisions of this LTMMA expressed as either covenants or conditions on the part of the City or the Contractor shall be deemed to be both covenants and conditions.

6.7. **Jurisdiction and Venue**. The jurisdiction and venue for any suit or proceeding arising out of or concerning this LTMMA, the interpretation or application of any of its terms, or any related disputes shall be the County of San Diego, State of California.

6.8. **Successors in Interest.** This LTMMA and all rights and obligations created by it shall be in force and effect whether or not any Parties to this LTMMA have been succeeded by another entity and all rights and obligations created by this LTMMA shall be vested and binding on any Party's successor in interest.

6.9. **Integration.** This LTMMA and the exhibits, attachments, and references incorporated into this LTMMA fully express all understandings of the Parties concerning the matters covered in this LTMMA. No change, alteration, or modification of the terms or conditions of this LTMMA, and no verbal understanding of the Parties, their officers, agents, or employees shall be valid unless made in the form of a written change agreed to in writing by both Parties or by an amendment to this LTMMA agreed to by both Parties. All prior negotiations and agreements shall be merged into this LTMMA.

6.10. **Counterparts.** This LTMMA may be executed in counterparts, which when taken together shall constitute a single signed original as though all Parties had executed the same page.

6.11. **No Waiver.** Any failure of either the City or the Contractor to insist upon the strict performance by the other of any covenant, term, or condition of this LTMMA, nor any failure to exercise any right or remedy consequent upon a breach of any covenant, term, or condition of this LTMMA, shall constitute a waiver of any such breach or of such covenant, term, or condition. No waiver of any breach shall affect or alter this LTMMA, and each and every covenant, condition, and term hereof shall continue in full force and effect to any existing or subsequent breach.

6.12. **Severability.** The unenforceability, invalidity, or illegality of any provision of this LTMMA shall not render any other provision of this LTMMA unenforceable, invalid, or illegal.

6.13. **Signing Authority.** The representative for each Party signing on behalf of a corporation, partnership, joint venture or governmental entity hereby declares that authority has been obtained to sign on behalf of the corporation, partnership, joint venture, or entity and agrees to hold the other Party or Parties hereto harmless if it is later determined that such authority does not exist.

LANDSCAPING
EROSION CONTROL

IN WITNESS WHEREOF, this Contract is executed by the City of San Diego, acting by and through its Purchasing & Contracting Department Director in accordance with Municipal Code section 22.3102, and by Contractor.

Dated this 1st day of December, 2022.

THE CITY OF SAN DIEGO

By: _____

Matthew Vespi
Chief Financial Officer
Office of the Chief Financial Officer

I HEREBY CERTIFY I can legally bind TC Construction Company, Inc., and that I have read this entire contract, this 28th day of November, 2022.

By: _____

Printed Name: Austin Cameron

Title: president

I HEREBY APPROVE the form of the foregoing Contract this

9th day DECEMBER of 2022.

Mara W. Elliott, City Attorney

By: _____

Printed Name: RYAN P. GERRITY
Deputy City Attorney

EXHIBIT A

SCOPE OF WORK

I. **Location of Work.** The location of the Work to be performed (Landscape Areas) is shown on Specifications and Drawings numbered **41750-01-D** through **41750-101-D**(Specifications), which are incorporated into this Contract by this reference as though fully set forth herein.

II. **Description of Work.** The Contractor shall maintain and monitor all Landscape Areas during the maintenance period in accordance with this Contract. The Work includes complete landscape maintenance consisting of hand-watering, pruning, shaping and training of trees, shrubs, and ground cover plants; fertilization; weed control; control of all plant diseases and pests; and trash removal, and all other maintenance listed in this Contract and as required to maintain the landscape areas in a useable condition and to maintain the plant material in a healthy and viable state.

III. **Method of Performing Work.**

A. **Irrigation.** Hand watering shall be applied to box and container plantsas required. Hand watering schedules will vary depending on site specific conditionsand weather patterns.

1. The Contractor shall furnish all hoses, nozzles, sprinklers, etc. necessary to accomplish regular hand watering application.. The Contractor shall exercise due diligence to prevent water waste, erosion, and detrimental seepage into existing underground improvements and to existing structures.

2. Irrigation shall be accomplished as follows:

   a) Landscaped improved banks and slopes (if any) shall be hand watered Monday through Friday as required to maintain acceptable growth, viability and health, and to encourage deep rooting.

   b) Shrub beds (if any) shall be hand watered as required to maintain acceptable growth, viability and health, and to encourage deep rooting. Shrub areas shall be hand watered at a rate which keeps surface runoff to a minimum. The irrigation rate shall be adjusted to the needs of shrub types, seasons and weather conditions.

B. **Pruning Shrubs and Ground Cover Plants.** The Contractor shall prune all shrubs and ground cover plants growing in the landscape areas as required to:

1. Maintain plant growth viability and health, and to encourage deep rooting.

2. Prevent encroachment of passage ways, walks, streets, or view of signs; and

3. Prevent encroachment in any manner deemed objectionable by the City.

The Contractor shall remove dead or damaged limbs with sharp pruning tools, with no stubs remaining. The Contractor shall perform pruning to permit plants to grow naturally in accordance with their normal growth characteristics except where box hedging is required by the City. The Contractor shall not shear, hedge, or severely prune plants, unless authorized by the City. The Contractor shall not use growth regulators.

C. **Tree Maintenance.** The Contractor shall maintain all trees and container plants in the landscape areas as required. The Contractor shall not top trees.

1. **Potential Hazards.** The Contractor shall notify the City within 24 hours of any tree that shows signs of root heaving or leaning, or is in any manner a potential safety hazard. The Contractor shall immediately reestablish trees and shrubs that are uprooted due to storms, if possible. If trees or shrubs cannot be reestablished, Contractor shall remove them immediately (including roots) and fill the holes until replacement planting is complete.

2. **Replacement.** The Contractor shall completely remove and replace trees lost due to Contractor's faulty maintenance or negligence, as determined by the City. The Contractor shall replace trees in kind and size as determined by the City. If there is a difference in value between the tree lost and the replacement tree, the City will deduct the difference from payment to be made under this LTMMA. The City shall determine the value of the tree lost using the latest International Society of Arboriculture (I.S.A.) guidelines for value determination.

3. **Staking.** The Contractor shall securely stake any newly planted trees and other trees needing support with two "lodge pole" type stakes placed on opposite sides of the tree outside the root ball and secured to the tree with at least two flexible rubber tree ties. The Contractor shall regularly inspect tree ties and stakes and reposition them as necessary to ensure against girdling and abrasion.

D. **Fertilization.** The Contractor shall fertilize the Landscape Areas as necessary.. Contractor shall submit to City Material Safety Data Sheets and a schedule of application showing the site, date, and approximate time of fertilizer application (Fertilizer Schedule). The Fertilization Schedule, regardless of its intensity, timing, or the number of sites covered daily or weekly, shall not excuse Contractor from performing any other Work regularly required under this LTMMA.

1. The Contractor shall notify the City at least 48 hours before beginning any fertilization. Fertilizer shall be delivered to the site only in the original unopened containers bearing the manufacturer's guaranteed analysis. Damaged packages shall not be accepted. The Contractor shall furnish to the City with duplicate signed, legible copies of all certificates and invoices for all fertilizer to be used for this LTMMA. The invoices shall state the grade, amount and quantity received. Both the copy to be retained by the City and the Contractor's copy shall be signed by the City, on site, before any fertilizer may be used.

2. If deemed necessary by the City to achieve required results, the Contractor shall apply other materials as directed by the City, including:

   a) iron chelate;

   b) soil sulfur;

   c) gypsum; or

   d) surfactant enzymes such as Sarvon or Naiad.

3. The Contractor shall adequately hand water the fertilized area(s) immediately following the application of fertilizers and/or amendments to force fertilizer material to rest directly on the soil surface.

E. **Weed Removal.** The Contractor shall completely remove weeds from the Re-vegetation Area, including all turf grass areas, shrub and ground cover areas, planters, tree wells, and cracks in paved areas, including sidewalks, parking lot, gutters and curbs, as shown on the Work Schedule. For the purposes of this Section, "Weed" means any undesirable or misplaced plant. The Contractor shall control Weeds by manual, mechanical, or chemical methods. The City may restrict the use of chemical weed control in certain areas.

Weed removal in landscape areas shall be in accordance with **Section 802 of the Whitebook**.

F. **Disease and Pest Control.** The Contractor shall regularly inspect the Revegetation Area for the presence of disease and insect or rodent infestation. The Contractor shall notify the City within 4 Calendar Days if disease or insect or rodent infestation is discovered. In its notice to the City, the Contractor shall identify the disease, insect, or rodent and specify the control measures to be taken. Upon approval of the City, the Contractor shall implement the approved control measures, exercising extreme caution in the application of all sprays, dusts, or other materials utilized. The Contractor shall continue the approved control measures until the disease, insect, or rodent is controlled to the satisfaction of the City.

1. All individuals who supervise the mixing and application of herbicides, pesticides, and rodenticides on behalf of the Contractor shall possess valid Qualified Applicators Certificate for Category B issued to them by the State Department of Food and Agriculture.

2. The Contractor shall utilize all safeguards necessary during disease, insect or rodent control operations to ensure safety of the public and the employees of the Contractor, in accordance with current standard practices accepted by the State of California Department of Food and Agriculture. If the Contractor is unable to control the pest or disease, a pest control company will be hired and the cost shall be deducted from Contractor's monthly payment.

G. **Plant Replacement.** Except as provided in **Section H** below, the Contractor shall notify the City within 4 Calendar Days of the loss of plant material due to any cause.

1. The Contractor shall, at no cost to the City, replace any tree, shrub, ground cover, or other plant which is damaged or lost as a result of Contractor's faulty maintenance or negligence. The size and species of replacement plant materials shall be as directed by the City.

2. If so directed by the City, the Contractor shall replace any plant damaged or lost that is not a result of the Contractor's faulty maintenance or negligence. The size and species of replacement plant materials shall be as directed by City. The City will pay for materials and labor outside of warranty.

3. The City may determine that certain plants should be replaced in order to ensure maximum ecological health and overall aesthetic appearance of planting in the Revegetation Area. When the City determines such replacement should occur, Contractor shall replace the plants as directed by the City. The City will pay for materials and labor outside of warranty.

H. **Damage Reports.** The Contractor shall notify the City within 24 hours of any damage to the Work Area caused by accident, vandalism, or theft.

I. **Litter.** The Contractor shall promptly dispose of all trash and debris at an appropriate City disposal site. The Contractor shall pay any and all fees associated with the disposal of debris or trash accumulated under the terms of this LTMMA. The Contractor understands that disposal of refuse at City landfills is subject to a fee and that the Refuse Disposal Division can be contacted at (619) 573-1418 for fee information.

1. **Contractor Generated Litter.** The Contractor shall promptly remove all debris generated by the Contractor's pruning, trimming, weeding, edging and other Work required by this LTMMA. Immediately after working in streets, park walks, gutters, driveways, and paved areas, the Contractor shall clean them in accordance with all applicable laws.

2. **Third Party Generated Litter.** Upon discovery, the Contractor shall remove all litter, including bottles, glass, cans, paper, cardboard, fecal matter, leaves, branches, metallic items, and other debris, from the Work site.

J. **Monitoring.** The Project Engineer will oversee all maintenance operations and conduct qualitative and quantitative biological monitoring of the Revegetation Area according to the schedule and methods described in the Contractors Maintenance Plan..

K. **Final Site Cleanup**. Prior to completion of the LTMMA, all temporary irrigation materials, BMP's, and signs shall be removed from the site and properly disposed of.

EXHIBIT B

INSERT A COPY OF THE ENGINEER'S FIELD NOTIFICATION WHICH ACCEPTS THE PLANT ESTABLISHMENT PERIOD (PEP) AND ESTABLISHES THE COMMENCEMENT DATE OF THE MONITORING PROGRAM, SEE THE 2021 WHITEBOOK, SECTION 802

EXHIBIT C

LICENSE DATA SHEET

State Contractor License Classification and Number:_____

Name of License Holder:_____

Expiration Date:_____

City of San Diego Business License Number:_____

Expiration Date:_____

APPENDIX L

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT-VERNAL POOL

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT - VERNAL POOL

This **84-Month Long-Term Maintenance and Monitoring Agreement (LTMMA)** is made and entered into by and between the City of San Diego (City), a municipal corporation, and TC Construction Company, Inc. (Contractor), who may be individually or collectively referred to herein as a "Party" or the "Parties."

RECITALS

A. Concurrent with execution of this LTMMA, the Parties entered into a general contract (Construction Contract) for the construction of **La Media Road Improvements (Project), WBS number S-15018, Bid No. K-23-2060-DBB-3.**

B. In accordance with the Construction Contract, the Contractor shall enter into this LTMMA with the City for the purpose of implementing and fulfilling long-term maintenance requirements in accordance with the City of San Diego Municipal Code and the Contract Documents for the specified elopement(s) of **La Media Road Improvements,** (Maintenance Requirements).

C. The Contractor is ready and willing to fulfill its maintenance requirements in accordance with the terms of this LTMMA.

NOW, THEREFORE, in consideration of the above recitals and the mutual covenants and conditions set forth herein, and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby set forth their mutual covenants and understandings as follows:

INTRODUCTORY PROVISIONS

A. **Recitals Incorporated.** The above referenced Recitals are true and correct and are incorporated into this LTMMA by this reference.

B. **Exhibits Incorporated.** All Exhibits and Attachments referenced in this LTMMA are incorporated into this LTMMA by this reference.

C. **Contract Term.** This LTMMA shall be effective upon completion of the Plant Establishment Period (PEP) as described in **Section 6-1.1** of **ATTACHMENT E – Supplementary Special Provisions** and **Section 802** of the 2021 GREENBOOK AND WHITEBOOK and it shall be effective until the completion of the Work as described below.

D. **Terms and Conditions.** This LTMMA is subject to the terms and conditions of the Construction Contract included in the 2021 GREENBOOK, WHITEBOOK, Part 1 and Part 8, and Special Provisions (**Contract Document-Attachment C)** except as otherwise stated in this LTMMA.

E. Partial Release of Payment Bond and Performance Bond.

1. Performance of Contract in Two Phases. There are two separate phases of Work to be performed by the Contractor under this Contract. The first phase covers the Work involved in the original agreement as described in this agreement ("Phase 1 Work"). The second phase covers the work involved in the long-term maintenance of the Re-vegetation/Restoration Area after Phase 1 Work has been completed ("Phase 2 Work").

2. Bond Handling for Contract Phases. The Payment Bond and the Performance Bond covering Phase 1 Work on this Contract shall remain in full force and effort until completion of that phase is certified. The original Payment Bond and the original Performance Bond covering Phase 1 Work on this Contract shall continue in full force and effort for Phase 2 Work, however the value of each bond may be reduced as follows:

i. Completion by the Contractor of all Phase 1 Work shall be evidenced solely by the City Engineer affirming in writing that to the best of their knowledge that all Phase 1 Work has been completed by the Contractor in strict conformity with all City-approved plans and revisions, and that the Phase 1 Work completed by the Contractor meets all applicable standards ("Notice of Completion").

ii. Upon issuance by the City Engineer of the Notice of Completion for Phase 1 Work, the Payment Bond for this Project, and the Performance Bond for this Project, may be partially released, and thereby reduced for the Work performed under Phase1. The remaining payment and performance bond will cover the full cost of Phase 2 Work on this Project, which will be the amount specified in "Section 4: COMPENSATION" in Section 4.1 of this LTMMA.

3. No Partial Release Upon Default. No Partial Performance Bond Release and Reduction shall be given to the Contractor if the Performance Bond and/or this Agreement is in default on Phase 1 Work.

SECTION 1 - MAINTENANCE CONTRACT SUMMARY

1.6. General. The Contractor shall fulfill the Project's Maintenance Requirements (Work) as identified in the scope of work attached as **Exhibit A** in a manner satisfactory to the City.

The Contractor shall provide all equipment, labor, and materials necessary to perform the **Work** as described in **Exhibit A**, at the direction of the City.

1.7. Schedule of Work. The Contractor shall follow the Schedule of Work (Schedule) for the maintenance and monitoring period provided in the Plans.

After receiving notification from the City, the Contractor shall create a comprehensive Schedule of Work (Schedule) for performance of this LTMMA for the City's approval. The Schedule shall include routine work, inspection, and infrequent operations such as repairs, fertilization, aerification, watering, and pruning.

The City will approve the Schedule prior to the commencement of the Work. The City may require the Contractor to revise the Schedule. The Contractor shall not revise the Schedule unless the revisions have received the prior written approval of the City.

1.8. Commencement of Work & Maintenance Period. This LTMMA shall commence when the City approves of the Work of the Plant Establishment Period and sends notice of the approval to the Contractor in accordance with **Part 8, Section 802** of the Construction Contract and shall continue for **84** months. A copy of the approval form is attached as **Exhibit B**.

1.9. License. The Contractor shall hold the following licenses in good standing:

1.9.1. **C-27** State Contractor's License.

1.9.1.1. Alternatively, the Contractor shall retain the services of a Subcontractor with a **C-27** State Contractor's License.

1.9.2. Pest Control Advisor's License.

1.9.2.1. Alternatively, the Contractor shall retain the services of a licensed Pest Control Advisor.

1.9.3. Registration with the County Agriculture Commission.

1.9.4. Qualified Applicator's Certificate for Category B. This shall apply to any person supervising the use of pesticides, herbicides, or rodenticides.

1.9.5. City of San Diego Business License.

Prior to performing the Work, the Contractor shall complete and submit to the City the License Data Sheet. **See Exhibit C**.

1.10. Hours of Performance. The Contractor shall perform the Work between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday (Working Hours). The City may, in its sole discretion, grant permission to the Contractor to perform Work during non-Working Hours. Maintenance functions that generate excess noise (operations of power equipment which would cause annoyance to area residents for example) shall not begin before 7:00 a.m.

SECTION 2 - ADMINISTRATION

2.6. **Contract Administrator. PURCHASING & CONTRACTING DEPARTMENT, PUBLIC WORKS DIVISION (PWD)** is the Contract Administrator for the LTMMA. The Contractor shall perform the Work under the direction of a designated representative of Purchasing & Contracting Department, Public Works Division. The City will communicate with the Contractor on all matters related to the administration of this LTMMA and the Contractor's performance of the Work rendered hereunder. When this LTMMA refers to communications to or with the City, those communications shall be with the City, unless the City or this LTMMA specifies otherwise. Further, when this LTMMA requires an act or approval by City, that act or approval will be performed by the City.

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2.8. **Emergency Calls.** The Contractor shall have the capability to receive and to respond immediately to calls of an emergency nature. The City shall refer emergency calls to the Contractor for immediate disposition. The Contractor shall provide the City with a 24 hour emergency telephone number for this purpose.

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2.10. **Contractor Inspections.** The Contractor shall perform inspections of the Work site and shall prepare and submit to the City a Punchlist and dates of correction. The Punchlist shall include a comprehensive report of Work performed at the Work site to ensure 100% cover.

SECTION 3: WORK SITE MAINTENANCE

3.5. **Use of Chemicals.** The Contractor shall submit to the City for approval sample labels and MSDS for all chemical herbicides, rodenticides, and pesticides proposed for use under this LTRMC. Materials included shall be limited to chemicals approved by the State of California Department of Agriculture.

The use of any chemical shall be based on the recommendations of a licensed pest control advisor. Annual PCA Pesticide Recommendations are required for each pesticide proposed to be used for the Work site covered by this LTRMC. The use of chemicals shall conform to the current San Diego County Department of Agriculture regulations.

No chemical herbicide, rodenticide, or pesticide shall be applied until its use is approved, in writing, by City as appropriate for the purpose and area proposed.

The Contractor shall submit a monthly pesticide use report to the City along with the Contractor's invoices for payment. This report shall include a statement of all applications of herbicides, rodenticides, and pesticides, detailing the chemical used, undiluted quantity, rate of application, applicator's name, and the date and purpose of the application. For months in which no pesticides are applied, state "No Pesticide Used" on the report.

3.6. **Irrigation Water.** The Contractor shall diligently practice water conservation, including minimizing run-off or other waste. The Contractor shall turn off irrigation systems, if any, during periods of rainfall and at such other times when suspension of irrigation is desirable to conserve water and to remain within the guidelines of good horticultural landscape maintenance practices in accordance with the instructions from the Project Biologist. The Contractor's failure to properly manage and conserve water may result in deductions from the monthly payment to be made to the Contractor or other penalties under this LTMMA.

If the Contractor causes excessive use or waste of irrigation water, the estimated cost of that water shall be deducted from the monthly payment. Further, any monetary fines or other damages assessed to City for the Contractor's failure to follow water conservation regulations imposed by the City, the Public Utilities Department of the City of San Diego, and, where appropriate, the State of California, the County Water Authority, or other legal entities shall be solely the responsibility of the Contractor and may be deducted from the monthly payment to be made to the Contractor under this LTMMA.

3.7. **Payment for Water.** The Contractor shall pay for the water used in the maintenance of the Work site and this cost is included in the price of this LTMMA.

3.8. **Satisfactory Progression.** If the Revegetation/Restoration Area is not progressing towards the required performance criteria, as defined in the Scope of Work, in accordance with the Work Schedule, and as determined by City, the City may accordingly adjust monthly payments to the Contractor.

SECTION 4: COMPENSATION

4.4. **Maximum Compensation.** The compensation for this LTMMA shall not exceed $390,000.00**.** (Contract Price).

4.5. **Method of Payment and Reports.** The payments will be made monthly in direct proportion that each month bears to the total value of the Contract Price. As conditions precedent to payment, the Contractor shall submit a detailed invoice and report of maintenance Work performed every month. The Contractor's failure to submit the required reports or certified payrolls as described in the Construction Contract shall constitute a basis for withholding payment by the City.

4.6. **Final Payment.** The Contractor shall not receive final payment until the following conditions have been completed to the City's satisfaction:

1.6.1. The item(s) of the Work subject to this maintenance coverage as specified in **Exhibit A** (Maintenance Items) have been determined to be in compliance with the Construction Contract and this LTMMA.

1.6.2. The Contractor has provided to the City a signed and notarized Affidavit of Disposal, a copy of which is attached to the Construction Contract, stating that all brush, trash, debris, and surplus materials resulting from the Work have been disposed of in a legal manner.

1.6.3. The Contractor has provided a final work summary report to the City.

1.6.4. The Contractor has performed comprehensive and successful testing and checks of the Maintenance Items.

SECTION 5: BONDS AND INSURANCE

5.3. **Contract Bonds.** Prior to the commencement of Work, the Contractor, at its sole cost and expense, shall provide the following bonds issued by a surety authorized to issue bonds in California satisfactory to the City:

1.3.1. A Payment Bond (Material and Labor Bond) in an amount not less than the Contract Price for this Bid item, to satisfy claims of material suppliers and mechanics and laborers employed by it on the Work. The Payment Bond shall be maintained by the Contractor in full force and effect until the Work is accepted by City and until all claims for materials and labor are paid, and shall otherwise comply with the California Civil Code.

1.3.2. A Performance Bond in an amount not less than the Contract Price for this bid item to guarantee the faithful performance of all Work within the time prescribed in a manner satisfactory to the City and to guarantee all materials and workmanship will be free from original or developed defects. The Performance Bond shall remain in full force and effect until performance of the Work is completed as set forth in this LTMMA.

5.4. **Insurance.** The Contractor shall maintain insurance coverage as specified in **Section 5-4, "INSURANCE"** of the Construction Contract at all times during the term of this LTMMA.

The Contractor shall not begin the Work under this LTMMA until they have complied with the following:

1.4.1. Obtain insurance certificates reflecting evidence of insurance:

4. Commercial General Liability

5. Commercial Automobile Liability

6. Worker's Compensation

1.4.2. Confirm that all policies contain the specific provisions required in **Section 5-4, "INSURANCE"**.

The Contractor shall submit copies of any policy upon request by the City.

The Contractor shall not modify any policy or endorsement thereto which increases the City's exposure to loss for the duration of this LTMMA.

SECTION 6: MISCELLANOUS

6.14. Illness and Injury Prevention Program. The Contractor shall comply with all the mandates of Senate Bill 198 and shall specifically have a written Injury Prevention Program on file with the City in accordance with all applicable standards, orders, or requirements of California Labor Code, Section 6401.7. This Program shall be on file prior to the performance of any Work.

6.15. City Standard Provisions. This LTMMA is subject to the same standard provisions and Contractor Certification requirements as the Construction Contract.

6.16. Taxpayer Identification Number. I.R.S. regulations require the City to have the correct name, address, and Taxpayer Identification Number (TIN) or Social Security Number (SSN) on file for businesses or persons who provide services or products to the City. This information is necessary to complete Form 1099 at the end of each tax year. As such, the Contractor shall provide the City with a Form W-9 upon execution of this LTMMA.

6.17. Assignment. The Contractor shall not assign the obligations under this LTMMA, whether by express assignment or by sale of the company, nor any monies due or to become due, without the City's prior written approval. Any assignment in violation of this section shall constitute a Default and is grounds for immediate termination of this LTMMA, at the sole discretion of City. In no event shall any putative assignment create a contractual relationship between the City and any putative assignee.

6.18. Independent Contractors. The Contractor and any Subcontractors employed by Contractor shall be independent contractors and not agents of the City. Any provisions of this LTMMA that may appear to give the City any right to direct the Contractor concerning the details of performing the Work, or to exercise any control over such performance, shall mean only that the Contractor shall follow the direction of the City concerning the end results of the performance.

6.19. Covenants and Conditions. All provisions of this LTMMA expressed as either covenants or conditions on the part of the City or the Contractor shall be deemed to be both covenants and conditions.

6.20. Jurisdiction and Venue. The jurisdiction and venue for any suit or proceeding arising out of or concerning this LTMMA, the interpretation or application of any of its terms, or any related disputes shall be the County of San Diego, State of California.

6.21. Successors in Interest. This LTMMA and all rights and obligations created by it shall be in force and effect whether or not any Parties to this LTMMA have been succeeded by another entity and all rights and obligations created by this LTMMA shall be vested and binding on any Party's successor in interest.

6.22. Integration. This LTMMA and the exhibits, attachments, and references incorporated into this LTMMA fully express all understandings of the Parties concerning the matters covered in this LTMMA. No change, alteration, or modification of the terms or conditions of this LTMMA, and no verbal understanding of the Parties, their officers, agents, or employees shall be valid unless made in the form of a written change agreed to in writing by both Parties or by an amendment to this LTMMA agreed to by both Parties. All prior negotiations and agreements shall be merged into this LTMMA.

6.23. Counterparts. This LTMMA may be executed in counterparts, which when taken together shall constitute a single signed original as though all Parties had executed the same page.

6.24. No Waiver. Any failure of either the City or the Contractor to insist upon the strict performance by the other of any covenant, term, or condition of this LTMMA, nor any failure to exercise any right or remedy consequent upon a breach of any covenant, term, or condition of this LTMMA, shall constitute a waiver of any such breach or of such covenant, term, or condition. No waiver of any breach shall affect or alter this LTMMA, and each and every covenant, condition, and term hereof shall continue in full force and effect to any existing or subsequent breach.

6.25. Severability. The unenforceability, invalidity, or illegality of any provision of this LTMMA shall not render any other provision of this LTMMA unenforceable, invalid, or illegal.

6.26. Signing Authority. The representative for each Party signing on behalf of a corporation, partnership, joint venture or governmental entity hereby declares that authority has been obtained to sign on behalf of the corporation, partnership, joint venture, or entity and agrees to hold the other Party or Parties hereto harmless if it is later determined that such authority does not exist.

VERNAL POOL

IN WITNESS WHEREOF, this Contract is executed by the City of San Diego, acting by and through its Purchasing & Contracting Department Director in accordance with Municipal Code section 22.3102, and by Contractor.

Dated this 1st day of December, 2022.

THE CITY OF SAN DIEGO

By: _____

Matthew Vespi
Chief Financial Officer
Office of the Chief Financial Officer

I HEREBY CERTIFY I can legally bind TC Construction Company, Inc., and that I have read this entire contract, this 28th day of November, 2022.

By: _____

Printed Name: Austin Cameron

Title: President

I HEREBY APPROVE the form of the foregoing Contract this

9th day DECEMBER of 2022.

Mara W. Elliott, City Attorney

By: _____

Printed Name: RYAN P. GERRITY
Deputy City Attorney

EXHIBIT A

SCOPE OF WORK

I. Location of Work. The location of the Work to be performed (Mitigation Area) is shown on Specifications and Drawings numbered **0100229-1-D** through **0100229-7 D** Specifications), which are incorporated into this Contract by this reference as though fully set forth herein.

II. Description of Work. The Contractor shall maintain and monitor the Revegetation/Restoration Area during the Monitoring Program in accordance with this Contract. The Revegetation/Restoration Area shall meet the success criteria specified in the Vernal Pool Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 15, 2022 incorporated herein as Exhibit D at each of the milestones listed in the Schedule for the maintenance and monitoring period. The Work includes regular maintenance including trash removal, weeding, and watering of native plant material and all other maintenance listed in this Contract and as required to maintain the Mitigation Area in a useable condition and to maintain the plant material in a healthy and viable state.

The Work also includes qualitative and quantitative biological monitoring of the Mitigation Area according to the schedule, methods, and qualifications specified in the Mitigation Plan. The monitoring work shall include all reporting tasks specified in the Vernal Pool Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 15, 2022 (Exhibit D).

III. Method of Performing Work.

The method for performing the work is outlined in the Vernal Pool Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 15, 2022.See Exhibit D below.

EXHIBIT B

INSERT A COPY OF THE ENGINEER'S FIELD NOTIFICATION WHICH ACCEPTS THE PLANT ESTABLISHMENT PERIOD (PEP) AND ESTABLISHES THE COMMENCEMENT DATE OF THE MONITORING PROGRAM, SEE THE 2021 WHITEBOOK, SECTION 802

EXHIBIT C

LICENSE DATA SHEET

State Contractor License Classification and Number:_____

Name of License Holder:_____

Expiration Date:_____

City of San Diego Business License Number:_____

Expiration Date:_____

EXHIBIT D

Vernal Pool Mitigation Plan for the La Media Road Improvement Project

Vernal Pool Mitigation Plan for the La Media Road Improvement Project San Diego, California

Prepared for
City of San Diego
Engineering & Capital Projects Department
525 B Street, Suite 750, MS 980A
San Diego, CA 92101

Prepared by
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9514-5
June 15, 2022

Meagan Olson, Restoration Ecologist

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FIGURES

TABLES

ATTACHMENT

Acronyms and Abbreviations

APRM	Advance Permittee-Responsible Mitigation
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
City	City of San Diego
CRAM	California Rapid Assessment Method
DSD	Development Services Department
DSM	digital surface model
E&CP	Engineering & Capital Projects Department
FAA	Federal Aviation Administration
MHPA	Multi-Habitat Planning Area
MMC	Mitigation Monitoring and Coordination
MSCP	Multiple Species Conservation Program
MSS	maritime succulent scrub
PEP	Plant Establishment Period
RWQCB	Regional Water Quality Control Board
SDFS	San Diego fairy shrimp
sUAV	small unmanned aerial vehicle
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VPHCP	City of San Diego Vernal Pool Habitat Conservation Plan

1.0 Introduction

This mitigation plan is intended to mitigate for impacts to vernal pool habitat for the La Media Road Improvement Project. Impacts from this project is discussed in more detail in the project-specific biological technical report (RECON 2020). The goal of this plan is the establishment, re-establishment, and enhancement of vernal pools as mitigation for 0.150 acre of impacts caused by the La Media Road Improvement (three vernal pool basins). These impacts are being mitigated through the establishment of 0.552 acre (24,039 square feet) of vernal pool surface area, re-establishment of 0.370 acre (16,106 square feet) of vernal pool surface area, enhancement of 0.206 acre (8,980 square feet) of existing vernal pools, and restoration of 6.502 acres of adjacent upland watershed as discussed in this plan. An additional 0.24 acre of vernal pool enhancement will occur at the La Media Road Wetland Mitigation Site and is discussed in the La Media Road Wetland Mitigation Plan (RECON 2022a). This will result in excess mitigation totaling 6.502 acres of maritime succulent scrub habitat and 0.528 acre of vernal pool basin, which will be available for future City of San Diego (City) projects as Advanced Permittee-Responsible Mitigation.

In accordance with Vernal Pool Habitat Conservation Plan (VPHCP) Section 5.3.1, this vernal pool mitigation plan was submitted to the City of San Diego (Development Services Environmental Analysis Section and Planning Department Multiple Species Conservation Program [MSCP] Staff) and resource agencies for approval as part of the development review process and will be included as an attachment to the La Media Road Improvement Project CEQA document. This mitigation plan will implement the La Media Road Widening Project vernal pool mitigation requirements and has not been revised as a part of the La Media Road Improvement CEQA process.

1.1 Project Location

The La Media Road Improvement Project is located in the Otay Mesa neighborhood of the City, along La Media Road, south of Interstate 905. The vernal pool mitigation site (mitigation site) is located in the City's Otay Mesa neighborhood, south of the southern terminus of Caliente Avenue, and approximately three miles west of the La Media Road Improvement Project.

The mitigation site is situated along a City-owned dirt road south of Dillon Canyon (Figures 1 through 3). The mitigation site is made up of eight City-owned one-acre parcels with an approximately 40-foot road easement that passes north to south through the center, bisecting the site into two four-acre areas. The City-owned parcels are dedicated Open Space as part of the City of San Diego VPHCP and managed by the City Park and Recreation Department. The City will be pursuing an easement vacation to dissolve the road easement and incorporate that area into the site. The road easement is the only existing easement on-site and easement vacation will begin in conjunction with the La Media Road construction and will be completed prior to mitigation site sign-off. In addition, no water or mineral right permits or licenses exist for the site. Figures 2 and 3 show the individual one-acre parcels with the road easement in the center while all subsequent figures display the mitigation site boundary as a whole, after road easement vacation. The mitigation site lies within a portion of Otay Mesa where past disturbances are prominent, including past agricultural

Project Location

RECON

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 1a
Regional Location

Map Source: City of San Diego

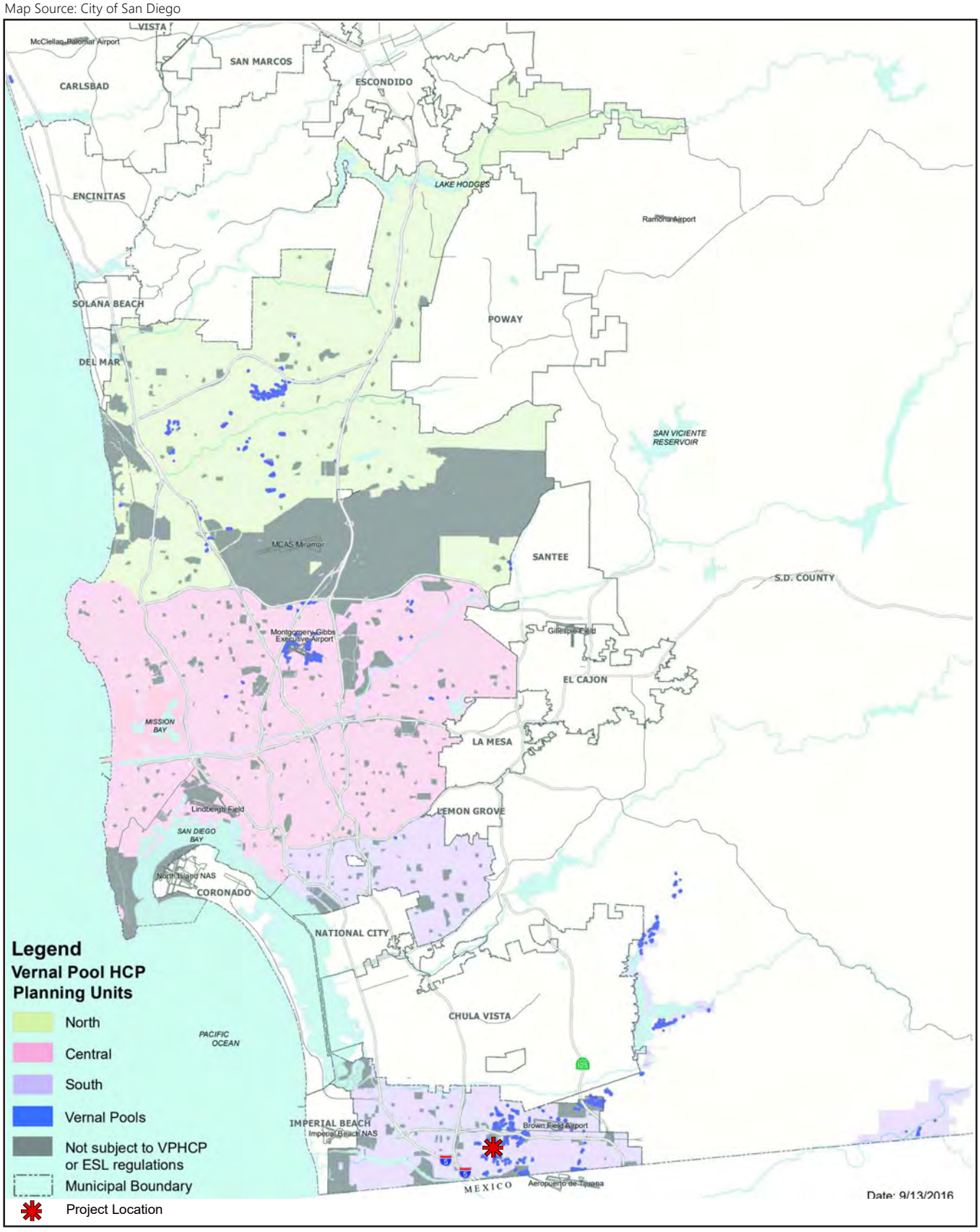

FIGURE 1b
Vernal Pool HCP Planning Units

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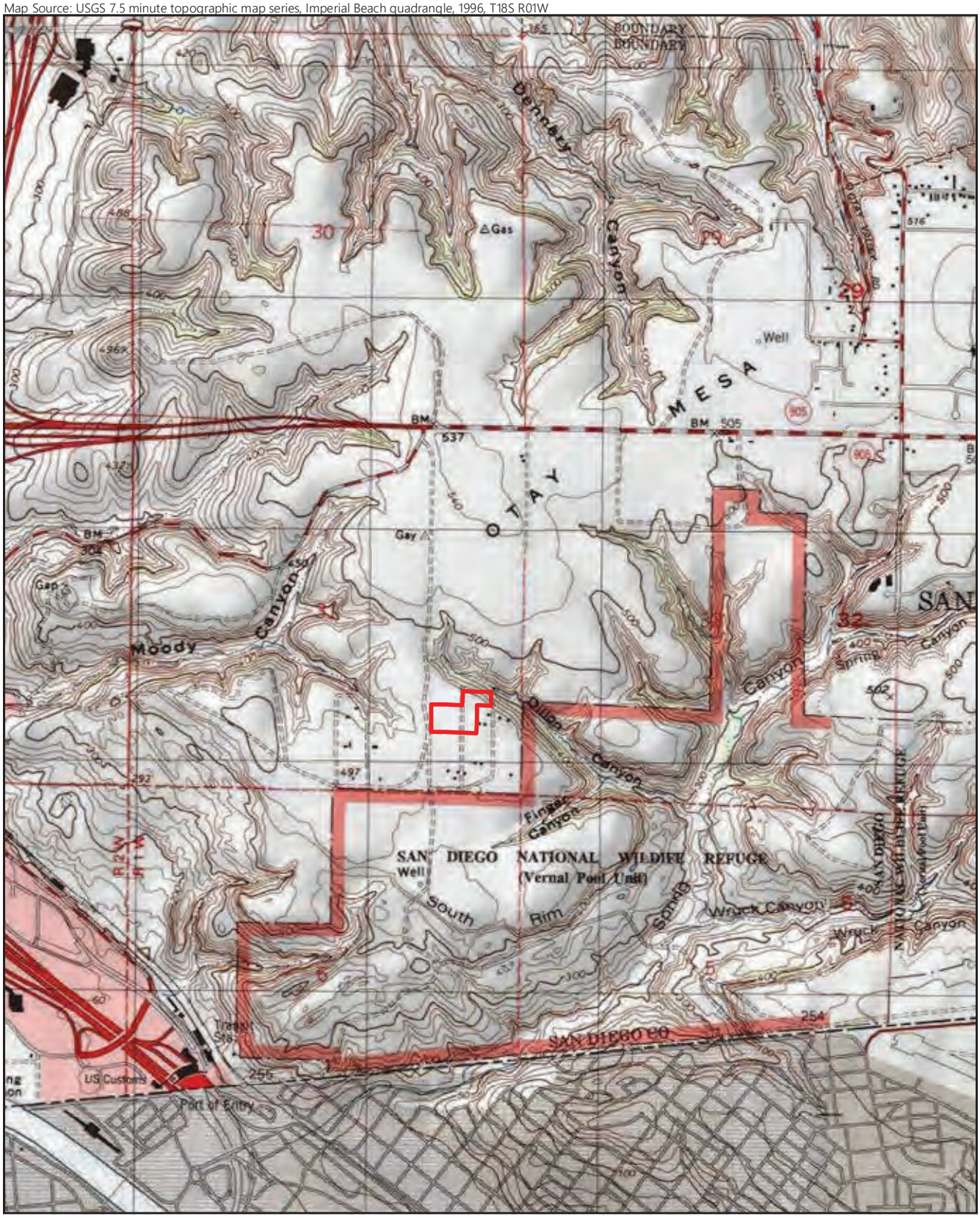
La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

Map Source: USGS 7.5 minute topographic map series, Imperial Beach quadrangle, 1996, T18S R01W



0 Feet 2,000

FIGURE 2

Mitigation Site Location on USGS Map

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Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1761

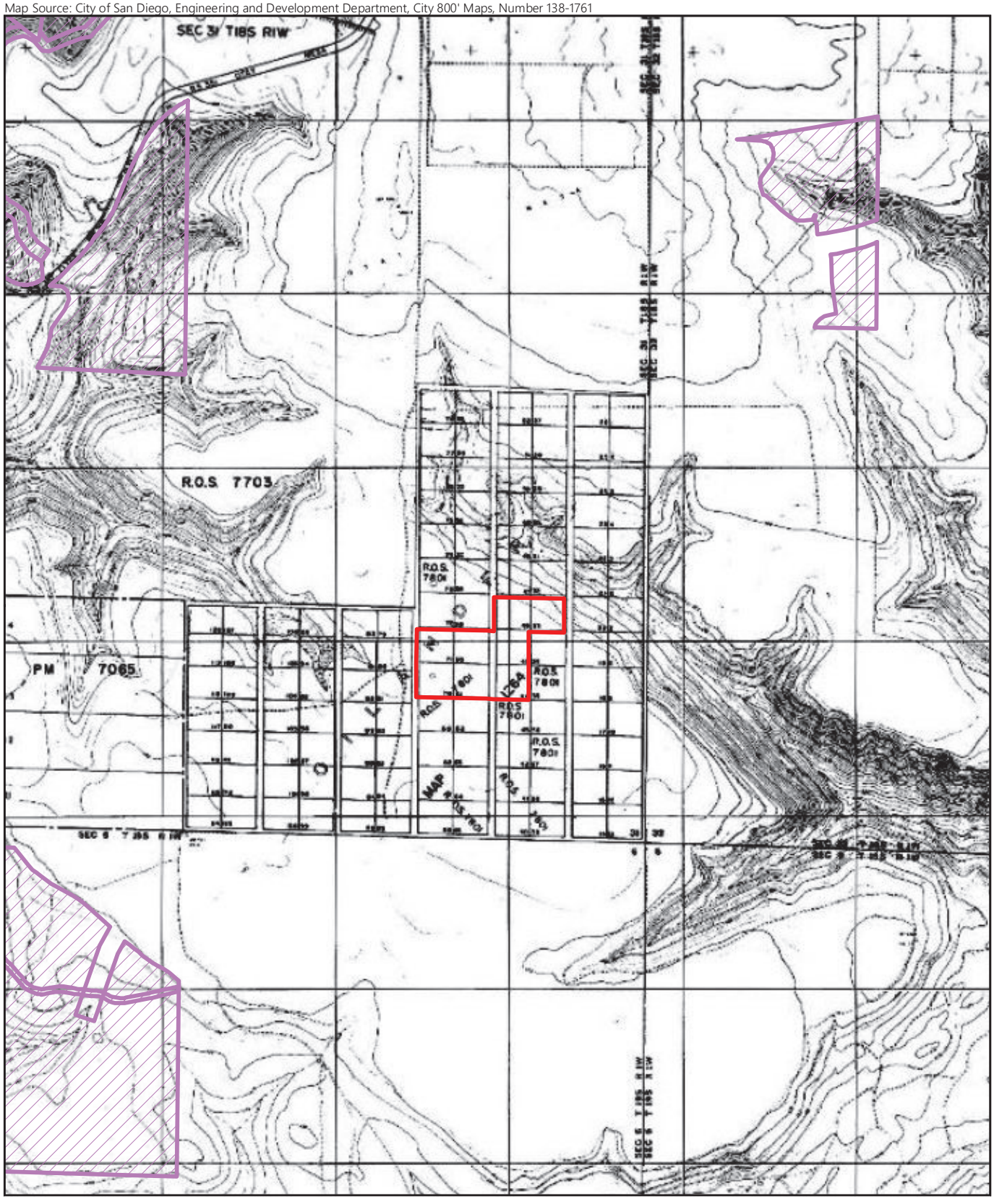

FIGURE 3

Mitigation Site Location on City 800' Map

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

and ranching activities, off-road-vehicle use, and trash dumping. While evidence of vernal pools can be seen in historic aerials from 1953 (Nationwide Environmental Title Research LLC [NETR] 2022), evidence of dirt roads and agricultural development is also prominent. The proposed mitigation of vernal pools within the site represents the establishment and re-establishment of an aquatic resource that has not been present within the area for decades.

1.2 Restoration Goals and Objectives

The goal of this plan is restoration of vernal pools as mitigation for 0.150 acre of impacts caused by the La Media Road Improvement project (three vernal pool basins). These impacts are being mitigated through the establishment of 0.552 acre (24,039 square feet) of vernal pool surface area, re-establishment of 0.370 (16,106 square feet) of vernal pool surface area, enhancement of 0.206 acre (8,980 square feet) of existing vernal pools, and restoration of 6.502 acres of adjacent upland watershed. For the Regional Water Quality Control Board (RWQCB), this approach results in an excess of 0.528 acre of vernal pool basin which will be available for future City projects as Advance Permittee-Responsible Mitigation (APRM; Table 1). For the U.S. Army Corps of Engineers (USACE), this approach results in an excess of 0.843 acre of vernal pool basin which will be available for future City projects as APRM (see Table 1).

Table 1
Proposed Mitigation for Impacts to Vernal Pool Habitat at La Media Road
(acres)

Impacts	Ratio	Mitigation Required	Mitigation			Total Mitigation	Excess Credits[4]
			Establishment	Re-establishment	Enhancement		
0.150	5.6:1[1]	0.840	0.552	0.370	0.446[3]	**1.368**	**0.528[5]**
0.150	3.5:1[2]	0.525	0.552	0.370	0.446[3]	**1.368**	**0.843[6]**

[1]Per the requirements of the 401 Certification (RWQCB 2021).
[2]Per the requirements of the USACE mitigation ratio checklist (404 permit in preparation).
[3]Includes 0.206 acre of enhancement at the vernal pool mitigation site described in this plan, and 0.24 acre of enhancement at the wetland mitigation site (RECON 2022a).
[4]Establishment of 6.502 acre of maritime succulent scrub habitat will also be conducted as part of this mitigation plan, and available for future City projects. Maritime succulent scrub establishment is not part of RWQCB or USACE requirements.
[5]Excess credits for RWQCB jurisdictional resources include 0.042 acre of establishment, 0.370 acre of re-establishment, and 0.356 acre of enhancement.
[6]Excess credits for USACE jurisdictional resources include 0.020 acre of establishment, 0.370 acre of re-establishment, and 0.446 acre of enhancement.

1.3 Determination of Credits

Requirements for mitigation efforts typically involve the achievement of a no-net-loss of jurisdictional water resources (i.e., wetland, non-wetland waters). Mitigation is achieved through one or a combination of methods that include establishment of jurisdictional waters, restoration or rehabilitation of disturbed areas of jurisdictional waters to a higher quality, and/or the enhancement of existing jurisdictional waters to improve functions and values (i.e., invasive species control,

hydrology improvements). Mitigation is conducted at ratios dependent on the type of jurisdictional water being mitigated for (impacted).

The terms "establishment", "restoration" (including "re-establishment" and "rehabilitation"), and "enhancement" as used in this plan are defined per the USACE regional compensatory mitigation guidelines (USACE 2015) as follows:

1. Establishment (creation): "Manipulation of the physical, chemical, or biological characteristics present at an upland site to develop an aquatic resource that did not previously exist. Establishment results in a gain in aquatic resource area and functions." A majority of the mitigation proposed in this plan is establishment, or the conversion of non-native grassland to vernal pools. Historically, vernal pools were present throughout Otay Mesa and historic aerials dating back to 1953 indicate that the mitigation site once supported several vernal pool basins. Proposed pools identified as establishment pools in this mitigation plan are those whose location on historic aerials did not contain evidence of past vernal pool ponding.

2. Restoration: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. For the purpose of tracking net gains in aquatic resources area, restoration is divided into two categories: re-establishment and rehabilitation."

   Re-establishment: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions." Proposed pools identified as re-establishment pools in this mitigation plan are those whose location on historic aerials contained evidence of past vernal pool ponding or pools that were identified as pools in the VPHCP, but these proposed pools did not demonstrate wetland indicators during the jurisdictional delineation conducted in May 2022 (RECON 2022b). The re-establishment of these pools represents the return of an aquatic resource area that has not existed within the mitigation site for at least the last several years, if not decades.

   Rehabilitation: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area." None of the pools included in this plan meet the definition of rehabilitation.

3. Enhancement: "Manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area." For a portion of the mitigation proposed in this plan, enhancement would involve the removal of non-native weed species, introduction of vernal pool endemic seed, and improvement of adjacent topography to improve vernal pool ponding, which would improve the functionality of the pools but not increase area.

1.4 Credit Release

Per Table 1, a total of 0.840 acre of mitigation credits generated by the restoration described in this plan will be utilized as compensation for impacts that will occur to RWQCB jurisdictional resources at the La Media Road Improvement Project. Credits in excess of those required by the RWQCB totaling 0.528 acre will be available for future City essential public projects. Also per Table 1, a total of 0.525 acre of mitigation credits generated by the restoration described in this plan will be utilized as compensation for impacts that will occur to USACE jurisdictional resources at the La Media Road Improvement Project. Credits in excess of those required by the USACE totaling 0.843 acre will be available for future City essential public projects. In collaboration with the USACE, Los Angeles District, Regulatory Division, the City has developed a memorandum for the record for APRM where mitigation credits are generated for use against expected future City essential public projects impacts, at a site that is established in advance of the impacts (City of San Diego 2015). Mitigation credits have been determined based on total acreage of vernal pools established and enhanced. Table 1 presents the proposed mitigation required to mitigate for impacts to vernal pools, acres shown as excess credits in Table 1 will be available for future impacts.

Table 2 presents the credit release schedule for the proposed mitigation project's excess credits (0.528 acre for RWQCB and 0.843 for USACE) per the California Mitigation Bank Enabling Agreement Template (California Multi-agency Project Delivery Team 2021). Mitigation activities are expected to take at least five years for the proposed mitigation site to achieve the performance standards described in this plan. Therefore, the credit release schedule provides a method for releasing credits even if the impacts occur before the mitigation project is complete. Credits shall be progressively released as the project reaches the implementation and management milestones shown in Table 2.

The credit release schedule begins with Credit Release 1 at Year 0, when up to 15 percent of total project credits may be released upon mitigation site approval (see Table 2). The long-term management of the mitigation site will occur under the jurisdiction and through administration of the MSCP; therefore, endowment requirements for credit release are not applicable for this mitigation project. Credit Release 2 occurs after completion of site preparation and the 120-day plant establishment period (PEP) (25 percent of credits, 40 percent cumulative). As-built drawings shall be submitted no later than 90 calendar days following completion of construction. The as-built drawings shall consist of full-size construction plans, with as-built conditions clearly shown. The as-built drawings and any attachments must describe in detail any deviation from the plan.

Credit Releases 3 through 5 shall occur after Years 2 through 5 of maintenance, monitoring, reporting, and performance standards achievement with 15 percent of credits becoming available at the completion of each year (85 percent cumulative upon successful completion of Year 5). Except for Credit Release 1, each credit release is contingent upon the completion of the previous credit release and completion of the maintenance and monitoring periods outlined in Table 2. Each credit release, except for Credit Releases 1 and 2, is also contingent upon submission of the annual report for the current reporting period and a site inspection. Early achievement of performance standards will not accelerate credit releases. A final credit release of the remaining available credits (100 percent cumulative) shall be made upon final completion of plan activities (see Table 2).

The City shall maintain a ledger to document use of all advance credits. Each transaction will be documented in the ledger and submitted to the appropriate agencies. The annual report shall also include an updated credit transfer ledger showing all credits transferred since project establishment and an account of remaining credits. The opportunity to use advance mitigation credits generated by the project will not expire if the performance standards have been achieved (USACE 2015). A mitigation credit shall only be used once by the City and will not accumulate additional value over time once used. The resource agencies and the City may define specific areas of the mitigation site and associated credits to compensate for specific proposed impacts. In some cases, proposed impacts may require on-site mitigation in addition to mitigation with advance credits (USACE 2015).

Table 2
Credit Release Schedule[1]

Credit Release Number	Percentage of Credit Release	Release Criteria
1	15 percent	15 percent of the total anticipated credits may be released upon mitigation site approval.
2	25 percent	Up to an additional 25 percent of the total anticipated credits (40 percent cumulative total) may be released when all the following have occurred: • As-built drawings have been submitted • The USACE has approved the as-built condition in writing • If applicable, an adjusted Credit Evaluation and Credit Table and Credit Transfer ledger shall be submitted reflecting as-built conditions • Credit Release 1 has occurred
3	15 percent	Up to an additional 15 percent of the total anticipated credits (55 percent cumulative total) may be released when all the following have occurred: • The annual report has been submitted • Year 2 performance standards have been attained • Credit Release 2 has occurred • A minimum of two years of monitoring have been conducted since all requirements of Credit Release 2 were met.
4	15 percent	Up to an additional 15 percent of the total anticipated credits (70 percent cumulative total) may be released when all the following have occurred: • The annual report has been submitted • Year 3 performance standards have been attained • Credit Release 3 has occurred • A minimum of one year of monitoring has been conducted since all requirements for Credit Release 3 were met.

Table 2 Credit Release Schedule[1]		
Credit Release Number	Percentage of Credit Release	Release Criteria
5	15 percent	Up to an additional 15 percent of the total anticipated credits (85 percent cumulative total) may be released when all the following have occurred: • The annual report has been submitted • The Year 4 performance standards have been attained • A delineation of aquatic resources in the mitigation area has been submitted • Credit Release 4 has occurred • A minimum of one year of monitoring has been conducted since all requirements for Credit Release 4 have been met.
Final Credit Release	15 percent	Any remaining balance of credits (100 percent cumulative total) may be released when all the following have occurred: • The annual report has been submitted, including the final monitoring report • Final performance standards have been attained • Any required remedial actions are completed • Any additional performance standards required, as a result of required remedial actions, have been attained • Credit Release 5 has occurred • A minimum of one year of monitoring has been conducted since all requirements for Credit Release 5 have been met.
[1]Excess RWQCB credits totaling 0.528 acre and USACE credits totaling 0.843 acre generated from the restoration activities described in this plan will be release per this credit release schedule.		

1.5 Potential Projects

The memorandum for the record (City of San Diego 2015) allows for the City to utilize an APRM approach for essential public projects. The future Fire-Rescue Air Operations Phase II project will mitigate for impacts to vernal pools using this APRM approach. The project is located at Montgomery-Gibbs Executive Airport in the Kearny Mesa Planning Area. Additional project details are included in the Biological Resources Report prepared for the project (City of San Diego 2020a) and the 401 Water Quality Certification (RWQCB 2022) for the mitigation project acknowledges that impacts from the Fire-Rescue Air Operations project will be mitigated within the vernal pool mitigation site. On-site mitigation is not feasible due to Federal Aviation Administration (FAA) restrictions that limit restoration near airports. Additionally, the Fire-Rescue Air Operations Phase II Project and the mitigation site are both located within spreading navarretia (*Navarretia fossalis*) critical habitat and, although no spreading navarretia was impacted, this mitigation plan aims to restore viable populations of this species. Per the VPHCP and Biology Guidelines, and through discussions with the RWQCB, impacts to vernal pools and wetlands would be mitigated at a 2:1 ratio because impacted pools lack listed fairy shrimp or sensitive plant species. A total of 0.089 acre of

impacts (six vernal pool basins) will be mitigated at a 2:1 ratio for a total of 0.178 acre of credits through the APRM established at the La Media Road Vernal Pool Mitigation Site.

Additional proposed and future City essential public projects that may use this APRM approach include:

- Long-term Canyon Sewer Maintenance Program;
- Master Storm Water Maintenance Program;
- Future Public Utilities Department projects including but not limited to pipe installation/repair, access road creation/repair, pump station or treatment facility construction, and infrastructure installation/repair;
- Future Transportation and Stormwater Department projects which include storm channel maintenance, culvert replacement/installation/repair, and flood control activities; and
- Other City essential public projects as defined in the memorandum for the record (City of San Diego 2015) including flood prevention dredging, installation of recreational trails, maintenance/repair to existing infrastructure, utility maintenance/installation, access path installation/maintenance, road widening, bridge installation/repair, and any other activities that the City would be reasonably expected to complete.

Once identified, these projects will be required to prepare detailed mitigation plans that address USACE required components to demonstrate consistency with the 2008 Mitigation Rule including that using credits from the La Media Road Vernal Pool Mitigation Site are ecologically superior to other alternatives.

1.6 Service Area

The service area is defined as the geographic area where impacts to jurisdictional resources may occur and require mitigation that would be appropriate within the proposed mitigation site. The service area for this mitigation site includes the north, central, and south vernal pool planning units as defined in the VPHCP (see Figure 1b). The mitigation site is located within the south planning unit but impacts to vernal pools that may occur within the north and central planning units would also be adequately mitigated at the site. The three planning units are appropriate for inclusion in the service area for this mitigation site based on commonalities in their urban development and native habitats. The vernal pools within each planning unit are found within similar soil types and support similar vernal pool endemic plant and animal species. With the exception of San Diego mesa mint (*Pogogyne abramsii*), all sensitive plant and animal species covered by the VPHCP are present within the south planning unit (City of San Diego 2019). The permittee-responsible mitigation proposed to occur at this site located in the south planning unit includes mitigation for impacts that will occur in the south as well as central planning units.

2.0 Mitigation Site Existing Conditions

2.1 Mitigation Site Description

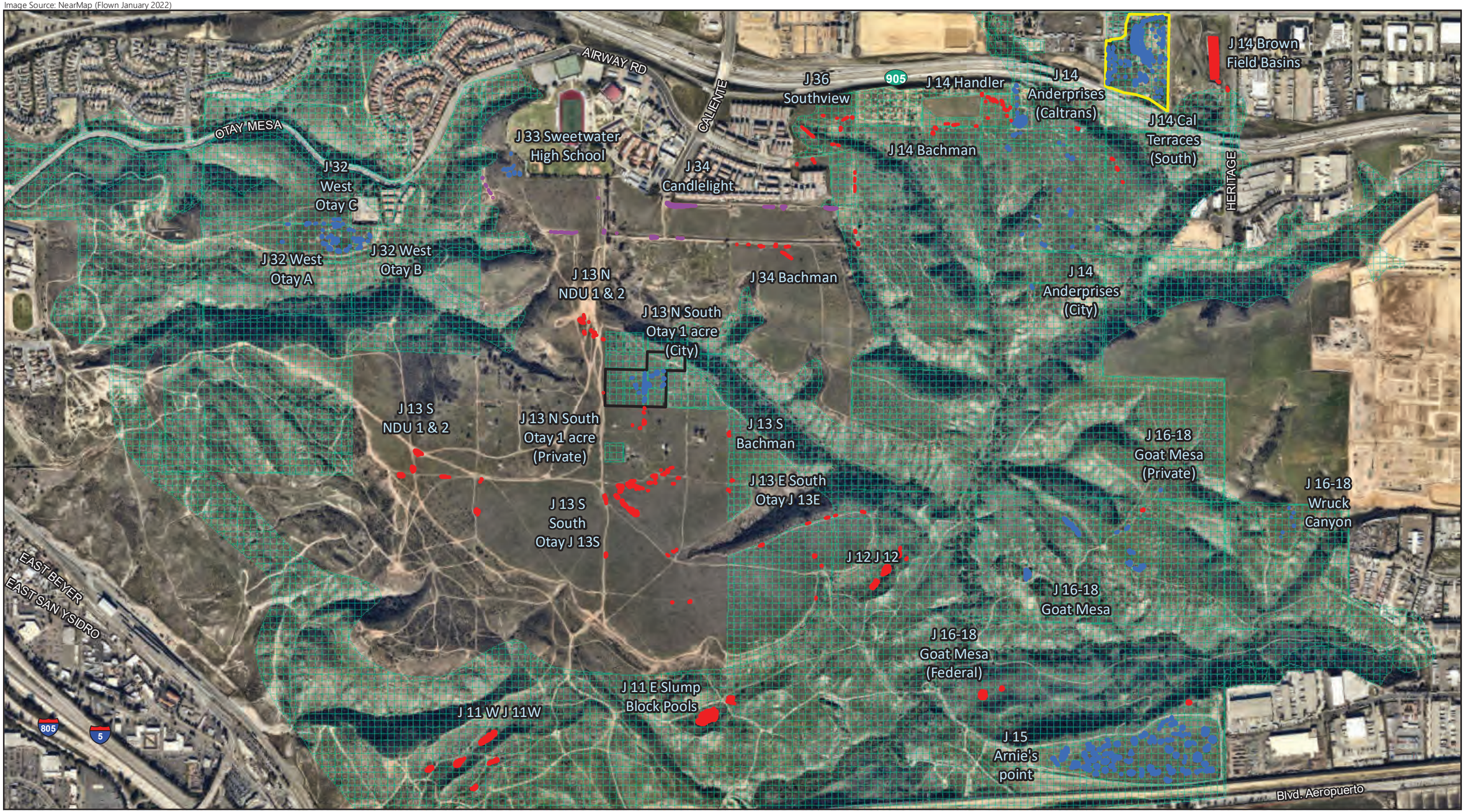
The VPHCP (City of San Diego 2019) and Vernal Pool Management and Monitoring Plan (VPMMP; City of San Diego 2020b) identify the mitigation site as part of vernal pool complex J 13 N (Figure 4). The J 13 N complex was identified in the Recovery Plan for Vernal Pools of Southern California (U.S. Fish and Wildlife Service [USFWS] 1998) as necessary to stabilize populations of San Diego button-celery (*Eryngium aristulatum*), Otay Mesa mint (*Pogogyne nudiuscula*), spreading navarretia (*Navarretia fossalis*), Orcutt's grass (*Orcuttia californica*), San Diego fairy shrimp (*Branchinecta sandiegoensis*), and Riverside fairy shrimp (*Streptocephalus woottoni*). Currently, the site supports only two pools that support sensitive plant species. The proposed mitigation within the J 13 N complex will provide substantial functional lift to the complex's vernal pool community through the expansion of habitat for sensitive plant and animal species, as well as aquatic resources.

Complex J 13 N comprises three sites: South Otay 1 acre (City), South Otay 1 acre (Private), and NDU 1 & 2 (see Figure 4). The VPHCP identifies 37 pools existing in the complex, of which 17 pools are located on the South Otay 1 acre (City) site, which is fully conserved and is owned and managed by the City Park and Recreation Department. The remaining 20 vernal pools are on the South Otay 1 acre (Private) and NDU 1 & 2 sites, which are on private non-conserved properties zoned for multi- and single-family residential development. It is assumed that these non-conserved properties will be developed in the future.

South Otay 1 acre (City) is an approximately 12-acre site comprising 12 one-acre parcels. The City acquired four one-acre parcels from The Environmental Trust as part the latter's bankruptcy proceedings, and the remaining eight one-acre parcels through a Federal Section Six Grant and City funds with the goal of establishing a vernal pool preserve. These 12 one-acre parcels were added to the Multi-Habitat Planning Area (MHPA) pursuant to the VPHCP.

The mitigation site totals 7.63 acres and consists of undeveloped City land and is currently surrounded by undeveloped open space (Figure 5). The areas immediately north and immediately east of the mitigation site will be preserved as open space, while development areas for the Otay Mesa Southwest Village will occur approximately 400 feet to the north, providing at least a 400-foot buffer between development and the mitigation site. Future developments may occur immediately west of the mitigation site and a road is planned 50 feet to the south. Privately-owned parcels north and east of the mitigation site are within the MHPA and planned as open space; however, these parcels could potentially be developed by the private landowners. To assure protection of the mitigation site and MHPA, any future development of these privately-owned sites would be required to adhere to the Land Use Adjacency Guidelines outlined in the MSCP Subarea Plan (City of San Diego 1997). For all future development that may occur adjacent to the mitigation site, development would be required to adhere to the MSCP and Section 5.2.1 of the VPHCP, including being designed in a manner that prevents runoff from developed parcels from entering vernal pools. The mitigation site was designed in a manner to provide adequate buffer between potential development and the vernal pools and their watersheds. The MHPA runs within Dillon Canyon to the northwest of the

Image Source: NearMap (Flown January 2022)



Vernal Pools per VPHCP

- Conserved Pools
- Non-Conserved Pools per VPHCP
- Not Part of VPHCP

- Project Boundary
- Cal Terraces Reference Site
- Multi-habitat Planning Area

0 Feet 800

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La Media Road Improvements
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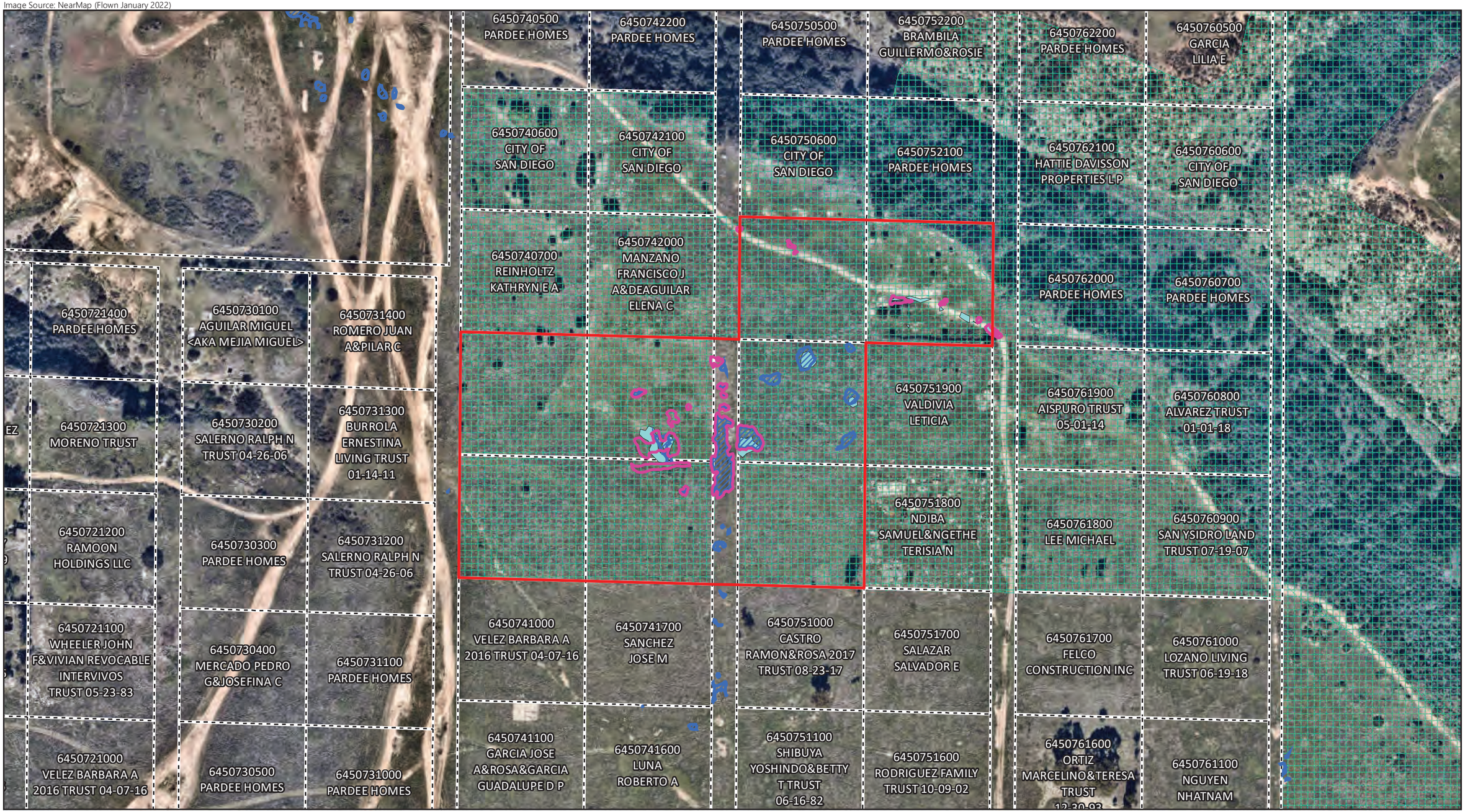
State ID TCEPSB1L 5004(212)

FIGURE 4
Regional Vernal Preservation Context

Image Source: NearMap (Flown January 2022)



Project Boundary
Parcel Boundary
Multi-Habitat Planning Area
Potentially Jurisdictional Resources per RECON 2022
Vernal Pools per RECON 2019
San Diego HCP Vernal Pools

0 Feet 150

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FIGURE 5
Mitigation Site Location and Surrounding Land Use

mitigation site. The mitigation site has been subjected to recent and historic disturbance and unauthorized activity (e.g., off-highway vehicle use, pedestrian traffic, and trash dumping). Land Use Adjacency Guidelines and mitigation site design features intended to adequately protect the proposed vernal pools and their watersheds from activities that may occur adjacent to the mitigation site are further discussed in Section 2.6.1 of this plan.

2.2 Soil Characteristics

Two soil series are mapped within the mitigation site: Huerhuero loam and Olivenhain cobbly loam (Figure 6; U.S. Department of Agriculture 1973). Huerhuero loam is the dominant soil, underlying most of the site. This soil series includes moderately well drained soils with clay subsoils. It occurs on gently sloping, undulating sites and often forms mima mounds in less disturbed areas. Olivenhain cobbly loams are present only in the northeast corner of the mitigation site, where the mesa ends and slopes north into a finger canyon. Olivenhain cobbly loams are well-drained, moderately deep soils with cobbly clay subsoils.

Both Huerhuero and Olivenhain soil series are known to support vernal pools, and vernal pools are present on the mitigation site (Bauder and McMillan 1998), so the soils are expected to be suitable for vernal pool restoration. The Huerhuero soil that is present within much of the site is typical of soils throughout Otay Mesa where, prior to human development and impacts, vernal pools were abundant. The low permeability clay subsoils are present at varying depths and undulate throughout the site.

2.3 Hydrology

The vernal pool mitigation site is primarily flat and does not contain any drainages or streams; however, there are 17 existing vernal pools as mapped by the City's VPHCP within the site, including nine pools within the 1-acre parcels and eight within the road easement that will be vacated. During the 2019 vegetation mapping conducted by RECON, ten pools with vernal pool vegetation were mapped. Seven of those pools did not overlap with the City's existing VPHCP pools, for a total of 24 existing vernal pools. A jurisdictional delineation was performed in 2022 to further define the aquatic resources on-site; six areas of potentially jurisdictional resources did not overlap with the RECON pools or the City's VPHCP pools (RECON 2022b; Figure 7). Results of the delineation are included in the Aquatic Resources Delineation Report which is currently being reviewed by the USACE (RECON 2022b).

In coastal southern California, annual precipitation is highly seasonal, with most of the rainfall occurring in the winter and early spring, from December through April. The first major rainfall event of the season typically functions to wet and recharge soils that dried during the summer drought. Thus, the first rainfall event rarely fills vernal pools, with surface ponding typically occurring from subsequent storms.

Image Source: NearMap (Flown January 2022)

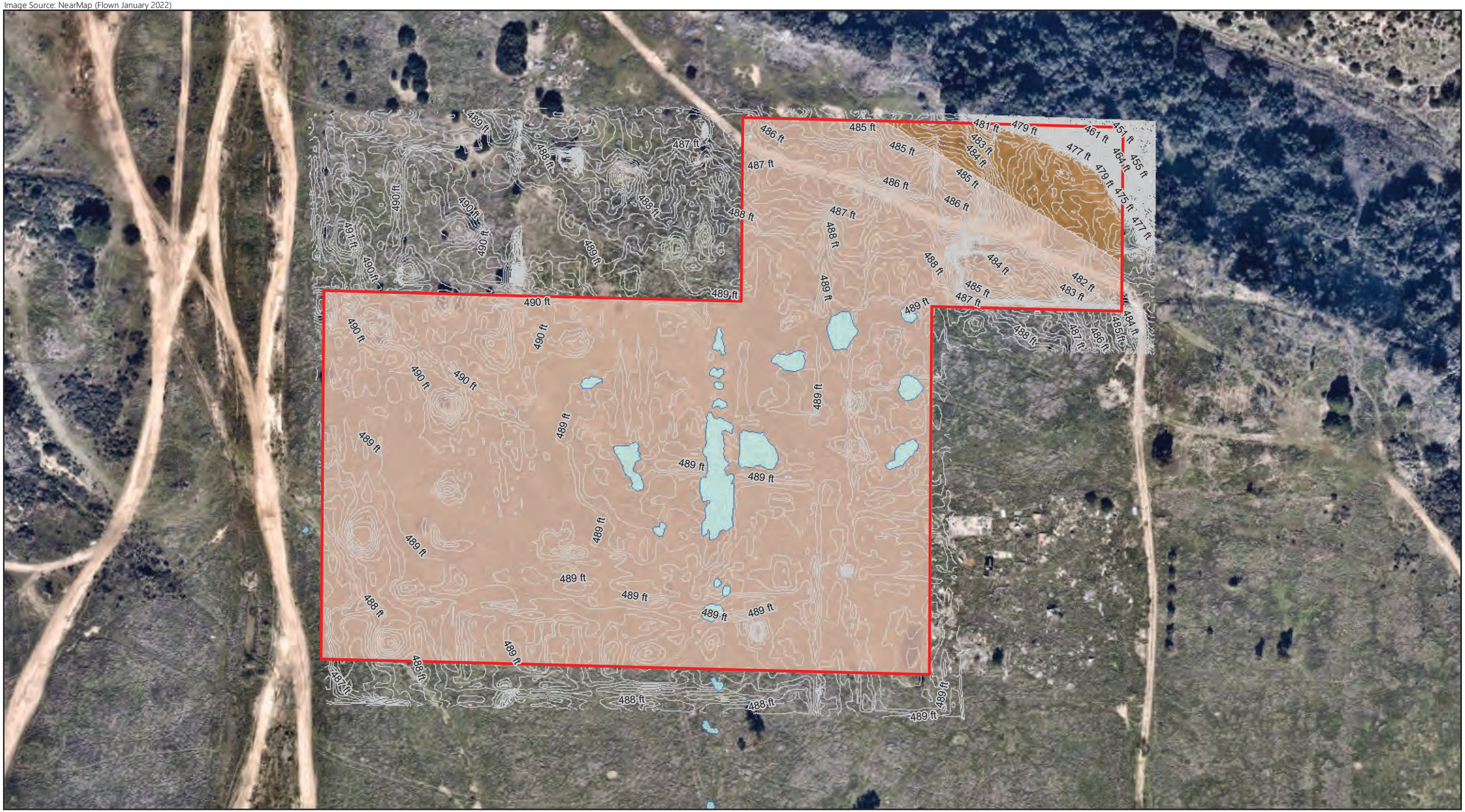

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FIGURE 6

Mitigation Site Soil Map

The formation of surface ponding in vernal pools requires very low permeability soils that create a perched water table, combined with topographic depressions to capture and hold precipitation. These conditions are typical of vernal pool habitat supported by Huerhuero soils throughout Otay Mesa. The shape and ponding capacity of the perched water table is influenced by soil permeability, overall site slope, and subsoil permeability (presence of sand, clay lenses, or holes in the hardpan). This surface shape ultimately determines the depth and duration of ponding.

The depth and duration of ponding is highly dependent upon the magnitude, number, and time between each storm, as well as climactic determinants of evaporation and transpiration (temperature, humidity, sunlight, and wind). A seasonal hydrologic regime characterizes the natural inputs to the vernal pools and other isolated waters of the U.S. and waters of the State on the site. The local watersheds of many of these pools have been altered by vehicular activity, dumping, and historical agriculture.

2.4 Biological Conditions

RECON Environmental, Inc. (RECON) biologists conducted a general biological survey of the mitigation site on March 28, 2019, and a vernal pool survey following the California Rapid Assessment Method (CRAM) on May 3, 2019.

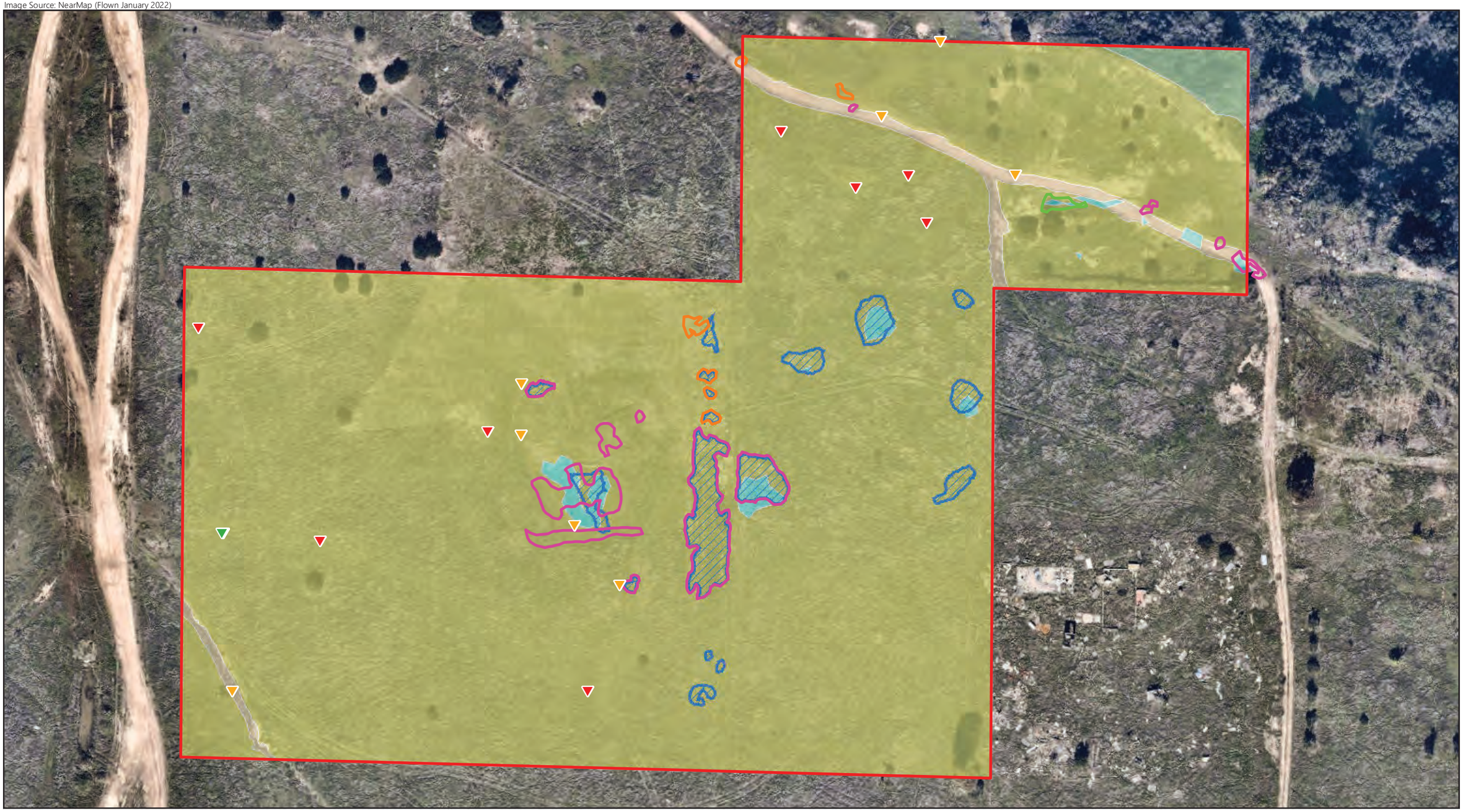
2.4.1 Vegetation Communities

The mitigation site is located on a large mesa characterized by non-native vegetation composed primarily of annual grasslands, with patches of native shrub habitat in the canyons. Dillon Canyon, which crosses the northeast corner of the mitigation site, supports grassland and Diegan coastal sage scrub. The area surrounding the project site generally contains flat topography intersected by finger canyons that lead south to the Tijuana River Valley (see Figure 2). There are four vegetation communities within the mitigation site: non-native grassland (7.341 acres), disturbed land (0.132 acre), vernal pool (0.078 acre), and Diegan coastal sage scrub (0.082 acre; see Figure 7).

Non-native grassland. Non-native grassland covers the majority of the mitigation site. Overall vegetation cover is dense, characterized by non-native annual grasses, such as rye grass (*Festuca perennis*), slender wild oat (*Avena barbata*), ripgut grass (*Bromus diandrus*), and wall barley (*Hordeum murinum*), as well as patches of black mustard (*Brassica nigra*), Russian thistle (*Salsola tragus*), and fennel (*Foeniculum vulgare*). A number of native herbs and annuals are present, including bluedicks (*Dichelostemma capitatum*), collar lupine (*Lupinus truncatus*), and common muilla (*Muilla maritima*). Additionally, there are occasional native shrubs, like California buckwheat (*Eriogonum fasciculatum*), broom baccharis (*Baccharis sarothroides*), and lemonade berry (*Rhus integrifolia*) present.

Disturbed land. Disturbed land, consisting of several dirt roads, occurs within the mitigation site, with one road in the northeast portion and one crossing the southwest corner of the site. These areas are only sparsely vegetated, with long-beak filaree (*Erodium botrys*) providing the majority of the cover, with scattered fascicled tarplant (*Deinandra fasciculata*), garland daisy (*Glebionus coronaria*), native pygmy weed (*Crassula connata*), and non-native grasses.

Image Source: NearMap (Flown January 2022)



Project Boundary
Vernal Pools per VPHCP

Potentially Jurisdictional Resources
Vernal Pool Basin
Vernal Pool Wetland
Wetland

Vegetation Community
Vernal Pool (0.079 Acre)
Diegan Coastal Sage Scrub (0.082 Acre)
Non-Native Grassland (7.412 Acres)
Disturbed Land (0.139 Acre)

Sensitive Plants
Ashy Spike-Moss (*Selaginella cinerascens*)

Vernal Pool Indicator Plant Species
Dwarf Pepper Grass (*Lepidiom latipes*)
Dwarf Woollyheads (*Psilocarphus brevissimus*)

0 Feet 100

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La Media Road Improvements
K-23-2060-DBB-3
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FIGURE 7

Mitigation Site Location and Existing Biological Resources

Vernal pools. The City's Vernal Pool Habitat Conservation Plan (VPHCP; City of San Diego 2019) identifies 9 vernal pools within the mitigation site, plus an additional 8 vernal pools within the road easement bisecting the eight one-acre parcels (see Figure 7). During the general biological survey, RECON identified 11 vernal pool areas within the mitigation site based on the presence of vernal pool indicator plants, such as dwarf woollyheads (*Psilocarphus brevissimus* var. *brevissimus*), American pillwort (*Pilularia americana*), toad rush (*Juncus bufonius*), and pale spikerush (*Eleocharis macrostachya*). Five of the 11 RECON-identified pools are pools that are also identified in the VPHCP. The jurisdictional delineation (currently being reviewed by USACE) identified an additional 6 potentially jurisdictional resources (RECON 2022b). In total, 29 pools have been observed on-site based on the presence of vernal pool vegetation and hydrologic indicators. Of the 29 pools observed on-site, the VPMMP (City of San Diego 2020b) identified one pool that supports San Diego button-celery and one pool that supports California Orcutt grass and spreading navarretia.

Diegan coastal sage scrub. Diegan coastal sage scrub occurs in the northeast corner of the mitigation site, where the flat mesa slopes into Dillon Canyon. Vegetation in this area is dominated by lemonade berry and black mustard, with lesser components of California sagebrush (*Artemisia californica*) and jojoba (*Simmondsia chinensis*).

2.4.2 Wildlife Species

Wildlife diversity is fairly low within the mitigation site, as may be expected for an area dominated by non-native grassland. The majority of the wildlife species detected are typical of grassland habitats and disturbed areas. A total of 12 birds were observed during the biological survey, including western meadowlark (*Sturnella neglecta*), common raven (*Corvus corax clarionensis*), American crow (*Corvus brachyrhynchos hesperis*), house finch (*Haemorhous mexicanus frontalis*), horned lark (*Eremophila alpestris*), white-crowned sparrow (*Zonotrichia leucophrys*), northern mockingbird (*Mimus polyglottos polyglottos*), red-tailed hawk (*Buteo jamaicensis*), Say's phoebe (*Sayornis saya*), mourning dove (*Zenaida macroura marginella*), cliff swallow (*Petrochelidon pyrrhonota tachina*), and wrentit (*Chamaea fasciata henshawi*). Additionally, three butterfly species were detected: painted lady (*Vanessa cardui*), west coast lady (*Vanessa atalanta rubria*), and Pacific Sara orangetip (*Anthocharis sara sara*). One crustacean species, seed shrimp (*Cladocera* sp.), was observed in the vernal pools, although fairy shrimp surveys were not conducted. Fairy shrimp species were not identified on-site by the VPHCP.

2.5 Cultural Resources

RECON archaeologists conducted a record search with the California Historical Resources Information System in March 2019. A total of 44 cultural resource records were found within the one-half mile search radius, including two records located between approximately 130 and 400 feet northwest of the mitigation site. These records consist of lithic scatters, including milling implement fragments. No cultural resource records, historic structures, or historic addresses are listed within or immediately adjacent to the mitigation site.

RECON conducted a field survey on March 19, 2019. No cultural material was observed during the survey; however, ground visibility was very low as a result of dense vegetation cover.

2.6 Rationale for Expecting Success

2.6.1 Regional Factors

The proposed mitigation site lies on a relatively flat portion of western Otay Mesa. The VPHCP identifies 28 distinct sites with vernal pool complexes in the vicinity. The mitigation site, identified as part of complex J 13 N on Figure 4, is on conserved land in the MHPA. Most of these complexes are located within the MHPA and several are on conserved lands; however, many of the vernal pool complexes closest to the mitigation site (red pools on Figure 4; J 11, J 13, J 13 S, J 34, and J 36) are on private property and may not be conserved. The complexes beyond these non-conserved areas (blue pools on Figure 4; J 32 and J 33 to the west and J 14, J 15, and J 16 to the east) are all conserved. Thus, the mitigation site will connect to the vernal pool preserve area to the north and open space to the east, and be buffered by the open space in Dillon Canyon to the northeast. Even with the Otay Mesa Southwest Village development, the mitigation site will improve the number and quality of vernal pools in Complex J 13 N and maintain a steppingstone connection between the conserved complexes on western Otay Mesa.

Currently, most of the land in the project vicinity is undeveloped; however, the planned Otay Mesa Southwest Village, other developments, and a road are expected to develop portions of the surrounding land to the west and south. The Southwest Village development is expected to preserve the areas north and east of the restoration site as open space. The locations and proximity of the nearby developments were considered when developing this mitigation plan and the vernal pool basins were designed to have adequate watershed-to-basin ratios to support vernal pool flora and fauna, despite adjacent development plans. The watersheds of all vernal pool basins are either within the mitigation site or just outside the mitigation site (i.e., extending no further than 50 feet outside the mitigation site) but within areas not planned for development. Additionally, any development that may occur adjacent to the mitigation site will be required to comply with Section 5.2.1 of the VPHCP and the Land Use Adjacency Guidelines in the MSCP Subarea Plan (City of San Diego 1997). These guidelines apply to projects that are adjacent to the MHPA and include restrictions on drainage of urban runoff, release of toxic materials, lighting, noise, public access, invasive non-native species, brush management, and grading within the MHPA. As the mitigation site is within the MHPA, these guidelines would provide protections for the restored pools from indirect impacts. The design of this mitigation site provides sufficient buffers to adequately protect the proposed vernal pools and their watersheds from activities that may occur adjacent to the mitigation site.

2.6.2 Environmental Factors

The mitigation site contains soils that are highly suitable for vernal pool restoration (Bauder and McMillan 1998), and there are a large number of vernal pool complexes on the site and surrounding area (see Figure 4). It is situated within an area of designated critical habitat for listed fairy shrimp species and also within the City of San Diego's MSCP hardline preserve. Moreover, vernal pool restoration on the site would add to the value of existing adjacent preserved open space areas (see Figure 4).

2.6.3 Design Factors

The proposed restoration includes a 7:1 watershed to basin ratio with additional watershed being provided by the preserved areas adjacent to the site. This ratio combined with the preserved areas adjacent to the site helps ensure that the basins will receive adequate hydrologic input to support vernal pool plant and animal species, assuming average or better rainfall. In addition, the planting and seeding palette for the vernal pool basins includes species with a wide range of hydrological and inundation requirements, and an emphasis on indicator species that are known to germinate and survive in lower rainfall years.

A hydrology study was prepared by Rick Engineering Company (Rick Engineering) to provide further verification of the mitigation site's ability to support successful vernal pool mitigation (Attachment 1). The study confirmed that after a typical 1-year 24-hour storm event, the ponding of all proposed vernal pools will be at least two inches after 14 days, and several pools will remain ponded 21 days after the storm event.

2.7 Consistency Analysis

This Mitigation Plan has been prepared in accordance with the mitigation measures included in the Biological Resources Report for the La Media Road Improvement Project (RECON 2020) and the VPHCP. Other future projects that utilize this APRM will also be required to demonstrate consistency with the VPHCP through the development of their detailed mitigation plans. Table 3 includes a consistency analysis for this Mitigation Plan with the VPHCP Conservation Objectives.

Table 3
VPHCP Conservation Objectives Consistency Analysis

Objectives	Restoration Goals[1]	Consistency[1]
Vernal Pool Objectives (Habitat Based)	Restore 19 vernal pool sites (within 12 complexes) to a "Level 1" (stewardship) management condition within the MHPA through implementation of the VPHCP Management and Monitoring Plan or Site-Specific Management Plans (that are consistent with the VPHCP goals and objectives).	The La Media Road Improvement Project proposes to impact three vernal pools (0.125-acre), one inside the MHPA and two outside the MHPA. The projects propose to reestablish and restore vernal pools inside the MHPA at a 2:1 ratio in a configuration that maintains long-term viability of VPHCP covered species. The mitigation associated with these projects will increase the number of pools and basin surface area of conserved vernal pools within the MHPA. The restoration project will restore the J13N complex from a Level 3 to a Level 1 management condition. The J13N complex will be managed in perpetuity in accordance with the VPMMP.
Species-Specific Objectives	Restore specific complexes identified in Appendix A of the VPMMP to enhance covered species populations to ensure long-term viability.	The La Media Road Improvement Project will impact pools that are occupied by San Diego fairy shrimp (SDFS) but are not within a complex identified in the VPHCP. The VPHCP Conservation Objectives for SDFS states "Restoration is not necessary for this covered species, as the populations of this species are adequately conserved under the VPHCP." The population of SDFS within Otay Mesa are currently

Table 3 VPHCP Conservation Objectives Consistency Analysis		
Objectives	Restoration Goals[1]	Consistency[1]
		stable and this project will not impact any of the conserved vernal pools occupied by covered species. This project proposes to restore and re-establish vernal pools within the Otay 1-Acre Complex (J13N). This restoration work will address the Conservation/Restoration Objectives for the J13N Complex and Conservation/Restoration Objectives for spreading navarretia, San Diego button-celery, California Orcutt grass, Otay mesa mint and Riverside fairy shrimp. The restoration project will establish viable populations of these species.
Otay Mesa mint	Establish viable populations of Otay Mesa mint within the J13E, J13N, J16–18, J20–21, J27, and J28 complex series.	The La Media Road Improvement Project will not impact any vernal pools occupied by Otay Mesa mint, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP. To offset impacts associated with these projects, restoration of vernal pools at the J13N Complex will occur. The restoration will incorporate Otay Mesa Mint to establish a viable population at J13N.
San Diego Mesa mint	Restoration is not necessary for this covered species, as the populations of this species are adequately conserved under the VPHCP.	The La Media Road Improvement Project will not impact any vernal pools occupied by San Diego Mesa mint, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP.
Spreading navarretia	Establish viable populations of spreading navarretia within J11E, J11W, J12, J13E, J13 N, J16–18, J20–21, J27, J28, and R1.	The La Media Road Improvement Project will not impact any vernal pools occupied by spreading navarretia, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP. To offset impacts associated with this project, restoration of vernal pools at the J13N Complex will occur. The restoration plan will restore and incorporate spreading navarretia to establish a viable population at J13N.
San Diego button-celery	Establish a viable population of San Diego button-celery within J13E and J13N.	The La Media Road Improvement Project will not impact any vernal pools occupied by San Diego button-celery, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP. To offset impacts associated with this project, restoration of vernal pools at the J13N Complex will occur. The restoration will restore and incorporate San Diego button-celery to establish a viable population at J13N.
California Orcutt's grass	Establish viable populations of California Orcutt grass within J11E, J11W, J12, J13E, J14, J16-18, J20–21, J21, J27, and J28E.	The La Media Road Improvement Project will not impact any vernal pools occupied by California Orcutt grass, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP. To offset impacts

Table 3 VPHCP Conservation Objectives Consistency Analysis		
Objectives	Restoration Goals[1]	Consistency[1]
		associated with this project, restoration of vernal pools at the J13N Complex will occur. The restoration will restore and incorporate California Orcutt grass to establish a viable population.
Riverside fairy shrimp	Establish viable populations of Riverside fairy shrimp within J11E, J11W, J12, J13E, J13N, J14, J16-18, J20–21, J21, J27, and J28E.	The La Media Road Improvement Project will not impact any vernal pools occupied by Riverside fairy shrimp, and all existing, occupied, and conserved vernal pools will continue to be managed consistent with the VPMMP. To offset impacts associated with this project, restoration of vernal pools at the J13N Complex will occur. The restoration plan will incorporate Riverside fairy shrimp to establish a viable population.
San Diego fairy shrimp	Restoration is not necessary for this covered species, as the populations of this species are adequately conserved under the VPHCP.	The La Media Road Improvement Project will impact pools occupied by SDFS. One of the pools being impacted is located within the MHPA and the other two pools are located outside the MHPA, but none of the pools are located within a VPHCP identified complex. The populations of SDFS on Otay Mesa are currently stable and these projects will not impact any of the conserved vernal pools occupied by SDFS.
[1]Management Levels (Levels 1, 2, and 3) as defined in the VPMMP (City of San Diego 2020b).		

3.0 Roles and Responsibilities

3.1 Project Proponent and Financial Responsibility

The project proponent (City of San Diego Engineering & Capital Projects Department [E&CP]) will be responsible for retaining (1) a qualified vernal pool restoration specialist with over seven years of experience monitoring vernal pool habitat restoration to oversee the entire installation and monitoring of the mitigation program in coordination with City Development Services Department (DSD) staff and (2) a qualified installation/maintenance contractor with documented success in vernal pool habitat restoration and maintenance. Contact information for the City's E&CP is provided below:

Contact: City of San Diego
Engineering & Capital Projects Department
525 B Street, Suite 750
San Diego, CA 92101
Office: 619-533-3629

The City E&CP will be responsible for financing the installation, five-year maintenance program, and biological monitoring of the proposed mitigation described in the plan. Mayoral and/or City Council approval are required to obtain funding for the implementation and maintenance of this project. These formal approvals provide financial assurances to effectively implement the project for the

minimum five-year requirement. All contracts are processed through the City's purchasing and contracting process; contracts have insurance and bond requirements to ensure projects are funded through successful completion. Long-term financial assurances are discussed in Section 8.0.

3.2 Responsible Agencies

The City DSD will be responsible for issuing any necessary permits and reviewing and approving this plan.

Contact: City of San Diego
Development Services Department
1222 First Avenue, MS 301
San Diego, CA 92101-4101
Office: 858-654-4237

Due to the location of the mitigation site on City-owned preserve lands, ongoing coordination with the City's Parks and Recreation and MSCP Department's will occur. These City departments will receive annual reports and will inspect and provide input on significant milestones involved in the implementation of this plan.

Contact: City of San Diego
Parks and Recreation Department (PRD)
202 C Street, 5th Floor, MS 5D
San Diego, CA 92101
Office: 619-685-1314

City of San Diego
Planning Department
Multiple Species Conservation Program
9485 Aero Drive
San Diego, CA 92123

3.3 Vernal Pool Restoration Specialist

Overall supervision of the installation and maintenance of this restoration effort will be the responsibility of a vernal pool restoration specialist. The vernal pool restoration specialist must have at least seven years of vernal pool restoration and maintenance experience and be approved by the resource agencies and the City. The vernal pool restoration specialist will oversee the efforts of the installation/maintenance contractor for the life of the restoration. Specifically, the restoration specialist will educate all construction and maintenance personnel about restoration goals and requirements; inspect plant material; directly oversee vernal pool grading, planting, seeding, weeding, and other maintenance activities; and conduct regular monitoring as well as annual assessments of the restoration effort. The restoration specialist will provide the E&CP Project Manager and contractor with a written monitoring memo, including a list of items in need of

attention, after qualitative monitoring visits (see Section 4.5 and 5.0 for discussion of qualitative monitoring). The restoration specialist will prepare and submit annual monitoring reports.

3.4 Installation/Maintenance Contractor

The City E&CP Project Manager will hire a qualified restoration contractor with at least seven years of applicable restoration experience, i.e., vernal pool restoration, sensitive plant species restoration, and native and non-native plant identification. The contractor will be a firm holding a valid C-27 Landscape Contracting License from the State of California, a valid Pest Control Business License, and a Qualified Applicator Certificate or Qualified Applicator License, with Category B, that will allow them to perform the required work for this restoration effort. The contractor may be from the same firm as the restoration specialist. The E&CP Project Manager may change contractors at their discretion.

During the installation, the contractor will be responsible for initial weed control/dethatching, fencing/barrier installation, irrigation installation (if applicable), top soil salvage and translocation, and planting and seeding, as well as maintenance of the restoration site during the 120-day PEP and five-year maintenance period.

Following installation, the contractor will submit marked up as-built plans for all implementation activities to the E&CP Project Manager. The contractor will be held responsible for meeting all PEP success criteria until formal sign-off of the PEP has been obtained from the restoration specialist, E&CP Project Manager, City DSD staff, City MSCP staff, and resource agencies.

Following formal sign-off of the PEP, the contractor will be responsible for maintaining the mitigation site for a minimum of five years. During this period, the contractor will service the entire mitigation site according to the maintenance schedule (Section 5.0, below). Service will include, but not be limited to, weed control, irrigation maintenance (if applicable), trash removal, watering, dead plant replacement, re-seeding, and pest and disease management. All activities conducted will be seasonally appropriate and approved by the restoration specialist and E&CP Project Manager. The contractor will meet with the restoration specialist and E&CP Project Manager at the site when requested and will perform all checklist items in a timely manner as directed.

3.5 Grading Contractor

The installation contractor will hire a qualified grading contractor if they are not capable of performing the grading themselves. The grading contractor will have at least five years of applicable vernal pool restoration experience working in and near vernal pools. The grading contractor must have demonstrated at least three projects with successful vernal pool creation, as determined by the basin's ability to hold water after rainfall events and support both vernal pool endemic plant and fairy shrimp species. The contractor will be a firm holding a valid A General Engineering or C-27 Landscape Contracting License from the State of California that will allow them to perform the required work for this restoration effort. The E&CP Project Manager may change contractors at their discretion.

During installation, the grading contractor will be responsible for topographic reconstruction and implementation of any best management practices required during grading.

3.6 Vernal Pool Biologist

The vernal pool biologist will work closely with the vernal pool restoration specialist to direct vernal pool restoration. The vernal pool biologist and vernal pool restoration specialist may be the same person provided all qualifications are met. The vernal pool biologist will have at least five years of vernal pool restoration experience and will be approved by the City and resource agencies. The biologist will possess a Section 10(a)1(A) Recovery Permit for Conducting Surveys for Listed Large Branchiopod Species and will directly supervise all work to be conducted in or adjacent to vernal pools known to support sensitive species.

3.7 Native Plant Nursery

Seed collection and bulking and container plant propagation will be conducted by a nursery that specializes in native plants and contract seed collection and growing. The nursery will have the appropriate collection permits for sensitive plant species and will have demonstrated experience in the collecting and bulking of vernal pool plant species seed. The nursery will be responsible for providing brief updates on the progress of seed collection and bulking activities to the restoration specialist and City E&CP Biologist.

4.0 Implementation Plan

This section describes the design of the compensatory mitigation and how it will be implemented. Implementation of mitigation efforts will be conducted under the direction of a qualified vernal pool restoration specialist as defined in Section 3.3. All restoration and enhancement activities will commence the first summer–fall season prior to, or concurrently with, the initiation of project impacts.

4.1 Avoidance and Minimization Measures

During mitigation implementation, avoidance and minimization measures will be implemented to avoid impacts to existing vernal pools and to ensure that the existing hydrology (rainwater runoff and subsurface flows) of the preserved vernal pools is maintained or enhanced during grading, construction, and implementation. The VPHCP includes avoidance and minimization measures that are specific for construction or development projects rather than mitigation projects; however, these measures have been adapted and modified to ensure the protection of existing resources at the mitigation site. These measures help ensure avoidance of negative impacts to the existing vernal pools and their watersheds.

General avoidance and minimization measures will be implemented as follows:

Mitigation Site Design

1. Any development adjacent to the MHPA shall be constructed to slope away from the extant pools to be avoided, to ensure that runoff from the project does not flow into the pools.

2. Vernal pool topsoil will not be salvaged from the vernal pools to be impacted at the La Media Road Improvement Project construction site. Occurrences of versatile fairy shrimp (*Branchinecta lindahli*) have been reported at the La Media Road Improvement Project, which raises concerns regarding the translocation of fairy shrimp species that may potentially hybridize with sensitive fairy shrimp species and impact their genetic integrity.

3. Permanent protective fencing along any interface with developed areas and/or use of other measures approved by the City of San Diego to deter human and pet access to on-site habitat will be installed. Fencing will be shown on the development plans and should have no gates (except to allow access for maintenance and monitoring of the mitigation area) and be designed to prevent intrusion by pets. Signage for the mitigation area will be posted and maintained at conspicuous locations. The requirement for fencing and/or other preventative measures is further discussed in Section 4.3.4.

During Mitigation Implementation

1. Temporary fencing (with silt barriers) will be required at the limits of the mitigation site (including implementation staging areas and access routes) to prevent additional vernal pool impacts and the spread of silt from the mitigation construction zone into adjacent vernal pools outside of the mitigation site. Fencing will be installed in a manner that does not impact native vegetation and existing vernal pools. Final construction plans will include photographs that show the fenced limits of impact and all areas of vernal pools to be avoided. If work inadvertently occurs beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the resource agencies and the City. Temporary construction fencing will be removed upon project completion.

2. Impacts from fugitive dust that may occur during vernal pool grading will be avoided and minimized through watering and other appropriate measures.

3. The qualified vernal pool biologist that has been approved by the City will be on-site as needed during implementation activities to ensure compliance with all mitigation measures identified in the CEQA environmental document. The biologist will perform the following duties:

    a. Oversee installation of and inspect the fencing and erosion control measures within or upslope of vernal pool restoration and preservation areas as needed, including daily during all rain events to ensure that any breaks in the fence or erosion control measures are repaired immediately.

    b. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust.

    c. Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented for construction personnel. At a

minimum, training will include discussions of (1) the purpose for resource protection; (2) vernal pool species and their habitats; (3) the conservation measures that must be implemented during implementation to conserve the vernal pool species, including strictly limiting activities, vehicles, equipment, and construction materials to areas that require grading; (4) environmentally responsible construction practices as outlined in measures 4, 5, and 6 below; (5) the protocol to resolve conflicts that may arise at any time during the construction process; and (6) the general provisions of the project's mitigation monitoring and reporting program, the need to adhere to the provisions of the federal Endangered Species Act, and the penalties associated with violating the federal Endangered Species Act.

D. Submit regular monthly letter reports to the City of San Diego Mitigation Monitoring and Coordination (MMC), City MSCP staff, and resource agencies during mitigation implementation and a final as-built report within 60 days following completion of construction. The final report will include as-built construction drawings with an overlay of habitat that was restored, final maximum extent of ponding for each vernal pool basin, general location of mounds, and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.

4. The following conditions will be implemented during project implementation:

   a. Employees will strictly limit their activities, vehicles, equipment, and implementation materials to the fenced project footprint.

   b. The project site will be kept as clean of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site.

   c. Disposal or temporary placement of excess fill, brush, or other debris will be limited to areas within the fenced project footprint.

5. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, and any other such activities will occur in designated areas as approved by the vernal pool biologist. These designated areas will be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering the vernal pools or their watersheds and should be shown on the construction plans. Fueling of equipment will take place within existing disturbed areas greater than 100 feet from the vernal pools or their watersheds. Contractor equipment should be checked for leaks prior to operation and repaired as necessary. A spill kit for each piece of construction equipment should be on-site to be used in the event of a spill. "No-fueling zones" will be designated on construction plans.

6. Grading activities immediately adjacent to vernal pools will be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the vernal pools unless the area to be graded is at an elevation below the pools. To achieve this goal, grading adjacent to existing pools will comply with the following:

   a. Grading will occur only when the soil is dry to the touch both at the surface and one inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and one inch below indicates whether the soil is dry.

b. After a rain of greater than 0.2 inch, grading will occur only after the soil surface has dried sufficiently as described above and no sooner than two days (48 hours) after the rain event ends.

c. To prevent erosion and siltation from storm water runoff due to unexpected rains, best management practices (i.e., silt fences) will be implemented as needed during grading.

d. If rain occurs during grading, work will stop and resume only after soils are dry, as described above.

e. Grading will be done in a manner to prevent runoff from entering existing vernal pools.

f. If necessary, water spraying will be conducted at a level sufficient to control fugitive dust but not to cause runoff into vernal pools.

g. If mechanized grading is necessary, grading will be performed in a manner to minimize soil compaction (i.e., use the smallest type of equipment needed to feasibly accomplish the work).

4.2 Preliminary Design and Engineering

This mitigation plan proposes establishment of 23 vernal pools, re-establishment of 15 vernal pools, and enhancement of 19 vernal pools. To determine the boundary of existing vernal pools, pool boundaries identified in the VPHCP were used for initial planning efforts. RECON vegetation surveys conducted in 2019 further defined these boundaries based on observed hydrological indicators or aquatic vegetation. Finally, a jurisdictional delineation was conducted in 2022 (currently being reviewed by USACE) to provide the most refined boundary of existing vernal pools. Areas defined as aquatic resources have been defined as "existing vernal pools" (see Figure 7). The mitigation site contains a total of 19 existing vernal pools (labeled with an "E" on Figure 8) and these pools will be enhanced as part of this mitigation effort through weeding, remedial seeding, and possible fairy shrimp inoculation. No grading or earthwork will occur within existing pool basins. Two of the existing pools (E24 and E27) will be avoided during all restoration activities due to their location along the boundary of the site. The acreage of these two pools is not included in the mitigation credits. Fifteen pools were determined to have historically been vernal pools. These pools were either previously identified in the VPHCP or were observed on historic aerials, but they were not confirmed as aquatic resources during the delineation (currently being reviewing by USACE). These pools will be re-established to their historic aquatic function through grading, weeding, seeding, and possible fairy shrimp inoculation. These pools will be referred to as "re-establishment pools" and will be labeled with an "R" (see Figure 8). An additional 23 new pools will be established through grading, weeding, seeding, and possible fairy shrimp inoculation and are labeled with a "VP" on Figure 8. Table 4 includes the type of restoration and the planned activities for each vernal pool proposed within the mitigation site.

Image Source: NearMap (Flown January 2022)

Project Boundary
Establishment Pools
Re-establishment Pools
Enhancement Pools
Existing Pools to be Avoided
Deepest Point of Pool
Mounds to be Established

0 Feet 100

RECON

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 8
Mitigation Site Restoration Plan

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
VP1	establishment	grading, seeding, weeding	971	12.0	3.4	2.7		CALMAR DOWCUS ERYARI MYOMIN NAVFOS ORCCAL TRISCI	
VP2	establishment	grading, seeding, weeding	626	12.0	6.7	6.0		CALMAR ELEMAC ERYARI ORCCAL TRISCI	
VP3	establishment	grading, seeding, weeding	1,281	12.0	2.9	2.2		CALMAR DOWCUS ERYARI MYOMIN NAVFOS ORCCAL TRISCI	
VP4	establishment	grading, seeding, weeding	853	8.0	2.9	2.2		DOWCUS MYOMIN NAVFOS	
VP5	establishment	grading, seeding, weeding	980	12.0	8.0	7.3		CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
VP6	establishment	grading, seeding, weeding	1,009	12.0	2.6	1.9		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP7	establishment	grading, seeding, weeding	874	12.0	2.6	1.9		DOWCUS MYOMIN NAVFOS	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
VP8	establishment	grading, seeding, weeding	1,073	12.0	2.6	1.9	DEIFAS (10%), PLAACA (10%), PSIBRE (1%)	CALMAR DOWCUS ERYARI MYOMIN NAVFOS	
VP9	establishment	grading, seeding, weeding	588	12.0	3.0	2.3		DOWCUS MYOMIN NAVFOS ORCCAL	
VP10	establishment	grading, seeding, weeding	627	8.0	2.7	2.0	PLAACA (10%)	CALMAR DOWCUS ERYARI MYOMIN NAVFOS ORCCAL TRISCI	
VP11	establishment	grading, seeding, weeding	1,177	6.0	2.6	1.9		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP12	establishment	grading, seeding, weeding	1,262	12.0	2.7	2.0		CALMAR DOWCUS ERYARI MYOMIN NAVFOS ORCCAL TRISCI	
VP13	establishment	grading, seeding, weeding	1,606	12.0	3.0	2.4		CALMAR DOWCUS ERYARI MALLEP MYOMIN NAVFOS ORCCAL TRISCI	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
VP14	establishment	grading, seeding, weeding	1,505	12.0	2.6	1.9		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP15	establishment	grading, seeding, weeding	694	12.0	2.8	2.1		DOWCUS MYOMIN NAVFOS	
VP16	establishment	grading, seeding, weeding	1,470	8.0	4.4	3.7		CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
VP17	establishment	grading, seeding, weeding	1,091	12.0	3.0	2.3		CALMAR DOWCUS ERYARI MYOMIN NAVFOS ORCCAL TRISCI	
VP18	establishment	grading, seeding, weeding	1,394	12.0	2.6	1.9		CALMAR ELEMAC ERYARI MALLEP TRISCI	BROMAD (<1%), EROBOT (<1%), FESPER (50-75%), HORMAR (5-10%)
VP19	establishment	grading, seeding, weeding	1,235	12.0	2.7	2.0		CALMAR DOWCUS ERYARI MALLEP MYOMIN NAVFOS TRISCI	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
R20	re-establishment	grading, seeding, weeding	1,346	12.0	3.7	3.0	LEPLAT	CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
R21	re-establishment	grading, seeding, weeding	1,691	12.0	2.6	1.9		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP22	establishment	grading, seeding, weeding	1,059	12.0	2.6	1.9		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
R23	re-establishment	grading, seeding, weeding	1,131	12.0	2.7	2.0		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP24	establishment	grading, seeding, weeding	1,052	12.0	2.7	2.0		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
VP25	establishment	grading, seeding, weeding	947	12.0	2.8	2.1		DOWCUS MYOMIN NAVFOS	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
R26	re-establishment	grading, seeding, weeding	2,128	12.0	2.7	2.0		CALMAR DOWCUS ERYARI MYOMIN NAVFOS TRISCI	
R27	re-establishment	grading, seeding, weeding	713	12.0	6.4	5.7		CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
R28	re-establishment	grading, seeding, weeding	1,203	12.0	4.3	3.6		CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
R29	re-establishment	grading, seeding, weeding	695	12.0	5.8	5.1		CALMAR ELEMAC ERYARI MALLEP ORCCAL TRISCI	
R30	re-establishment	grading, seeding, weeding	1,215	12.0	2.9	2.2		CALMAR DOWCUS ELEMAC ERYARI MYOMIN NAVFOS TRISCI	
R31	re-establishment	grading, seeding, weeding	1,020	12.0	2.8	2.1		CALMAR DOWCUS ERYARI MYOMIN NAVFOS	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
VP32	establishment	grading, seeding, weeding	665	12.0	2.9	2.2		DOWCUS MYOMIN NAVFOS	
E2a	enhancement	seeding, weeding	1,698				PSIBRE (5-10%), ERYARI, CRETRU (<1%), DEIFAS (<1%), ELEMAC (5-10%), MALLEP (5-10%)	CALMAR ELEMAC ERYARI MALLEP TRISCI	BROMAD (<1%), EROBOT (<1%), FESPER (50-75%), HORMAR (5-10%)
E2b	enhancement	seeding, weeding	732				PSIBRE (5-10%), ERYARI, CRETRU (<1%), DEIFAS (<1%), ELEMAC (5-10%), MALLEP (5-10%)	CALMAR ELEMAC ERYARI MALLEP TRISCI	BROMAD (<1%), EROBOT (<1%), FESPER (50-75%), HORMAR (5-10%)
R4	re-establishment	grading, seeding, weeding	786					CALMAR ELEMAC ERYARI MALLEP	
E1	Enhancement	seeding, weeding	192				PSIBRE, MALLEP (15%)	[4]	
E3	Enhancement	seeding, weeding	118				PSIBRE (1%), ELEMAC (7%), MALLEP (5%)	[4]	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
E7	enhancement	seeding, weeding	3,300				PSIBRE (25-50%), NAVFOS, ORCCAL, ELEMAC (<1%), DEIFAS (1-5%), LEPNIT (<1%), LYSMIN (<1%), MALLEP (5-10%)	[4]	ATRSEM (<1%), BROHOR (<1%), BROMAD (<1%), EROBOT (1-5%), FESPER (50-75%), HORMAR (<1%), HYPGLA (<1%), LACSER (<1%), LYTHYS (<1%), MESNOD (<1%), PHAAQU (1-5%), PHAMIN (<1%), SALTRA (<1%), SONASP (<1%), SPEBOC (<1%)
E8	enhancement	seeding, weeding	1,339				PSIBRE, MALLEP (1%)	[4]	
E9	enhancement	seeding, weeding	112				MALLEP (1%)	[4]	
E10	enhancement	seeding, weeding	61				PSIBRE, MALELP (15%)	[4]	
E11	enhancement	seeding, weeding	116				PSIBRE, MALLEP (5%)	[4]	
E12	enhancement	seeding, weeding	202				PSIBRE, MALLEP (3%)	[4]	
R13	re-establishment	grading, seeding, weeding	806					CALMAR ELEMAC ERYARI MALLEP	
R14	re-establishment	grading, seeding, weeding	804					CALMAR ELEMAC ERYARI MALLEP	
R15	re-establishment	grading, seeding, weeding	808					CALMAR ELEMAC ERYARI MALLEP	

Table 4 Establishment, Re-establishment, and Enhanced Vernal Pools									
Proposed Pool Number	USACE defined compensatory mitigation type	Proposed Activities	Vernal Pool Size (sq. ft.)	Target Depth	Ponding Depth After 14 days[1]	Ponding Depth After 21 days[1]	Existing Native Species[2,3]	Target Native Vernal Pool Species[4]	Existing Non-native Species[3]
R16	re-establishment	grading, seeding, weeding	1,006					CALMAR ELEMAC ERYARI MALLEP	
R17	re-establishment	grading, seeding, weeding	752				PSIBRE	[4]	
E19	enhancement	seeding, weeding	256				PSIBRE	[4]	
E20	Enhancement	seeding, weeding	165						
E21	enhancement	seeding, weeding	63				PLAACA (15%)	[4]	
E22	enhancement	seeding, weeding	150				DEIFAS (10%), PLAACA (10%), PSIBRE (1%)	[4]	
E23	enhancement	seeding, weeding	48					[4]	
E25	enhancement	seeding, weeding	280				ELEMAC (5%), MALLEP (10%)	[4]	
E26	enhancement	seeding, weeding	42				ELEMAC (5%), MALLEP (2%)	[4]	
E28	enhancement	seeding, weeding	72				PSIBRE	[4]	
E29	enhancement	seeding, weeding	20				PSIBRE	[4]	
TOTAL			**49,125**						
Established square feet		*24,039 (0.552 acre)*							
Re-established square feet		*16,106 (0.370 acre)*							
Enhanced square feet		*8,980 (0.206 acre)*							

[1]SOURCE: Rick Engineering 2019, depth of restored pools remaining after 1-year storm event
[2]SOURCE: VPHCP (City of San Diego 2017b and RECON 2019)
[3]Cover data only available from City of San Diego 2019 surveys and aquatic resource delineation (RECON 2022).
[4]CRAAQU, DESDAN, JUNBUF, LYSMIN, PILAME, PLAACA, PLAELO, POGNUD, PSIBRE targeted to be present in all pools.

Table 4
Establishment, Re-establishment, and Enhanced Vernal Pools

Key for Species:
ATRSEM = *Atriplex semibaccata*
BROHOR = *Bromus hordeaceus*
BROMAD = *Bromus madritensis rubens*
CALMAR = *Callitriche marginata*
CRAAQU = *Crassula aquatica*
CRETRU = *Cressa truxillensis*
DEIFAS = *Deinandra fasciculata*
DESDAN = *Deschampsia danthonioides*
DOWCUS = *Downingia cuspidata*
ELEMAC = *Eleocharis macrostachya*
EROBOT = *Erodium botrys*
ERYARI = *Eryngium aristulatum*
FESPER = *Festuca perennis*
HORMAR = *Hordeum marinum*
HYPGLA = *Hypochaeris glabra*
JUNBUF = *Juncus bufonius*
LACSER = *Lactuca seriola*
LEPLAT = *Lepitium latifolium*
LEPNIT = *Lepidium nitidum*
LYSMIN = *Lysimachia minima*
LYTHYS = *Lythrum hyssopifolia*
MALLEP = *Malvella leprosa*
MESNOD = *Mesembryanthemum nodiflorum*
MYOMIN = *Myosurus minimus*
NAVFOS = *Navarretia fossalis*
PHAAQU = *Phalaris aquatica*
PHAMIN = *Phalaris minor*
PILAME = *Pilularia american*
PLAACA = *Plagiobothrys acanthocarpus*
PLAELO = *Plantago elongata*
POGNUD = *Pogogyne nudiuscula*
PSIBRE = *Psilocarphus brevissimus*
SALTRA = *Salsola tragus*
SONASP = *Sonchus asper*
SPEBOC = *Spergularia bocconi*
TRISCI = *Triglochin scilloides*

A hydrology study was prepared by Rick Engineering (2019) to confirm that each established/re-established/enhanced vernal pool has sufficient watershed that a typical 1-year storm event would create 2 to 3 inches of ponding for a period of 14 days to support San Diego fairy shrimp or 21 days to support Riverside fairy shrimp. The hydrology study shows that all 32 proposed pools will, after a typical 1-year storm event, hold at least 2 to 3 inches of water for at least 14 days and 24 of the proposed pools will hold at least 2 to 3 inches of water for at least 21 days. Figure 9 shows the planned location of the vernal pools and their respective watersheds and flow patterns (this figure will be further refined as grading plans are prepared).

A minimum of 0.552 acre (24,039 square feet) of new vernal pool surface area will be established and 0.370 acre (16,106 square feet) will be re-established through topographic recontouring/grading, soil translocation, seed collection and dispersal, and continued maintenance and monitoring. An additional 0.206 acre (8,980 square feet) of existing vernal pools (pools identified by the delineation conducted in April 2022) will be enhanced through hand weeding, soil translocation, seed collection and dispersal, and continued maintenance and monitoring.

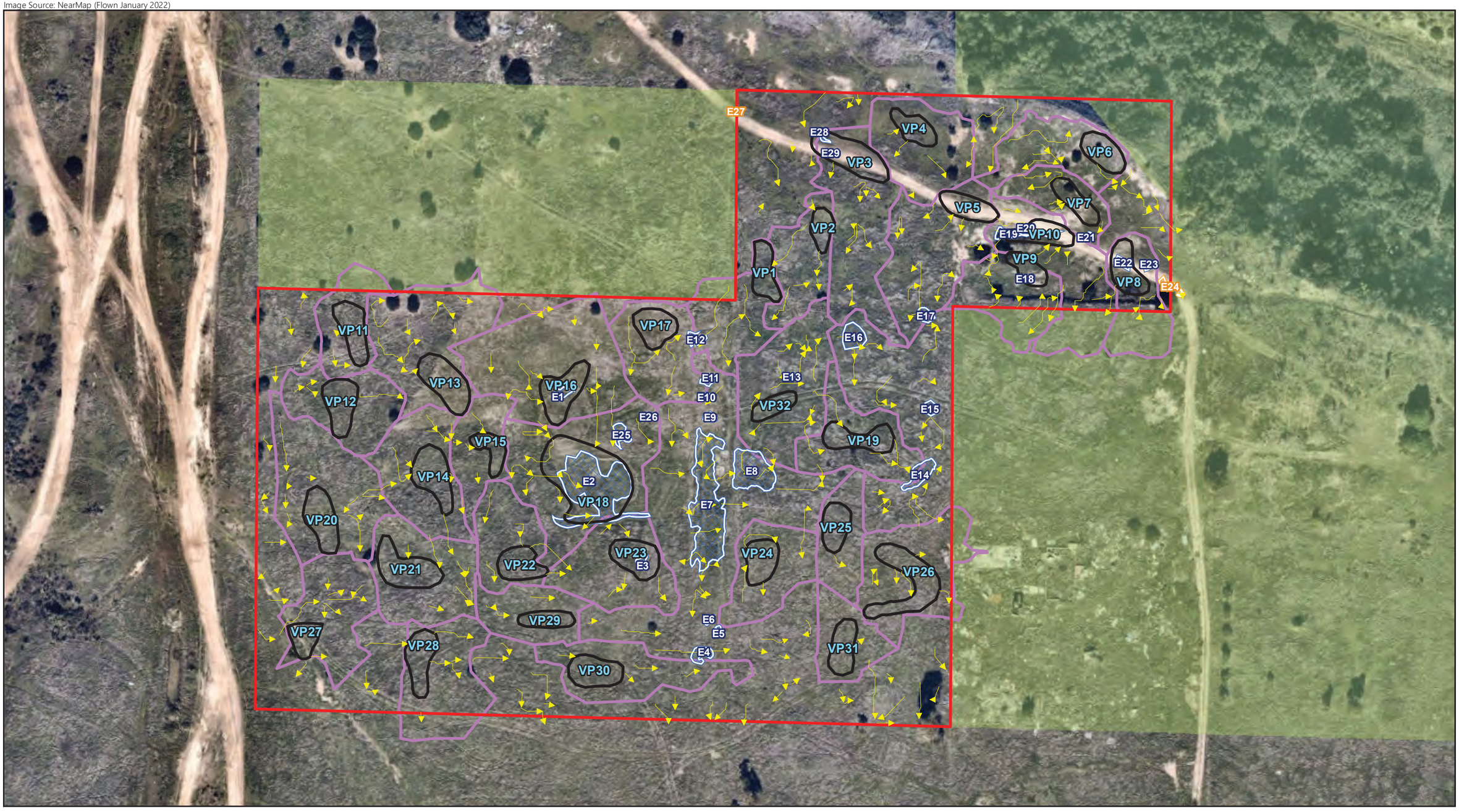
In addition, the mitigation will consist of 6.502 acres of upland watershed that will be restored to native maritime succulent scrub (MSS) habitat on the mima mounds and native herbs, grasses, and forbs in the interspaces. Otay Mesa historically supported MSS habitat and establishing MSS at this site is an appropriate goal. However, if on-site trends (i.e., low container plant survival, lack of recruitment) indicate that MSS habitat may not be appropriate, adaptive management measures (i.e., replanting and reseeding) will utilize species that are already performing well on-site. This may result in upland habitat that is more indicative of Diegan coastal sage scrub, such as that already present in the northeastern corner of the site. Restoration will occur through weed dethatching, barrier installation, native plant and seed introduction, and continued maintenance and monitoring. Implementation activities are described in more detail in Section 4.3, and ongoing maintenance and monitoring activities are discussed in Sections 5.0 and 7.0.

4.3 Implementation Activities

Implementation activities include seed collection and bulking, non-native weed dethatching, topographic recontouring/grading, barrier/signage installation, irrigation system installation, vernal pool soil salvage and translocation, and planting and seeding. The implementation schedule is shown in Table 5. Implementation will commence prior to or concurrently with the start of construction of the project.

All final specifications and topographic-based grading, planting, and watering plans will have 0.2-foot contours for the vernal pools, watersheds, and surrounding uplands (including adjacent mima mounds) at the restoration site. The basis for this fine-scale resolution is the micro-depth (i.e., several inches) of the vernal pools that will be restored. The grading plans will also show the watersheds of existing vernal pools and overflow pathways that hydrologically connect the restored pools in a way that mimics natural vernal pool complex topography and hydrology.

Image Source: NearMap (Flown January 2022)



Project Boundary
Existing Pools to be Enhanced
Existing Pools to be Avoided
Restored Vernal Pools
Surface Flow
Drainage Basins
Multi-Habitat Planning Area

0 Feet 100

RECON

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 9
Restored Vernal Pool Watersheds and Flow Patterns

Table 5 Implementation Schedule	
Task	Time of Year
Seed Collection and Bulking	Spring/Summer for vernal pool seed and annual upland seed, Summer/Fall for perennial upland seed
Non-native Weed Dethatching	Summer/Fall (prior to grading)
Topographic Recontouring/Grading	Summer/Fall (prior to start of wet season)
Barrier/Signage Installation	Fall (after grading)
Irrigation System Installation	Fall (after grading)
Vernal Pool Soil Salvage	Summer/Fall (prior to start of wet season)
Vernal Pool Soil Translocation	Winter[1]
Maritime Succulent Scrub Plant and Seed Installation	Winter
Vernal Pool Hand Seeding	Winter[1]
[1]After vernal pool hydrology accepted	

4.3.1 Seed Collection and Bulking

Seed collection should begin immediately and should be conducted within the mitigation site vicinity. Species recommended for collection are shown in Table 6 and will be used for container plant propagation, seed bulking, and hand seeding. The Species-Specific Objectives in the VPMMP (City of San Diego 2020b) for vernal pool complex J 13 N include protecting and managing populations of San Diego button celery, spreading navarretia, and Orcutt's grass and establishing viable populations of Otay Mesa mint. Collection of seed from these four species will be of particular importance during the mitigation project.

Seed should be collected first from existing on-site pools that support endemic vernal pool plant species. If adequate seed cannot be obtained on-site, then an alternate site located on Otay Mesa will be used upon approval by the City. Nearby vernal pool complexes owned by the City that may be targeted for seed collection include Cal Terraces and Goat Mesa (see Figure 4). Collection of sensitive plant species on City-owned land would be considered a covered activity under the VPHCP (City of San Diego 2019). If seed cannot be obtained from within these parameters, seed collected within San Diego County at a similar elevation to the mitigation site or commercial sources may be acceptable with consultation with the restoration specialist and the City E&CP Biologist and approval by the City and resource agencies. Care will be taken to avoid collection of soil during seed collection as fairy shrimp eggs may be mixed with the seed and soil. The sources and proof of local origin of all plant material and seed will be provided to the City prior to dispersal.

Seed bulking and plant propagation should begin as soon as possible by a qualified native plant nursery as defined in Section 3.7. Seed collected or procured for the project will be used for container plant propagation in the species and quantities discussed in Section 4.3.7. Container plants will be inoculated with mycorrhizae (mutualistic fungi) by using native soil that contains fungi and other microorganisms. Providing the necessary microorganisms can increase outplanted plants survival rates (Allen 1988). Seed bulking includes propagating container plants specifically for the purposes of seed production. Container plants will be sown and grown under ideal conditions, allowed to

germinate and flower, and all resulting seed will be harvested, rough cleaned, and stored for hand seeding. Species that will be targeted for bulking are shown in Table 6.

Vernal pool species will be introduced to the site through either soil transfer or seed collection and dispersal. The hand-collected vernal pool seeds will be distributed in the newly established vernal pools according to the planting plan outlined in Section 4.3.9 or at the discretion of the restoration specialist.

Table 6
Plant Species Targeted for Collection

Plant Species	Common Name
Upland Maritime Succulent Scrub Species	
Acmispon glaber[1]	Deerweed
Amsinkia menziesii[1]	Common fiddleneck
Artemisia californica[1]	California sagebrush
Artemisia chenopodifolia	San Diego bur-sage
Atriplex pacifica	South coast saltbush
Bahiopsis laciniata	San Diego sunflower (viguiera)
Bergerocactus emoryi	Golden cereus
Brodiaea terrestris[2]	Dwarf brodiaea
Bothriochloa barbinodis	Cane bluestem
Cylindropuntia prolifera[1]	Coast cholla
Dichelostemma capitatum[1, 2]	Blue dicks
Distichlis spicata[1]	Salt grass
Dodecatheon clevelandii[2]	Padre's shooting star
Encelia californica	California encelia
Eriogonum fasciculatum[1]	California buckwheat
Eriophyllum confertiflorum	Golden yarrow
Euphorbia misera	Cliff spurge
Ferocactus viridescens	Coast barrel cactus
Isomeris arborea	Bladderpod
Lasthenia californica[2]	Goldfields
Linanthus dianthiflorus[1, 2]	Ground pink
Lupinus bicolor[1]	Miniature lupine
Lupinus truncatus[1]	Collar lupine
Lycium californicum	California desert thorn
Microseris douglasii var. *platycarpa*[1, 2]	Silverpuffs
Muilla maritima[1, 2]	Common muilla
Opuntia littoralis	Coast prickly pear cactus
Plantago erecta[1, 2]	Dot-seed plantain
Simmondsia chinensis[1]	Jojoba
Sporobolus airoides	Alkali sacaton
Stipa pulchra[2]	Purple needlegrass
Trifolium willdenovii[1]	Tomcat clover

Table 6 Plant Species Targeted for Collection	
Plant Species	Common Name
Vernal Pool Plant Species	
Callitriche marginata[3]	Water-starwort
Crassula aguatica[1, 3]	Stone-crop
Deschampsia danthonioides[2]	Annual hairgrass
Downingia cuspidata[2]	Toothed calico flower
Eleocharis macrostachya[1, 2]	Pale spikerush
Eryngium aristulatum var. *aristulatum*[1, 2,4,5]	San Diego button-celery
Juncus bufonius[1, 2]	Toad rush
Lysimachia minima[1]	Chaffweed
Malvella leprosa[1]	Alkali mallow
Myosurus minimus[2]	Little mouse tail
Navarretia fossalis[4,5]	Spreading navarretia
Orcuttia californica[4,5]	California Orcutt's grass
Pilularia americana[1,3]	American pillwort
Plagiobothrys acanthocarpus[1, 2]	Adobe popcornflower
Plantago elongata[1, 2]	Plantain
Pogogyne nudiuscula[2,5]	Otay Mesa mint
Psilocarphus brevissimus[1]	Dwarf woollyheads
Triglochin scilloides[3]	Flowering quillwort
SOURCE: VPHCP (City of San Diego 2019) [1]Observed at mitigation site during 2019 vegetation surveys [2]To be bulked at a native plant nursery [3]To be targeted for introduction to the site via soil collection [4]Identified as occurring on-site per the VPHCP [5]Required per VPMMP Species – Specific Objectives (City of San Diego 2020b)	

4.3.2 Non-native Weed Dethatching

Prior to topographic recontouring and outside of the bird breeding season (February 15 through August 15), crews familiar with native and non-native plants will remove the accumulated weedy thatch throughout the mitigation site through the use of line trimmers and rakes. If dethatching must occur during the bird breeding season, a nesting bird survey will be conducted by a qualified biologist before work begins. Cut material will be raked into piles, removed from the site, and taken to a landfill or put into a green waste dumpster for disposal. Removal of the weedy thatch material will enable the project biologist and heavy equipment operator to see the soil surface so that the proper vernal pool elevations could be contoured. Removal of the thatch will also aid in preparing the site for container plant installation, creating space for hand seeding of native annual species, and reducing future weed growth, which could be aided by the mulching effect of the thatch.

4.3.3 Topographic Recontouring/Grading

Topographic recontouring, or grading, at the site will be implemented to create mound and basin topography typical of vernal pool habitats on Otay Mesa. The result will be the establishment/re-establishment of natural watershed topography with the ability to capture and retain precipitation

for the established/re-established/enhanced vernal pools. Additional details related to grading are described in the grading plans titled Vernal Pool Mitigation for the La Media Road Widening Project prepared by Rick Engineering (2022).

The primary physical change accomplished by grading will be the redistribution of a portion of the soil surface to establish and re-establish (i.e., excavate) new vernal pool basins and allow ponding and water retention. Excess material displaced by the excavation process will be used to construct low mounds as shown on Figure 8. Mounds will be placed in a manner that enhances the local watershed of the complex by encouraging ponding of established/re-established/enhanced pools and improving hydrologic connectivity between pools. No soil amendments will be used to artificially enhance ponding, as the site currently supports the heavy clay soils appropriate for vernal pool habitat and vernal pool restoration.

Existing vernal pools on-site will be enhanced (see Figure 8). Enhancement of existing pools will include light grading immediately adjacent to the pool's edges to improve the pool's ponding capabilities, erase tire ruts, and manipulate soil to create greater topographic complexity, as depicted in the project specific grading plans (Rick Engineering 2022). No grading will be conducted within the boundary of existing vernal pools to avoid impacts to existing aquatic resources.

Grading activities will be timed to avoid wet weather in order to avoid potential impacts (e.g., siltation) to the existing vernal pools. To ensure that potential impacts to the existing vernal pools are avoided, grading activities will be performed consistent with the following:

- Grading will occur only when the soil is dry to the touch at the surface and one inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and one inch below indicates the soil is dry.

- After a rain of greater than 0.2 inch, grading will occur only after the soil surface has dried sufficiently as described above and no sooner than two days (48 hours) after the rain event ends.

- Grading will commence only when no rain is forecasted during the anticipated grading period. If rain occurs during grading, work will stop and resume only after soils are dry.

- Grading will be done in a manner to prevent silt from entering the existing vernal pools. To prevent erosion and siltation from storm water runoff due to unexpected rains, best management practices (e.g., silt fences or other means such as fiber rolls) will be implemented as needed during any recontouring work.

The grading will be conducted under the direction of a qualified vernal pool restoration specialist, as described in Section 3.3. Areas that are to remain unaffected by grading activities will be marked prior to implementation. The grading will be implemented using a small bulldozer or skidsteer, as deemed appropriate by the grading contractor. The machine operator will also be experienced in vernal pool restoration work per Section 3.5.

After grading, cobble generated by grading activities will be placed within the vernal pool basins to provide topographic complexity to the basin bottoms. After grading and prior to container plant

installation, the maximum potential ponding area of the newly established and re-established vernal pools will be surveyed to ensure that the boundary for each pool does not differ by more than 10 percent from the target areas. High resolution aerial photography will be captured using a professional small unmanned aerial vehicle (sUAV). Using industry standard photogrammetry software and procedures, a digital surface model (DSM) will be generated using the data collected by the sUAV. The as-built grading plans and report figures will include vernal pool boundaries and 0.2-foot contours, both of which will be derived from the DSM, and will be replotted at 1 inch equals 40 feet.

4.3.4 Barrier/Signage Installation

Protection of the mitigation site from human disturbance is essential for success. Of particular importance is protection of the mitigation site from pedestrians and off-road vehicles. Concurrent with topographic recontouring, a temporary fence will be erected and maintained around the perimeter of the mitigation site to bar unauthorized vehicle access. Once the topographic recontouring is complete, the mitigation site will be permanently fenced with chain-link and three-strand barbless wire fencing in consultation with the City. Chain-link will be installed on the north, west, and south project limits where adjacent planned development presents an increase probability of trespassing. Three-strand barbless wire will be installed on the eastern limits and along the edge of Dillon Canyon to allow for wildlife movement through the site. In addition, signs will provide notice that the area is an ecological preserve, notify that trespassing is prohibited, and cite penalties for trespass violation, including liability for repair of any damage to soil or biological resources within the barrier. Signs in both Spanish and English will be mounted at approximately 200-foot intervals around the mitigation site.

4.3.5 Irrigation System Installation

If a point of connection to a reliable water source is available at the time of mitigation implementation, a temporary aboveground irrigation system will be installed within areas planned to receive container plants in the upland MSS habitat at the restoration contractor's discretion and with the approval of the City E&CP Biologist. The irrigation system will be field fit to ensure adequate irrigation coverage to all installed container plants to the extent practicable with avoidance of overspray into the vernal pool basins. At no point will irrigation water that results in pooling of water be allowed to enter the vernal pool basins. The system will also be installed with hose bibs to allow for hand watering of container plants that cannot be watered by the system due to their proximity to vernal pools.

If a reliable point of connection is not available at the time of container plant installation, all container plants and germinating upland seed will be watered by water truck and hoses. The water truck will fill up at the closest fire hydrant using the appropriate water meter (mostly likely City of San Diego).

4.3.6 Salvage and Translocation of Vernal Pool Soil for Fairy Shrimp

Vernal pool soil will not be salvaged from the vernal pools to be impacted at the La Media Road Improvement Project construction site. Occurrences of versatile fairy shrimp (*Branchinecta lindahli*) have been reported at the La Media Road Improvement Project. This raises concerns regarding genetic integrity of fairy shrimp and, therefore, soil will not be introduced into the mitigation site from the impact location.

The City owns and manages several nearby vernal pool complexes on Otay Mesa (i.e., Cal Terraces, Goat Mesa) where versatile fairy shrimp have not been observed or are known to be present in a few limited vernal pools. Soil from nearby vernal pools containing San Diego and Riverside fairy shrimp eggs will be collected and used to inoculate all of the established/re-established/enhanced pools where fairy shrimp are not already present. Vernal pools known to support versatile fairy shrimp will not be targeted for collection of soil.

Necessary criteria for this mitigation plan include establishment of populations of Riverside fairy shrimp. Establishment of San Diego fairy shrimp is desirable but not required as they are adequately conserved under the VPHCP (City of San Diego 2019). Following topographic recontouring, the newly established/re-established vernal pools will be inoculated with shrimp egg–bearing soils collected from nearby pools only after the newly established/re-established vernal pools have demonstrated suitable hydrologic conditions (i.e., at least 14 to 21 days for San Diego fairy shrimp and 21 to 28 days for Riverside fairy shrimp). Fairy shrimp eggs will be introduced into these vernal pools following the guidelines listed below.

The following translocation guidelines will be adhered to for the fairy shrimp translocation effort:

1. Egg-bearing soil (inoculum) will be collected when it is dry to avoid damaging or destroying fairy shrimp eggs, which are fragile when wet.

2. A hand trowel or similar instrument will be used to collect the top two inches of soil from the pools. Whenever possible, soil will be collected in chunks. The trowel will be used to pry up intact chunks of sediment, rather than loosening the soil by raking and shoveling, which can damage the eggs. The soil from donor pools will be stored individually in labeled boxes with adequate ventilation and away from direct sunlight. Salvaged soil will be kept at an approved seed storage facility that provides the appropriate conditions of light and temperature.

3. Prior to placing any salvaged egg-bearing soil into the established/re-established/enhanced pools, the pools will have been surveyed for versatile fairy shrimp to the satisfaction of the resource agencies and the City. Versatile fairy shrimp are undesirable in vernal pools as they can be considered weedy and possibly hybridize with sensitive fairy shrimp species. The survey will consist of soil collection and testing for the presence of the versatile fairy shrimp. If the soil contains versatile fairy shrimp cysts, then inoculum will not be introduced until measures approved by the above agencies have been implemented to remove the versatile fairy shrimp from the pools.

4. Salvaged soil will be dispersed into the bottoms of the established/re-established/enhanced vernal pools to give the greatest chance for the material to be inundated during the rainy season. Inoculum will be placed in a manner that preserves, to the maximum extent possible, the orientation of the fairy shrimp eggs within the surface layer of soil (e.g., collected inoculum will be shallowly distributed within the pool so that eggs have the potential to be brought into solution upon inundation).

5. Inoculum will not be introduced until the established/re-established/enhanced vernal pool basins have demonstrated the ability to retain water for the appropriate amount of time to support San Diego fairy shrimp (i.e., at least 14 to 21 days) and Riverside fairy shrimp (i.e., at least 21 to 28 days), as approved by the resource agencies and the City.

6. Inoculum from different source pools will not be mixed for translocation to any established/re-established/enhanced vernal pools.

4.3.7 Maritime Succulent Scrub Plant and Seed Installation

Planting of the upland watersheds will occur following site preparation and after the first significant rain of the rain season. See Table 5 for the seeding and planting schedule.

The 6.502-acre watershed will be restored to MSS. The portion of the mitigation site to be restored currently supports non-native grassland and disturbed land. The areas immediately southeast and southwest of the mitigation site contain non-native grasslands with MSS. The restoration of native plant communities will be based on a principle of reestablishing suitable soil conditions (i.e., mycorrhizal fungi) and native seed banks, and reintroduction of native shrub and herbaceous species. The container plant palette for the MSS restoration are listed in Table 7 and includes species indicative of MSS habitat as well as species more typical of coastal sage scrub and grasslands to provide a plant palette that will readily establish on mounds and vernal pool interspaces.

Table 7
Container Stock for the Maritime Succulent Scrub Restoration

Scientific Name	Common Name	Size	Number per Acre
Mound Installation			
Artemisia californica	California sagebrush	1-gallon	200
Atriplex pacifica	South coast saltbush	1-gallon	100
Bahiopsis laciniata	San Diego sunflower (viguiera)	1-gallon	200
Bergerocactus emoryi	Golden cereus	1-gallon or cuttings	50
Bothriochloa barbinodis[1]	Cane bluestem	1-gallon	100
Cylindropuntia prolifera	Coast cholla	1-gallon or cuttings	100
Encelia californica	California encelia	1-gallon	150
Euphorbia misera	Cliff spurge	1-gallon	200
Ferocactus viridescens	Coast barrel cactus	1-gallon	10
Lycium californicum	California desert thorn	1-gallon	100

Table 7 Container Stock for the Maritime Succulent Scrub Restoration			
Scientific Name	Common Name	Size	Number per Acre
Opuntia littoralis	Coast prickly pear cactus	1-gallon or cuttings	100
Simmondsia chinensis	Jojoba	1-gallon	250
		TOTAL	1,560
Interspace Installation			
Artemisia chenopodifolia	San Diego bur-sage	1-gallon	150
Brodiaea terrestris[2]	Dwarf brodiaea	bulb	25
Dichelostemma capitatum[2]	Blue dicks	bulb	50
Distichlis spicata	Salt grass	Rose-pot	1,000
Eriogonum fasciculatum	California buckwheat	1-gallon	100
Isomeris arborea	Bladderpod	1-gallon	125
Muilla maritima[2]	Common muilla	bulb	50
Sporobolus airoides	Alkali sacaton	1-gallon	300
Stipa lepida	Foothill needlegrass	1-gallon	750
Stipa pulchra	Purple needlegrass	1-gallon	1,500
		TOTAL	2,550
[1]To be installed on north sides of mounds [2]Bulb species to be installed within the planting hole of purple or foothill needlegrass container plants			

4.3.8 Hand Seeding

The site will be hand-seeded with native seed purchased from the approved native plant nursery. The areas to receive seed, the upland interspaces and edges of mounds, will be lightly raked prior to a depth of 0.5-inch to ensure good soil to seed contact. All species of seed will be mixed together with an inert material, such as sand or rice hulls, and applied to the freshly raked areas through hand broadcasting. Seed will be applied during the late winter months, immediately prior to (within 48 hours) a forecasted rain event of 0.25 inch or more. Table 8 includes a recommended seed list and appropriate quantities; this list may be adjusted based on the results of seed collection and in consultation with the restoration specialist and City E&CP Biologist and approval by the City and resource agencies.

Table 8 Seed Mix for the Maritime Succulent Scrub Restoration		
Scientific Name	Common Name	Pounds per Acre
Acmispon glaber	Deerweed	1.0
Amsinkia menziesii	Common fiddleneck	0.25
Eriophyllum confertiflorum	Golden yarrow	2.0
Lasthenia californica	Goldfields	1.0
Linanthus dianthiflorus	Ground pink	0.5
Lupinus bicolor	Miniature lupine	1.0
Lupinus truncatus	Collar lupine	1.0
Malvella leprosa	Alkali mallow	0.25
Microseris douglasii	Silverpuffs	0.5
Plantago erecta	Dot seed plantain	2.0
Stipa pulchra	Purple needlegrass	4.0
Trifolium willdenovii	Tomcat clover	0.25
	TOTAL	10.5

4.3.9 Establishment of Vernal Pool Vegetation

Establishment of vernal pool habitat requires the reintroduction of vernal pool target plant species, in addition to the physical topographic recontouring described above. The establishment or enhancement of vernal pool habitat can be greatly accelerated by the active transport of propagules from donor sites into the new vernal pools and associated watershed (Scheidlinger et al. 1985). This will be accomplished by one or a combination of the following:

- The redistribution of topsoil containing seeds, spores, bulbs, and other propagules salvaged from on-site vernal pools. Table 4 identifies species to be targeted for seed or soil collection. Species that are more readily collected and dispersed by soil collection and are known to occur on-site include stone-crop (*Crassula aquatic*) and American pillwort (*Pilularia americana*). Additional species that are more readily collected and dispersed by soil collection but are not known to occur on-site include water-starwort (*Callitriche marginata*) and flowering quillwort (*Triglochin scilloides*). Soil containing these species will be collected from City-owned pools on Otay Mesa known to support these species and do not support versatile fairy shrimp.
- If necessary, the use of vernal pool soil from an off-site source approved by the resource agencies and the City.
- Collection and dispersal of vernal pool soil will follow the methods described in Section 4.3.6.
- The use of locally collected vernal pool seed from within Otay Mesa. Vernal pool seed will be directly dispersed in the basins or will be used for bulking at a native plant nursery per Section 4.3.1.
- The vernal pools will only be seeded and/or inoculated with soil after they have been shown to have hydrology adequate to support vernal pool species (i.e., hold water for seven consecutive days).

- Care will be taken when hand seeding vernal pool species to ensure that species are seeded into pools that have the appropriate hydrology to support the species. In addition, species that tend to more readily colonize will not be seeded with species that are more easily out competed.
- Pools and species to be hand seeded will be approved by the qualified restoration specialist.

In the event that natural rain is inadequate to support plant establishment during the initial reintroduction of vernal pool plants, artificial watering of the established/re-established/enhanced pools and their watersheds may be done upon approval by the resource agencies and the City in order to establish plants but not hydrate shrimp. Any artificial watering will be done in a manner that prevents ponding in the pools. Only water identified and documented to be free of contaminants that could harm the pools or target species will be used.

Soil will be spread evenly over the surface, no more than 0.25-inch deep. If any ponding water is present at the time of soil inoculation, the soil will only be placed on the wet soil adjacent to the ponded areas. Soil will be placed into the bottoms of the established/re-established/enhanced pools in a manner that preserves, to the maximum extent possible, the orientation of the plant seeds within the surface layer of soil (e.g., collected soil will be shallowly distributed within the pond so that seeds have the potential to be brought into solution upon inundation).

4.4 As-Built Reporting

At the completion of implementation, the installation will be approved by the City E&CP Biologist; City DSD, MMC, and MSCP staff; and resource agencies. The installation/maintenance contractor will submit an as-built report within 90 days of the completion of implementation that documents implementation activities and the dates they were completed. The report will include but not be limited to dates of on-site work, location and size of vernal pools basins, final plant and seed lists and quantities, and modifications to the mitigation site design that occurred through consultation with the restoration specialist and City E&CP Project Manager. The report may be a brief letter report with photos of the final site design and figures with locations of site elements. Figures will include the results of the DSM created after vernal pool grading.

4.5 120-day PEP

The 120-day PEP will begin once the implementation activities are approved by the City, likely once all container plants and native seed have been installed. The PEP will last for 120 calendar days and will consist of all maintenance activities and methods discussed in Section 5.0. Regular (at least once per week) qualitative monitoring will be conducted to assess native container plant establishment and non-native weed germination and make recommendations for maintenance activities, as needed (Table 9). At the end of the PEP, any dead container plants will be replaced in kind and the site will be free of non-native weed species. Year 1 will begin after successful completion of the PEP and any required remedial container plant installation has been completed. At the completion of the PEP, the restoration specialist will prepare a letter report for submittal to the City DSD, MMC, and MSCP staff, and resource agencies to document activities conducted during the PEP and the site progress towards final success criteria.

Table 9 Vernal Pool and Watershed Maintenance Schedule						
Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Weed Control (herbicide treatment)	As needed	Monthly[1]	Monthly[1]	5 to 6 times per year[1]	4 to 5 times per year[1]	4 times per year[1]
Weed Control (hand pulling – vernal pools)	As needed	3 times per year[1]	3 times per year[1]	2 times per year[1]	2 times per year[1]	2 times per year[1]
Watering	As needed	As needed	As needed	As needed	--	–
Supplemental Upland Planting/Seeding	At end of PEP	Fall/Winter	Fall/Winter	–	–	–
Vernal Pool Seeding	Winter	Winter	Winter	Winter	–	–
Trash Removal	As needed	As needed	As needed	As needed	As needed	As needed
Barrier/Sign Maintenance	As needed	As needed	As needed	As needed	As needed	As needed
Footpath Decompaction/ Hydroseeding	--	–	–	–	–	End of project
[1]Minimum frequency						

5.0 Maintenance Plan

Regular maintenance of the mitigation site will be required during the five-year maintenance and monitoring period to establish native container plants and control aggressive non-native weeds in the vernal pools and adjacent upland watershed habitats. The need for weeding is expected to decrease substantially by the end of the monitoring period provided successful habitat restoration has been achieved. Weeding activities will include herbicide application within the associated uplands. Herbicide has been used to control weeds safely and successfully in the vernal pool restoration programs on Otay Mesa and elsewhere. In these projects the success criteria for listed fairy shrimp have been met or exceeded with no negative effects on fairy shrimp noted. Maintenance activities will also include watering of planted container stock, hand weeding of the vernal pool basins, replanting and reseeding of native species, repair of fencing and signage, and trash removal. Maintenance activities will be performed per the schedule in Table 9.

5.1 Weed Control

Weed control will be performed consistent with the following:

- All weeding will be done by hand within and immediately adjacent to the preserved and newly established/re-established vernal pools. Use of herbicides within and immediately adjacent to restored pools will only be used under conditions approved by USFWS, RWQCB, and the City.

- All herbicide and pesticide use will be under the direction of a licensed qualified applicator and will be applied by personnel trained to apply herbicide. All weeding personnel will be educated to distinguish between native and non-native species to ensure that local native plants are not inadvertently killed.

- Herbicides will be applied on all areas that have been dethatched and at least three feet from the edge of the pools. Herbicide will only be applied when wind speed is less than five miles per hour, and spray nozzles will be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to non-target plants. Application of herbicide will not occur if rain is projected within 24 hours of the scheduled application.

- Weeding of the uplands will be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequently as weekly, depending on weather patterns. Any weeds that have set seed will be removed by hand and disposed of off-site.

- When vernal pools are ponding or close to saturation, weeds germinating along the basin edge will be cut using line trimmers by specially trained field personnel to ensure that germinating native species are not harmed. Cut material will be lightly raked away from the pools and care will be taken to not disturb the soil with raking activities.

- Herbicide treatment will be avoided within a 10-foot buffer from any concentrations of sensitive plant species.

5.2 Watering

Watering will be performed consistent with the following:

- Irrigation system operation or hand watering of container plants will be done in a manner to mimic natural rainfall, at a frequency and duration to encourage deep root establishment, but not enough to create runoff into the vernal pool basins.

- Irrigation system operation or hand watering will be carefully tapered off during the summer months to allow plants to experience their typical summer dormancy and avoid potential root rot or excessive soil shrinking and swelling that can damage plant roots.

- Irrigation will be discontinued at least two years prior to the completion of the five-year maintenance and monitoring period.

5.3 Supplemental Planting and Seeding

Remedial planting and seeding of the MSS uplands and remedial seeding of the vernal pool basins will be performed consistent with the following:

- Container plants will be replaced, as needed, within the upland watersheds. All dead plants will be replaced during years 1 and 2 after initial plant installation, unless their function has been replaced by natural recruitment.

- Areas of the site where native plants and seed struggle to recruit will be remedially seeded during Years 1 and 2.

- Remedial seeding will be conducted to increase vegetative cover and native species richness.
- Vernal pool basins that do not support their target vegetation (see Table 2), are not demonstrating the desired vernal pool endemic coverage, or are not meeting native richness performance standards will be remedially seeded.
- Hand seeding of the vernal pool basins will be conducted in the winter, after the pools begin to pond after the start of the wet season.

5.4 Trash Removal and Barrier/Sign Maintenance

Trash removal and barrier/sign maintenance will be performed consistent with the following:

- Trash in the mitigation areas will be removed as necessary.
- All fencing and signs will be checked and repaired as necessary.
- Other site problems, such as vehicle damage and erosion, will be reported to the City or other adjacent landowners with recommendations for remedial measures.

5.5 Footpath Decompaction and Hydroseeding

Footpath decompaction and hydroseeding will be performed consistent with the following:

- At the completion of the five-year maintenance and monitoring period and prior to final sign-off, foot paths and access routes that may have developed within the site as a result of maintenance and monitoring activities will be lightly decompacted by hand tools or heavy equipment and hydroseeded with the species and quantities shown in Table 7. Any footpath areas that have developed soil crusts will not be decompacted, and seed will only be applied in these areas by hand.

5.6 Maintenance Monitoring

Qualitative monitoring of the mitigation site to guide maintenance activities will be performed consistent with the following:

- After completion of the PEP, mitigation areas will be qualitatively monitored once a week by the vernal pool restoration specialist for the first two months, once every other week for the next four months, and monthly thereafter during the growing season. Monitoring will include, but not be limited to, assessment of container plant health, native seed germination, weed presence, and unauthorized trespassing. Monitoring results will be used to determine the timing and frequency of maintenance activities.

5.7 Adaptive Management Approach

An adaptive management approach will be implemented for the mitigation site in the event that areas of the site are not attaining the desired habitat values and functions. Adaptive management is defined, for the purposes of this project, as a flexible, iterative approach to the long-term management of biological resources. It is directed by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation site. Effects of any catastrophic events that affect the mitigation will receive prompt and appropriate corrective actions.

Adaptive management measures to be implemented will include the utilization of qualitative data gathered in the field throughout the five-year maintenance and monitoring period to assess the health and vigor of established/re-established/enhanced vernal pools and restored upland watershed habitat within the mitigation sites. Following an event that causes damage to all or part of the mitigation sites, this data will be used in part to drive management considerations for the repair of the damaged areas. Achieving the key goals of the mitigation program and establishing self-sustaining native habitats will be the focus of all adaptive management decisions. Adaptive measures may include collection and dispersal of vernal pool plant seed, recontouring of vernal pool basins, reintroduction of additional soil inoculum, upland replanting or reseeding, additional weed control efforts, and others deemed appropriate through consultation with the City and resource agencies. Examples of potential remedial measures that may be employed during the mitigation project are included in Table 10.

Table 10
Remedial Actions

Problem	Potential Solution
Upland Habitat Establishment	
High annual weed cover	Increased weed control visits
High perennial weed cover	Selective herbicide application, additional manual removal
Low native species cover	Additional container plant or cactus cutting installation
Low species richness	Additional seeding of underrepresented species (may focus on annual species)
Minimal native plant growth	Additional watering and/or focused irrigation
Vernal Pool Habitat Establishment	
Vernal pools ponding for less than 14 days	Additional grading to improve hydrology
High weed cover	Increase hand weeding visits, including hand weeding of vernal pool edges during spring season (March – May)
Low vernal pool vegetation cover	Additional seed collection and dispersal in pools with low coverage
Low vernal pool species richness	Introduction of species not currently present in low diversity pools

If an interim performance standard is not met for any of the established/re-established/enhanced vernal pools or restored upland MSS habitat in any year or if the final performance standards are not met, the project proponent will prepare an analysis of the cause(s) of failure and, if deemed necessary

by resource agencies and the City, propose remedial actions for approval. In general, the greatest challenges to successful vernal pool habitat restoration are the establishment of appropriate hydrology and establishment of vernal pool vegetation. Remedial actions will be conducted within any establishment/re-establishment/enhanced vernal pools that do not demonstrate the required vernal pool ponding during Years 1 and 2. Appropriate vernal pool ponding is further defined in Section 6.3, Vernal Pool Hydrological Performance Standards. Adaptive management actions may include additional grading to improve hydrology within the vernal pools of concern. The approach to remedial grading will be determined based on observations made during qualitative and hydrology monitoring and may include grading to deepen the vernal pool basins, improve or expand the vernal pool watershed, enhance basin topography, or other actions recommended by the vernal pool restoration specialist and resource agencies. Remedial actions to address concerns related to vernal pool vegetation establishment may include additional weeding and additional vernal pool seed collection and dispersal. Remedial actions will be focused on establishment/re-establishment/enhanced vernal pools that are individually not achieving the performance standards described in Section 6.0. If any of the established/re-established/enhanced vernal pools or restored upland watershed habitat has not met a performance standard during the initial five-year period, the maintenance and monitoring obligations will continue until the above agencies deem the mitigation successful, or contingency measures are implemented. Mitigation will not be deemed successful until at least two years after any contingency measures are implemented, as determined by the resource agencies and the City.

6.0 Performance Standards

The performance standards used to determine successful vernal pool mitigation include the achievement of standards for CRAM, hydrologic regime; vernal pool vegetation cover, plant species richness, and weed tolerance; and species-specific standards for fairy shrimp. Standards for hydrologic regime, vernal pool vegetation cover, plant species richness, weed tolerance, and fairy shrimp will be compared to the same values taken from a reference site.

A reference site will be used to define the target vegetation and establish target values for cover, species richness, wildlife usage, and weed abundance for the vernal pool and upland MSS restoration areas.

Each of the specified performance standards will be evaluated following the completion of seasonal field monitoring to determine if the final performance standards have been met and to assess the likelihood that any particular standard will be met (taking into account the seasonal conditions). The final assessment of success will be based on the combined performance over the monitoring period and an analysis of the trends established.

6.1 Location of Reference Site

The VPHCP requires that vernal pool mitigation projects utilize reference pools from each of the three VPHCP subareas, however, due to the unique nature of Otay Mesa pools (endemic vernal pool plant species, clay pan substrate), one reference site, the City-owned Cal Terraces vernal pool complex on Otay Mesa, will be used for this project. The Cal Terraces complex supports high-quality

vernal pools surrounded by established upland MSS habitat. Multiple vernal pools from the Cal Terrace reference site will be used to provide a variety of conditions for comparison to the restored pools. Cal Terraces is located two miles northwest of the mitigation site and will serve as the reference site for this project (see Figure 4). Representative, high-quality reference vernal pools will be chosen from within Cal Terraces. The most functional vernal pools will be chosen at the time of the analysis to include the ranges of both physical and biotic characteristics that meet the performance standards. All reference vernal pools will support vernal pool vegetation, as defined below in the target vegetation and cover criteria. Any vernal pools to be used as reference pools for this mitigation project must be approved by the City. Cal Terraces will also serve as the reference site for the MSS habitat for the watershed restoration. Most vernal pool complexes on Otay Mesa are either restored vernal pools or severely degraded and while Cal Terraces is a restoration site itself, the site achieved all success criteria and was signed off by regulatory agencies in 2003. The site has remained high-quality vernal pool and MSS habitat for 17 years. Cal Terraces represents one of the older restoration sites and provides a high-quality example of what restoration sites should look like upon completion.

The City performs annual monitoring of Cal Terraces per the requirements of the VPHCP (City of San Diego 2019). The complex supports 377 vernal pools, a subset of which are surveyed each year per the methods described in the VPMMP (City of San Diego 2020b). In 2020, of the 36 sampled pools, 100 percent contained Otay Mesa mint and San Diego button-celery, 36 percent contained spreading navarretia, and 31 percent contained California Orcutt's grass, with 61 percent containing Riverside fairy shrimp and 92 percent containing San Diego fairy shrimp (AECOM 2021). The vegetative cover of the focal species observed in each sampled pool ranged from 1 to 25 percent. Due to the random selection of the sample pools, it is assumed that these percentages can be applied through the complex which represents one of the healthiest and most diverse vernal pool complexes in San Diego County. Non-native species cover for the monitored vernal pools was observed to be less than 1 percent for most pools, with some pools containing up to 5 percent non-native cover. Based on these monitoring results, it is anticipated these reference pools will provide a high-quality target for the vernal pool restoration effort.

6.2 California Rapid Assessment Methodology–Vernal Pools

CRAM is a wetland assessment method that combines landscape, hydrological, physical, and biological structure attributes, further separated into metrics and submetrics, into an index value. These indexed values (A=12, B=9, C=6, D=3) are repeatable, are scientifically defensible, and offer a window into overall wetland functionality (California Wetlands Monitoring Workgroup 2019).

CRAM will be used as an additional monitoring method to demonstrate mitigation site improvement and provide a more overall view of the mitigation system as whole. CRAM will not be used in lieu of quantitative monitoring efforts but in combination to demonstrate the functionality of the vernal pool systems within the mitigation site.

A vernal pool CRAM assessment was conducted for the mitigation site on May 3, 2019, and will be used to determine baseline conditions. The site was separated into two assessment areas and the average results of the assessments are shown in Table 11.

Table 11 CRAM Metric Goals for Five Years Post-Establishment of Vernal Pools			
CRAM Attribute	CRAM Metric and Submetrics	Average Current Score	Target CRAM Metric Goal
Buffer and Landscape Context	Aquatic Area Abundance	B	B
	Percent of AA with Buffer	A	B
	Average Buffer Width	A	B
	Buffer Condition	C	C
Hydrology	Water Source	A	A
	Hydroperiod	A	A
	Hydrologic Connectivity	A	B
Physical Structure	Structural Patch Richness	D	B
	Pool and Swale Density	D	C
	Topographic Complexity	D	B
Biological Structure	Horizontal Interspersion and Zonation	D	B
	A. Number of Codominant Species	D	B
	B. Percent Non-native	C	A
	C. Endemic Species Richness	D	C

In general, buffer and landscape context and hydrology attributes are expected to stay the same even after restoration activities are completed. CRAM metric and submetric scores for physical and biological structure are expected to change from the baseline as a result of both vernal pool restoration and completion of adjacent residential development. CRAM scores for physical structure and biological structure may be expected to increase, although buffer and landscape context scores may be expected to decrease as a result of the adjacent development. The goals for each metric are shown in Table 10; however, attainment of these goals will not confirm site success, nor should inability to achieve these goals determine site failure. Rather, the measurement of these metrics will add to the qualitative discussion of the progress of the mitigation site.

CRAM assessments will use the Vernal Pool Module (version 6.1 or most recent) and be conducted a total of two times during the five-year maintenance and monitoring period to inform adaptive management: Year 0 (post-implementation) and Year 5 (prior to sign-off).

Although no official success standards will be applied to this project, CRAM scores will be used to evaluate form and function of the vernal pool mitigation site and therefore general achievement of non-wetland waters mitigation requirement of the project. When compared to the as-built condition, the results of the Year 5 CRAM surveys should show, at a minimum, the following:

- Physical form and structure suitable for ponding and hydrologic connectivity
- Development of hydrologic features within the system that provide evidence of expected function
- Continued improvement in biotic structure
- Overall trajectory toward improved rather than degraded condition

These attributes assess the areas adjacent to the assessment area and, therefore, are mostly outside the mitigation site and not within the control of this mitigation program.

The improvement of the physical structure and biological structure of the mitigation site will be the primary focus of mitigation as these attributes focus on the topography and biology within the assessment area, which is well within the control of this mitigation program.

6.3 Vernal Pool Hydrological Regime Performance Standards

The depth and duration of water in established/re-established/enhanced vernal pools are highly dependent upon the magnitude and number of storm events, the time interval between each event, and the climactic determinants of evaporation and transpiration (temperature, humidity, sunlight, and winds) between each storm event in a given year. Annual rainfall in the region is remarkably variable. Therefore, the performance standards for hydrological characteristics depend on a comparison with control habitats representing the expression of performance standards during each monitoring year. In general, newly restored vernal pools pond earlier and longer than older, more established pools, and this variation should be taken into consideration when discussing the success of the established/re-established/enhanced pools.

- The duration, periodicity, and depth of inundation for the established/re-established/enhanced vernal pools will be considered successful if, prior to the end of the monitoring period, the vernal pools demonstrate hydrological patterns of duration, periodicity, and depth of inundation that fall within the range of the highest-functioning reference vernal pool.

- Total area of inundation of the established/re-established/enhanced vernal pools must be equal to or greater than the area proposed in the mitigation plan (1.128 acres,49,125 square feet) during an average or above rainfall year.

- Each established/re-established/enhanced vernal pool must be inundated for a duration and depth that is within range of inundation for the reference vernal pools.

- The average depth and duration of inundation of the established/re-established/enhanced pools must be within one standard deviation of the average depth and duration of the reference pools.

- Each established/re-established/enhanced vernal pool must be inundated/saturated within the primary root zone (upper 12 inches from soil surface) for a duration of time sufficient to maintain wetland hydrology (i.e., 14 or more consecutive days).

6.4 Vernal Pool Vegetation Performance Standards

The established/re-established/enhanced vernal pools will be subject to the vegetation performance standards listed below. The upland watershed is restored to MSS and will be subject to the performance standards listed in Section 6.6.

Desired absolute vernal pool vegetation goals are shown in Table 12 and serve as a guide for monitoring annual changes and determining needs for adaptive management; however, the performance standards included in 6.4.1 through 6.4.3 will be utilized to determine ultimate project success and whether the site meets the objectives identified in the Site Specific Objectives of the VPMMP (City of San Diego 2020b).

Table 12
Vernal Pool Vegetation Performance Standards

Year	Native Species Richness	Endemic Vernal Pool Species Cover (%)	VPHCP Cover Species Presence (# of pools)	Non-native Cover (%)
1	2	5	ERYARI – 4 NAVFOS – 5 ORCCAL – 2 POGNUD – 10	<5 0 Cal-IPC high or perennial species
2	3	10	ERYARI – 8 NAVFOS – 10 ORCCAL – 4 POGNUD – 15	<5 0 Cal-IPC high or perennial species
3	4	20	ERYARI – 11 NAVFOS – 12 ORCCAL – 6 POGNUD – 20	<5 0 Cal-IPC high or perennial species
4	5	30	ERYARI – 12 NAVFOS – 13 ORCCAL – 8 POGNUD – 25	<5 0 Cal-IPC high or perennial species
5	6	40	ERYARI – 20 NAVFOS – 15 ORCCAL – 10 POGNUD – 30	<5 0 Cal-IPC high or perennial species

Cal-IPC = California Invasive Plant Council
ERYARI = San Diego button-celery (*Eryngium aristulatum* var. *aristulatum)*
NAVFOS = spreading navarretia (*Navarretia fossalis)*
ORCCAL = California Orcutt's grass (*Orcuttia californica)*
POGNUD = Otay Mesa mint (*Pogogyne nudiuscula)*

6.4.1 Endemic Vernal Pool Plant Species Richness Performance Standards

The established/re-established/enhanced vernal pools will support reproducing populations of a minimum number of endemic vernal pool plant species (see CRAM Vernal Pool modules) equivalent to that supported by the reference vernal pools (see Table 12). Equivalence is met when (1) the endemic vernal pool species richness (i.e., number of native vernal pool species) value for each of the established/re-established/enhanced vernal pools is equal to or greater than the minimum value found in the reference vernal pools and (2) the average value of vernal pool species richness in the established/re-established/enhanced vernal pools is equal to or greater than that of the average of the reference vernal pools.

6.4.2 Endemic Vernal Pool Vegetation Cover Performance Standards

For the established/re-established/enhanced vernal pools the performance standards are as follows:

- The vernal pool endemic plant species cover of all established/re-established/enhanced pools on average must be at least 70 percent of the average for the reference pools.
- For each of the established/re-established/enhanced pools, the absolute vernal pool endemic species cover must be at least 50 percent of the average absolute cover of vernal pool endemic species for the reference pools.
- Vernal pool endemic species cover for each established/re-established/enhanced vernal pool must increase in each successive year based on initial quantitative monitoring, except in years of extreme drought.

6.4.3 Vernal Pool Non-native Cover Performance Standards

The non-native cover performance standards are as follows:

- Within all of the vernal pools in the mitigation site (established/re-established/enhanced), Cal-IPC List High or perennial weed species will not be present, and the relative cover of all other non-native species will not exceed five percent.
- The average absolute cover of non-native species in the established/re-established/enhanced vernal pools must be less than the average absolute cover of non-native species of the reference pools.

6.5 Fairy Shrimp Performance Standards

The established/re-established/enhanced vernal pools will support reproducing populations of Riverside and San Diego fairy shrimp (i.e., gravid females). Re-establishment of San Diego fairy

shrimp is not a requirement of this project as they are adequately conserved under the VPHCP (City of San Diego 2019) and it is not a requirement of any permits associated with the La Media Road Improvement Project. However, the Recovery Plan for Vernal Pools of Southern California (USFWS 1998) has identified the J 13 N vernal pools as necessary to stabilize San Diego and Riverside fairy shrimp populations, as stated in the VPMMP (City of San Diego 2020b). Therefore, presence of San Diego fairy shrimp on-site is desirable, should meet or exceed baseline conditions, and will be measured, but it is not required for project success. Success for fairy shrimp reintroduction will be determined by measuring the ponding of water, presence of viable eggs, hatched fairy shrimp, and gravid females within the established/re-established/enhanced vernal pools as outlined below:

- The established/re-established/enhanced vernal pools will pond for a period of time similarly to reference vernal pools during an average rainfall year and at an appropriate depth and quality to support San Diego and/or Riverside fairy shrimp.

- Protocol wet season sampling will be taken annually in the established/re-established/enhanced vernal pools to determine presence and approximate quantities of hatched fairy shrimp and gravid females, by species (USFWS 1996).

- At the end of the monitoring period, Riverside fairy shrimp presence will be confirmed in 25 percent of the pools on-site.

- At the end of the monitoring period, San Diego fairy shrimp presence will be confirmed in 33 percent of the pools on-site.

6.6 Maritime Succulent Scrub Vegetation Performance Standards

The performance standards for the upland MSS areas will be based on a reference site that supports vernal pools and the upland habitat targeted for restoration in this mitigation plan. Successful restoration of uplands is not required for USACE mitigation. While achieving a fully mature system within five years may not be possible, the site should demonstrate that it is exhibiting a positive trajectory towards long-term viability. The City-owned Cal Terraces vernal pool complex has been identified as the reference site for this mitigation site. The reference site will be used to establish target values for vegetation cover, species richness (number of different species present), wildlife usage, and weed abundance. Target values will be relative to the reference site where quantities observed for the mitigation site will be divided by those same values observed at the reference site to determine how the mitigation site is performing relative to the reference site. Yearly target values for the performance standards cover and species richness of MSS habitat are presented in Table 13.

Table 13 Maritime Succulent Scrub Performance Standards as a Relative Percentage of Reference Site Values			
Year	Percent Cover–Native Shrub Species	Percent Cover–Native Herbaceous Species	Species Richness
1	10	5	30
2	20	10	40
3	30	20	50
4	50	40	60
5	70	60	85

6.6.1 Plant Survivorship, Vegetation Cover, and Species Richness Performance Standards

In combination with the performance standards included in Table 13, the standards listed below will also be evaluated annually and applied to the mitigation site. The plant survivorship, vegetation cover, and species richness performance standards are as follows:

- Container plant survival will be 80 percent of the initial plantings for Years 1 through 5. After Years 1 and 2, all dead plants will be replaced unless their function has been replaced by natural recruitment.
- At the end of the five-year maintenance and monitoring program, the upland habitat relative percent cover values will be 70 percent of the reference site for shrub cover and 60 percent of the reference site for herbaceous cover.
- At the end of the five-year maintenance and monitoring period, 85 percent of the upland plant taxa are shared with the reference site.

6.6.2 Non-native Weed Cover Performance Standards

The relative cover of all non-native species within the upland MSS will not exceed an absolute value of 10 percent and no Cal-IPC List High or perennial species will be present at the end of each year during the five-year maintenance and monitoring period.

6.7 Photographic Documentation

Permanent photopoints will be located at each established/re-established/enhanced vernal pool and at locations within the upland MSS. Representative photographs will be taken at each photopoint to visually document the progress of vegetation cover development over the monitoring period.

7.0 Monitoring Requirements

A minimum commitment of five years of monitoring of the vernal pool and upland MSS restoration areas will be completed. In addition to the qualitative monitoring discussed in Section 5.6, biological monitoring for performance standards will include quantitative hydrology monitoring, quantitative vegetation monitoring, USFWS protocol surveys (wet season), complete flora and fauna inventories, and photographic documentation. To minimize impacts to the soil surface of any vernal pools during restoration and monitoring activities, cobbles will be oriented within the established/re-established/enhanced vernal pools to serve as steppingstones. The monitoring schedule is presented in Table 14.

7.1 Vernal Pool Hydrology Monitoring

The success criteria for hydrological characteristics will be based on comparing performance measurements for the established/re-established/enhanced vernal pools with those for reference vernal pools during each monitoring year. Hydrological characteristics to be monitored include depth, periodicity, and duration of inundation. Precipitation will be based on records from the nearest reporting weather station. Field methods for the quantitative hydrological monitoring are described below.

- The established/re-established vernal pools will be topographically mapped at 0.2-foot contour intervals.
- The water depth for established/re-established vernal pools and reference pools will be measured every 48 hours after initial ponding between November 1 and May 15 until inundation/saturation within the primary root zone (upper 12 inches from soil surface) is observed for 14 or more consecutive days. After 14 consecutive days of ponding, water depth will be measured weekly until the standing water is gone. Water depth will be measured using a ruler placed in the low point of each pool. Alternatively, water depth and duration may be measured by data loggers, as determined appropriate through consultation with the City and Vernal Pool Biologist. The implementation of data loggers, including the number and location, will be approved by the USACE prior to implementation.
- A water depth versus time chart will be prepared illustrating water depth at the deepest point and ponding periodicity of each established/re-established/enhanced vernal pool and reference pool.
- Water measurements will also be taken annually in the established/re-established/enhanced pools and reference pools to determine water quality (e.g., pH, temperature, total dissolved solids, salinity) of ponding.
- A wetland delineation will be conducted during the early spring months during Year 5 (see Table 14). The wetland delineation will follow the guidelines set forth by USACE, including the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008).

Table 14 Vernal Pool and Maritime Succulent Scrub Monitoring Schedule						
Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative Monitoring	Weekly	Every other week during growing season	Every other week during the growing season	Monthly during the growing season	Bi-monthly during the growing season	Bi-monthly during the growing season
Hydrology Monitoring	Every 48 hours after initial ponding[1]	Every 48 hours after initial ponding[1]	Every 48 hours after initial ponding[1]	Every 48 hours after initial ponding[1]	Every 48 hours after initial ponding[1]	Every 48 hours after initial ponding[1]
Wetland Delineation	--	--	--	--	--	Spring
Vernal Pool Vegetation (quantitative)	None[2,3]	March (aquatic phase) and May (dry phase)[3]	March (aquatic phase) and May (dry phase)[3]	March (aquatic phase) and May (dry phase)[3]	March (aquatic phase) and May (dry phase)[3]	March (aquatic phase) and May (dry phase)[3]
Fairy Shrimp (wet season)	Protocol survey[3]	Protocol survey[3]	Protocol survey[3]	Protocol survey[3]	Protocol survey[3]	Protocol survey[3]
Photograph Documentation	Monthly	As-needed	Spring	Spring	Spring	Spring
Maritime Succulent Scrub Vegetation Monitoring (quantitative)	None[1]	Spring	Spring	Spring	Spring	Spring

[1]Hydrology monitoring to occur every 48 hours after initial ponding and continue until 14 days of consecutive ponding is confirmed. Hydrology monitoring may be performed by data loggers, as approved by USACE.
[2]Quantitative monitoring to begin in Year 1.
[3]Time dependent on rainfall.

7.2 Vernal Pool Vegetation Monitoring

Monitoring tasks for vernal pool vegetation are as follows:

- The established/re-established/enhanced vernal pools and reference pools will be sampled for plant species presence and estimated cover using a meander survey of at least a 15-minute duration per basin during the aquatic phase (e.g., March, dependent on weather patterns) and within 30 days of the disappearance of standing water (e.g., May, dependent on weather patterns). All species present will be noted and their cover estimated.

- The established/re-established/enhanced vernal pools will be photographed from an established photopoint during the vegetation sampling period.

7.3 Vernal Pool Fairy Shrimp and Invertebrate Monitoring

Monitoring tasks for vernal pool fairy shrimp and invertebrates are as follows:

- Annually, the established/re-established/enhanced vernal pools will be sampled for aquatic invertebrates using pole-mounted dip-nets of appropriate mesh size to capture cladocerans, ostracods, branchiopods, and tadpoles following USFWS protocol survey methods (1996). The presence of hatched fairy shrimp and gravid females by species will be recorded.

7.4 Maritime Succulent Scrub Monitoring

It is anticipated that the MSS habitat will become established within the five-year maintenance and monitoring period, although full maturation of the community may take longer. Overall native cover (i.e., shrubs, herbaceous species) and species richness will be evaluated for these areas as well as for the reference site.

The native vegetation cover will be measured quantitatively using line-intercept sampling method in the spring, beginning in Year 2. This method involves the establishment of randomly placed transects, usually 10 meters long, to gather data to estimate native vegetation cover (i.e., shrub and herbaceous). Approximately two 10-meter transects will be sampled per acre. Species richness will be determined by lists of all plant species present within the restoration areas.

7.4.1 Invasive Non-native Plants

The presence of invasive non-native plant species will be monitored in the restored MSS areas. Information collected during monitoring visits will be used to schedule the maintenance crews to conduct maintenance activities.

7.4.2 Wildlife Usage

A list of wildlife species observed using the mitigation site will be prepared and included in the annual reports. Species lists for both established/re-established/enhanced vernal pools and the MSS areas will be compiled annually.

7.5 Reporting

Annual reports that assess both the attainment of yearly interim and progress toward the final performance standards for the established/re-established/enhanced vernal pools and restored upland MSS will be submitted to the City by December 1 of each year. The City will be responsible for submitting these reports to the appropriate resource agencies. The reports will also summarize the project's compliance with all applicable mitigation measures and permit conditions. A final monitoring report will be prepared and submitted to the City for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Long-term Management and Financial Assurances

The USACE regional compensatory mitigation guidelines (USACE 2015) require that after the successful completion of mitigation, compensatory mitigation sites "must be provided long-term protection and funding for long-term management." The following sections describe how City recordation of MSCP lands offer the same protections of a conservation easement and how the long-term funding of the MSCP offers the same financial assurances as a non-wasting endowment.

Long-term maintenance and monitoring of the approved mitigation land shall be conducted by the City PRD Open Space Division, who would serve as the long-term management entity. The Open Space Division is responsible for management of MHPA lands and is comprised of an interdisciplinary team of biologists, park rangers, pesticide applicators, ground maintenance managers and workers, planners, and directors. Management of MHPA lands would occur in accordance with the MSCP program and MSCP Implementing Agreement, which obligates the City to protect and manage lands within the MHPA for purposes of habitat and species conservation.

The mitigation site is within the City MSCP's Multi-Habitat Planning Area and the vernal pool complex is a VPHCP preserve area. After the successful restoration of the vernal pool basins and associated uplands, the vernal pool complex will be managed pursuant to the guidelines of the MSCP, VPHCP, and VPMMP (City of San Diego 1997, 2019, 2020b) by the City's Parks and Recreation and MSCP departments, in perpetuity. With the adoption of the VPHCP, the City accepts responsibility for implementation of the VPMMP on City-owned lands. The VPHCP guidelines are summarized in Section 8.3 and include requirements for long-term management of the mitigation site with respect to long-term maintenance (i.e., planting, weed control, barriers-fencing, lighting, drainage, signage-public information and education, trash removal), funding, prohibitions, corrective measures for unforeseen circumstances, monitoring, and responsible parties (i.e., City of San Diego). The extensive preserve management responsibilities included in the MSCP and VPHCP provide for the long-term

management of the City-owned mitigation site as part of the MHPA, which provides long-term site protection through the City's program for long-term preserve management. Upon successful restoration, the City will meet the conservation mechanism requirement through implementation of the MSCP Conditions of Coverage and by including a copy of permits, restrictions, and conditions in the property file for the parcels in which the mitigation site lies. These documents are recorded on the property Action Sheet Log with the City's Department of Real Estate and Airport Management who manages all City properties. The Action Sheet Log is managed and maintained by Real Estate Assets Records Management Agent. Prior to any real estate action on a particular property, the Agent must check the Action Sheet Log to ensure that the requested action is in compliance with any guidelines pertaining to the property. This Action Sheet Log provides the same protections of a conservation easement.

8.1 Funding

The City has secured funding for in-perpetuity management as part of the VPHCP development process. In lieu of a non-wasting endowment, funding for maintenance would come from the annual operating budget used to manage Parks and Recreation Open Space lands, including specific habitat monitoring and management required by the MSCP and VPHCP. Each year, City departments prepare and submit their projected annual budgets to the Mayor for presentation to the public and City Council. Budget items related to regulatory compliance are prioritized above other projects to ensure the City is in compliance with all federal and state regulations; this includes the City's compliance with the management directives outlined in the MSCP and VPHCP. The City's General Fund, Environmental Growth Fund, and Open Space Special Funds in the Park and Recreation Department long-term accounts provide for maintenance and management of the MHPA with approval from the City Council. Most of the Open Space Special Funds may be used only in specific vernal pool complexes while others, such as the Vernal Pool Preservation Program, may be used for research and maintenance of vernal pools and habitat throughout the City.

PRD's fiscal year (FY) 2023 annual budget for Open Space includes $15.08 million for the management of approximately 27,000 acres of open space and preserve lands (City 2022). This annual allocation provides for the management and maintenance of existing City preserves, including vernal pool complexes. Cost estimates for implementation of the VPMMP are based on the assigned management level for each site. The annual cost to maintain all South Planning Unit complexes at a Management Level 1 is $123,230 (2014 dollars, City of San Diego 2019) or 0.9 percent of the total Open Space annual budget (when converted to 2022 dollars). After the completion of restoration activities, the mitigation site will be maintained at a Level 1 and the annual estimated cost is $8,526 (2014 dollars, Table E-5 VPHCP City of San Diego 2019), 6.9 percent of the annual budget for South Planning Unit vernal pool complexes management, or 0.6 percent of the total Open Space annual budget (when converted to 2022 dollars). An annual estimated cost of $8,526 provides for approximately 160 labor hours, or an average of 4 hours per pool per year which is sufficient to conduct annual maintenance.

8.2 Site Protection Mechanism

The City MSCP is a comprehensive conservation planning program that was developed to preserve habitat and open space within the region, in perpetuity. In 1997, the City, USFWS, and California Department of Fish and Wildlife (CDFW) entered into the MSCP Implementing Agreement to establish the MHPA. The MSCP provides land use considerations and management directives that ensure the protection of lands and biological resources located within the MHPA. The USFWS and CDFW oversee the biological monitoring program. Since the mitigation site lies entirely within the MHPA, the land use considerations and management directives outlined in the MSCP will also guide the long-term management of the mitigation site and ensure the long-term protection of the site. The MSCP and MSCP Implementing Agreement restricts uses within the MHPA similar to a conservation easement, including the implementation of preserve guidelines, land-use adjacency guidelines, planning policies, and design guidelines. The mitigation site is preserved in perpetuity in conformance with the MSCP Implementing Agreement and as codified in the City Land Development Code for Environmentally Sensitive Lands Regulation, which serves to protect lands within the MHPA from direct and indirect habitat degradation. As stated in the memorandum for the record for APRM (City of San Diego 2015), APRM sites will be permanently preserved and maintained per Section 21.3 of the Implementing Agreement which meets the USACE requirement for site protection. Furthermore, a copy of permits, restrictions, and conditions are recorded on the property Action Sheet Log with the City's Department of Real Estate and Airport Management to ensure preservation by the City in perpetuity.

Section 1.4.1 of the City MSCP lists land uses that are compatible with the biological objectives of the MSCP and that may therefore be implemented within the MHPA. Section 1.4.2 provides planning policies and design guidelines to be applied in the review and approval of any development project within or adjacent to the MHPA. In addition, Section 1.4.3 provides further guidelines for land uses adjacent to the MHPA to ensure minimal indirect impacts to the MHPA from nearby activities. These restrictions provide greater site protection and ensure a higher degree of long-term sustainability than a typical conservation easement and/or deed restrictions because they provide a framework for continued resource protection within the mitigation parcels, and apply to adjacent areas in addition to the site itself.

Section 1.5 of the MSCP also provides directives for site protection as part of its management goals and objectives. The MSCP states that management of lands preserved as part of the MSCP through mitigation and other means is necessary to adequately protect the species and habitats that have been set aside. MSCP management objectives include protecting existing and restored biological resources from intense or disturbing activities within and adjacent to the MHPA. Based on these objectives, the MSCP recommends management directives for mitigation, restoration, recreation, trash removal, adjacency management issues, invasive species control, and flood control activities. Directives are organized according to priorities, which determine funding and direct efforts. Priority 1 directives (see Section 2.1.1.2) are focused on resource protection in the MHPA.

8.3 Vernal Pool Habitat Conservation Plan

The mitigation site is located entirely within the City MHPA and will therefore be monitored and managed according to the general MSCP requirements listed in Section 8.1. The MSCP defers to adopted regulations for management guidelines specific to vernal pool sites and covered species. Such guidance is provided by the VPHCP.

Long-term management and monitoring of conserved vernal pools is necessary for their preservation, as pressures from the surrounding urbanized landscape preclude them from sustaining themselves naturally. Therefore, after the successful restoration of the vernal pool basins and associated uplands, the vernal pool complex will be managed at the stewardship level pursuant to the guidelines of the VPHCP. Stewardship activities identified in the VPHCP for the mitigation site are intended to maintain habitat conditions and covered species populations within the vernal pool complex. The City implements the VPHCP strategy through its VPMMP (City of San Diego 2020b), which provides the framework for site-specific management plans that fulfill the objectives of the VPHCP.

The VPHCP expects that an adaptive management approach will be employed for long-term maintenance and monitoring. The VPMMP's approach to adaptive management distinguishes between three monitoring and management levels, whose application depend on the habitat conditions and population status of covered species within a vernal pool complex. VPHCP standards and goals are considered achieved if complexes are maintained at Management Level 1 – meaning that the complex has stable or increasing covered species populations and management activities aim to maintain existing habitat conditions.

Management activities under Level 1 will include annual (or more frequent) trash and debris removal; fence and signage maintenance; monitoring and adaptive measures for edge effects; fire suppression and fire damage repair; access patrol, enforcement, and trespass damage repair; monitoring and repair of topographic damage; and weed control within and around the vernal pools.

The City will be responsible for implementing measures that comply with the following sections.

8.3.1 Monitoring and Reporting

The monitoring methods developed for the VPMMP use data collected on-site to assess the conditions of each vernal pool complex. If the data shows that VPMMP standards are not being met, then management actions must be changed. Several existing monitoring methods have been adapted and integrated into the vernal pool monitoring approach, including the Hydrogeomorphic Model, CRAM, and USFWS protocols. The VPMMP discusses these in detail.

Monitoring activities under Management Level 1 include qualitative and quantitative monitoring. Qualitative monitoring is conducted three times annually during the wet season by visual assessment, regardless of management level. Qualitative monitoring assesses threats, pool inundation and fairy shrimp viability and reproduction.

Quantitative monitoring includes a one-time baseline hydrological survey, annual covered plant surveys, as needed fairy shrimp density surveys (based on qualitative observations), and as needed topographic disturbance assessments. The VPMMP provides additional details on survey methods and requirements specific to each management level.

The City's Biological Monitoring Plan for the Multiple Species Conservation Program (monitoring plan; City of San Diego 1997b) identifies monitoring and reporting requirements for the entire MSCP Preserve system, which includes VPHCP managed lands. Long-term monitoring efforts within the MHPA are the joint responsibility of the City, the U.S. Fish and Wildlife Service, and CDFW. Monitoring includes a combination of habitat assessment through satellite imagery, on-ground visual inspections by the habitat reserve manager, and quantitative monitoring. Vernal pool complexes are monitored per the requirements of the VPHCP. The City summarizes the management and monitoring actions completed each year as part of the MSCP Annual Report. The MSCP Annual Report is provided to USFWS and CDFW in accordance with the MSCP Implementing Agreement to detail progress towards the City's conservation goals in the MSCP.

8.3.2 Adaptive Management Triggers

The required management level (Level 1, 2, or 3) for the mitigation site is determined by comparing monitoring results to VPMMP standards. While quantitative monitoring is conducted annually, regardless of precipitation, annual survey results are only comparable to VPMMP standards during years when rainfall is at least 55 percent of the average rainfall for the area.

The VPMMP outlines the complete list of triggers capable of causing a move between management levels. Adaptive management triggers that would cause the vernal pool mitigation site to move from Management Level 1 to Management Level 2 include the following:

- An average decline of one cover class for any covered plant species present in the pools assessed over three years with adequate rainfall.
- An average increase of one cover class in combined non-native cover in vernal pools over a three-year period, regardless of rainfall (only for complexes with at least 10 percent non-native cover).
- A 20 percent decline in density of the covered shrimp species, over three years.
- A change in the vernal pool hydrological network (i.e., inlet and outlet features) and water storage functions such that the maximum depth of ponding is increased or decreased by more than 10 percent (but less than 20 percent) from the recorded baseline.

8.3.3 Trash and Debris Removal

The vernal pool mitigation site will be kept free of trash and debris through annual or as-needed removal.

8.3.4 Fencing and Signage

Fencing and signage will be installed per the avoidance and minimization measures described in Section 4.2 of this plan. Monitors will assess the conditions of fencing and other site protection measures during qualitative monitoring visits to verify that the site is secured, and appropriate signage is in place. If problems are identified, recommendations for repair or replacement will be made and implemented (e.g., replacement of locks, gates, signs, or fence repairs).

8.3.5 Edge Effects Maintenance

The mitigation site will be inspected for the following edge effects; irrigation runoff, invasive species, and herbicide application, from landscaping activities; water quality and increased ponding relating to water drainage; dust production; dumping, and other issues within the complex or on adjacent properties.

Management of edge effects may include changes in irrigation designs or schedules, modification of landscape species, erosion-control measures, dust-suppression measures, and other adaptive efforts. The City will contact adjacent property owners or managers to address any issues caused by adjacent land uses.

8.3.6 Fire and Fire Suppression Damage Repair

Fire or disturbance from fire suppression may cause the following impacts to the site: loss of native habitat; weed invasion; and erosion. Following a fire, quantitative data should be evaluated to identify short- and long-term impacts. Damage resulting from fire suppression may include fence damage and contamination from fire suppressant chemicals and should be addressed immediately.

8.3.7 Trespass Damage Repair

Monitors will assess the mitigation site for evidence of trespass or illegal off-highway-vehicle activity. Unauthorized trails appearing within the mitigation site will be closed and signage installed. The City will resolve any impacts that alter the site's hydrology.

8.3.8 Topographic Disturbance Repair

The vernal pools within the mitigation site will be monitored for topographic disturbance or altered hydrology from vehicle damage, and trespass. Monitors will evaluate pool integrity and hydrologic function, shape and size of any disturbances relative to the overall pool, depth and duration of ponding, and whether there is any need for repairs and/or further watershed analysis. Repairs may be conducted by hand or using mechanical equipment depending on the scale of the disturbance. Major repairs should be reserved for the dry season to minimize disturbance to on-site resources. Minor topographic damage such as footprints and small tire ruts will be repaired with hand tools.

8.3.9 Weed Control

Monitors will look for the presence of non-native plants and wildlife and note their presence during qualitative monitoring visits. Weed control visits will be conducted twice per spring to maintain acceptable non-native cover levels within vernal pools occupied by covered species, and to prevent the spread of additional invasive non-native species into covered species pools.

9.0 Notification of Completion

If the final success criteria have been met at the end of the five-year maintenance and monitoring program, notification of these events will be provided with the Year 5 report. If the final success criteria have not been met by the end of the five-year maintenance and monitoring program, the Year 5 report will discuss the possible reasons and recommendations for remedial measures to cause the site to meet the criteria. If any of the established/re-established/enhanced vernal pools or upland watershed habitats have not met the performance standards, the project proponent's maintenance and monitoring obligations will continue, until the resource agencies and City deem the mitigation program as successful or contingency measures must be implemented (see Section 8, Adaptive Management Plan).

Following receipt of the final annual report, the resource agencies and the City will be invited to visit the restoration site to confirm completion of the mitigation effort. The mitigation requirements will be deemed complete once the final success criteria are met and after written approval by the resource agencies and the City has been received.

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ATTACHMENT 1

Hydrology Study for Vernal Pools at La Media Road Widening & Fire Rescue Air Operation Phase II Project

November 6, 2019
Revised: November 15, 2019

Ms. Meagan Olson
Project Manager
Recon Environmental
1927 Fifth Avenue
San Diego, California 92101

SUBJECT: HYDROLOGY STUDY FOR VERNAL POOLS AT LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATION PHASE II PROJECT (RICK ENGINEERING COMPANY JOB NUMBER 18509-A)

November 15, 2019 Revisions:

The revisions in this letter have been made in response to comments from the City of San Diego received on November 8, 2019. The pan evaporation rates have been revised to reflect wet season conditions (October through March). A discussion of the design criteria, soil type, and runoff factor has been included for clarification. This letter has also been updated to discuss the level of ponding after 21-days and Attachment 1 now includes an analysis of the 21-day evaporation rate as well as an evaluation of the ponding remaining in the proposed vernal pools after 21-days.

Dear Ms. Olson:

This letter has been prepared in support of the proposed vernal pools for the La Media Road Widening & Fire Rescue Air Operation Phase II projects (herein referred to as the "project"). The vernal pool plan mitigates for the impacts to the vernal pool habitat from the two projects. The Vernal Pools are located directly south of Dillon Canyon and bound on the east by Dillon's trail. The specific focus of this letter report is on the hydrologic analyses performed in support of the proposed vernal pools.

Basis of Design

Based on input received from the habitat restoration specialist from RECON Environmental, the basis of design pertaining to hydrologic characteristics is listed below:

- Approximately one (1) mima mound per vernal pool.
- The ratio of the drainage area to vernal pool area should be approximately 8:1.
- Based on a typical storm event (i.e. – 1-year, 24-hour storm event), two (2) to three (3) inches of ponding is to remain for approximately fourteen (14) days.

- Based on a typical storm event (i.e. – 1-year, 24-hour storm event), twenty-four (24) vernal pools will have two (2) to three (3) inches of ponding remaining for approximately twenty-one (21) days. Please see Attachment 1 for ponding depths.

The design criteria, including the design storm event as well as the depth and duration requirements, were recommended based on frequency and on the needs of both the San Diego and the Riverside fairy shrimp.

Hydrology

Pursuant to the basis of design, the primary goal of the hydrologic analysis is to confirm each vernal pool is designed to receive enough runoff from its micro-drainage area to collect and store approximately two (2) to three (3) inches of runoff for fourteen (14) days during a typical storm event (1-year, 24-hour storm event). Additionally, to satisfy the depth and duration requirements for the Riverside fairy shrimp, two (2) to three (3) inches of ponding shall remain for twenty-one (21) days in a majority of the proposed vernal pools. Please see Attachment 1 for results. In order to reach the primary goal, several steps took place. An initial delineation of vernal pool locations and sub-basin drainage areas was developed. A target size of 1/8 of the drainage area was used as the basis of design for the vernal pools, however, in locations where site constraints limited the area tributary to the vernal pool it was verified that there would be two (2) to three (3) inches of ponding remaining after 14-days following a typical storm event (1-year, 24-hour). The total surface area of the vernal pools was determined and further adjustments to the size of each pool complex was made to ensure the required surface area for the overall project requirements was provided.

With the location, size, and drainage area of each vernal pool identified, the rainfall volume was determined by multiplying the sub-basin area by the rainfall depth. The 24-hour rainfall depth for the 1-year storm event was obtained from the NOAA Atlas 14 Precipitation Frequency Data Server. Refer to Attachment 2 for the precipitation data. The rainfall volume was then multiplied by the runoff factor to determine the runoff volume. A runoff factor of 0.30 (City of San Diego Storm Water Standards Manual; Table B.1-1) was used for natural Type-D soils that are found at the project site. See Attachment 2 for Table B.1-1. This is consistent with both the County of San Diego Hydrology manual, June 2003, which recommends 0.35 for Type-D soils in undisturbed natural terrain, and the Caltrans Highway Design Manual, December 2015, which uses a range 0.30 - 0.40 for undisturbed natural desert or desert landscaping. The runoff factor considers antecedent soil moisture content and is on the low end of recommended runoff factor/coefficient values and is therefore a conservative approach to calculating total runoff. Type D soils typically have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water. Type D soils are clay loam, silty clay loam, sandy clay, silty clay, or clay.

The next step was determining the capacity of the vernal pools. The vernal pool storage volumes were calculated using volumetric measuring tools in CAD. A stage storage curve was developed by dividing the pool stage into quarters (i.e. – storage at ¼ the vernal pool depth, ½, ¾, and full depth). Based on a 1-year, 24-hour storm event, the final step was to check the depth of ponding, pan evaporation levels, and ponding depth remaining after fourteen (14) and twenty-one (21) days. The 1-year ponding depth was identified by comparing the runoff volume to the available storage capacity, and interpolating the depth based on the vernal pool stage-storage rating curve described above. The pan evaporation uses the monthly average data from the Chula Vista station. The typical monthly average pan evaporation during the wet season (October through March) is approximately 3.8-inches. Therefore, the 14-day average pan evaporation is 1.9-inches; however, a correction factor of 0.75 is used to account for radiation on the side walls and heat exchanges with the pan material. The final corrected total of the 14-day average pan evaporation is 1.4 inches. Using the same approach, the average 21-day pan evaporation is 2.1 inches. Refer to Attachment 2 for back-up regarding pan evaporation data. The evaporation rates are subtracted from the total ponding depth in the vernal pool after a 1-year, 24-hour storm event. The result provides the ponding depth that remains after fourteen (14) and twenty-one (21) days of evaporation for a 1-year, 24-hour storm event.

Refer to Attachment 1 for a table that includes the detailed hydrologic analyses for each vernal pool and refer to Map Pocket 1 for a drainage map of the overall vernal pool area, including identification of each pool, mima mound, and drainage area. As indicated above, additional backup for the Hydrologic Analyses has been included as Attachment 2, including reference material from the NOAA Atlas 14 precipitation data and Monthly Average Pan Evaporation Data for the Chula Vista Evaporation Station.

Conclusion

This letter has been prepared in support of the Vernal Pool portion of the La Media Road Widening & Fire Rescue Air Operation Phase II and has been provided to show that the hydrologic characteristics of the vernal pool complexes have been designed consistent with the basis of design. The initial depth of ponding in each vernal pool for a typical 1-year, 24-hour storm event corresponds to approximately four (4) inches. Based on typical evaporation over fourteen (14) days, the ponding depth remaining in all vernal pools is two (2) to three (3) inches or greater, and after twenty-one (21) days of typical evaporation, a majority of the vernal pools have a ponding depth of two (2) to three (3) inches, which reflects the design intent and the primary goal of the hydrologic analyses.

Please feel free to contact me if you have any questions and/or concerns at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

Brendan Hastie
RCE #65809, Exp. 09/21
Associate Principal

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ATTACHMENT 1

Vernal Pools - Hydrologic Analyses

18509A LA MEDIA ROAD MITIGATION: VERNAL POOLS - HYDROLOGIC ANALYSES

Storm Event:	1-yr
P 24-hr Rainfall Depth [1] (in):	1.25
Runoff Coefficient [2]:	0.30
14-Day Average Pan Evaporation with adjustment factor (0.75) [3.1] (in):	1.4
21-Day Average Pan Evaporation with adjustment factor (0.75)[3.2] (in):	2.1

Proposed VP #	Area of Sub-Basin (sf)	Area of Sub-Basin (ac)	Area of Vernal Pool [4] (sf)	Runoff Volume (Runoff C x Area of Subbasin x rainfall depth) (cf)	Available Storage Volume in Vernal Pool (cf)	Check Depth, Evaporation, and Ponding for 1-Year Storm Event				
				1-yr	VP Full Depth[5]	Depth of Ponding from 1-Year Storm Event [6] (in)	14 Day Average Pan Evaporation [7] (cf)	21 Day Average Pan Evaporation[8] (cf)	Ponding Depth Remaining After 14 Days for 1-Year Storm [9] (in)	Ponding Depth Remaining After 21 Days for 1-year Storm[10] (in)
VP1	6,315	0.14	971	197	601	4.8	1.4	2.1	3.4	2.7
VP2	5,187	0.12	626	162	263	8.1	1.4	2.1	6.7	6.0
VP3	10,252	0.24	1,560	320	1261	4.3	1.4	2.1	2.9	2.2
VP4	7,060	0.16	853	221	515	4.3	1.4	2.1	2.9	2.2
VP5	9,820	0.23	980	307	426	9.4	1.4	2.1	8.0	7.3
VP6	5,841	0.13	1,009	183	696	4.0	1.4	2.1	2.6	1.9
VP7	3,902	0.09	874	122	505	4.0	1.4	2.1	2.6	1.9
VP8	5,310	0.12	1,135	166	724	4.0	1.4	2.1	2.6	1.9
VP9	6,057	0.14	699	189	394	4.4	1.4	2.1	3.0	2.3
VP10	8,761	0.20	1,047	274	458	4.1	1.4	2.1	2.7	2.0
VP11	4,552	0.10	1,177	142	604	4.0	1.4	2.1	2.6	1.9
VP12	6,127	0.14	1,262	191	789	4.1	1.4	2.1	2.7	2.0
VP13	10,661	0.24	1,606	333	1214	4.5	1.4	2.1	3.1	2.4
VP14	7,663	0.18	1,505	239	1021	4.0	1.4	2.1	2.6	1.9
VP15	4,461	0.10	689	139	364	4.2	1.4	2.1	2.8	2.1
VP16	13,171	0.30	1,470	412	983	5.8	1.4	2.1	4.4	3.7
VP17	6,324	0.15	1,091	198	662	4.4	1.4	2.1	3.0	2.3
VP18	13,881	0.32	2,797	434	1849	4.0	1.4	2.1	2.6	1.9
VP19	6,307	0.14	1,235	197	734	4.1	1.4	2.1	2.7	2.0
VP20	10,884	0.25	1,346	340	958	5.1	1.4	2.1	3.7	3.0
VP21	8,001	0.18	1,691	250	1075	4.0	1.4	2.1	2.6	1.9
VP22	5,331	0.12	1,059	167	719	4.0	1.4	2.1	2.6	1.9
VP23	7,497	0.17	1,249	234	974	4.1	1.4	2.1	2.7	2.0
VP24	5,779	0.13	1,052	181	662	4.1	1.4	2.1	2.7	2.0
VP25	4,224	0.10	947	132	515	4.2	1.4	2.1	2.8	2.1
VP26	8,801	0.20	2,128	275	1135	4.1	1.4	2.1	2.7	2.0
VP27	7,247	0.17	713	226	384	7.8	1.4	2.1	6.4	5.7
VP28	7,865	0.18	1,203	246	601	5.7	1.4	2.1	4.3	3.6
VP29	4,621	0.11	695	144	269	7.2	1.4	2.1	5.8	5.1
VP30	6,848	0.16	1,215	214	841	4.3	1.4	2.1	2.9	2.2
VP31	4,114	0.09	1,020	129	462	4.2	1.4	2.1	2.8	2.1
VP32	9,497	0.22	655	99	393	4.3	1.4	2.1	2.9	2.2
TOTAL	232,361	5.33	37,559							

Notes:

1. 24-hr rainfall depth determined from NOAA Atlas 14 Precipitation Frequency Data Server. Refer to Attachment 2 for back up precipitation data.
2. Runoff factor determined by City of San Diego Storm Water Standards Manual for Type D Soils = 0.30

3.1 The monthly average pan evaporation during the wet season (October-March) is 3.8-inches. Based on 14 days (half a month), then 3.8 inches/2 = 1.9 inches. Including a correction factor of 0.75 to account for radiation on the side walls and heat exchanges with the pan material. Therefore, the 14-day average pan evaporation is 1.9*0.75 = 1.4-inches. See Attachment 2 for back up pan evaporation rates.

3.2 The monthly average pan evaporation during the wet season (October-March) is 3.8-inches. Based on 21 days (3/4 of a month), then 3.8 inches*0.75 = 2.9 inches. Including a correction factor of 0.75 to account for radiation on the side walls and heat exchanges with the pan material. Therefore, the 21-day average pan evaporation is 2.9*0.75 = 2.1-inches. See Attachment 2 for back up pan evaporation rates.

4. Area of Vernal Pool is based on shapes provided by RECON consulting with the target ratio of 8:1 drainage area to vernal pool area
5. Vernal pool storage determined by volume calculations in CAD
6. 1-year ponding depth interpolated from vernal pool storage volume
7. 14-day evaporation volume determined by pan evaporation rates with an adjustment factor of 0.75 applied. See Attachment 2 for back up pan evaporation rates.
8. 21-day evaporation volume determined by pan evaporation rates with an adjustment factor of 0.75 applied. See Attachment 2 for back up pan evaporation rates.
9. Ponding depth after evaporation determined by subtracting 14-day evaporation from 1-yr ponding
10. Ponding depth after evaporation determined by subtracting 21-day evaporation from 1-yr ponding
11. This analysis includes proposed vernal pools and does not include existing vernal pool analysis.

ATTACHMENT 2

Back-up Material for Hydrologic Analyses

- **24-Hour Rainfall Depth from NOAA Atlas 14 Precipitation Frequency Data Server**
- **Runoff Factor Table B.1-1**
- **Monthly Average Pan Evaporation Data**

NOAA Atlas 14, Volume 6, Version 2
Location name: San Diego, California, USA*
Latitude: 32.5578°, Longitude: -117.016°
Elevation: 484.74 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.103** (0.086-0.125)	**0.129** (0.108-0.157)	**0.165** (0.137-0.200)	**0.195** (0.161-0.239)	**0.238** (0.190-0.302)	**0.273** (0.213-0.353)	**0.309** (0.235-0.410)	**0.347** (0.257-0.475)	**0.402** (0.285-0.573)	**0.446** (0.305-0.659)
10-min	**0.148** (0.124-0.179)	**0.186** (0.155-0.225)	**0.237** (0.197-0.287)	**0.280** (0.231-0.343)	**0.341** (0.272-0.433)	**0.391** (0.305-0.506)	**0.443** (0.337-0.587)	**0.498** (0.368-0.680)	**0.576** (0.408-0.821)	**0.639** (0.437-0.944)
15-min	**0.179** (0.150-0.217)	**0.224** (0.187-0.272)	**0.286** (0.238-0.347)	**0.339** (0.280-0.414)	**0.413** (0.329-0.523)	**0.473** (0.369-0.612)	**0.535** (0.407-0.710)	**0.602** (0.445-0.823)	**0.696** (0.493-0.993)	**0.773** (0.528-1.14)
30-min	**0.251** (0.210-0.303)	**0.315** (0.262-0.381)	**0.401** (0.334-0.487)	**0.475** (0.392-0.581)	**0.579** (0.461-0.733)	**0.662** (0.517-0.857)	**0.750** (0.571-0.996)	**0.844** (0.624-1.15)	**0.976** (0.691-1.39)	**1.08** (0.740-1.60)
60-min	**0.349** (0.291-0.421)	**0.437** (0.364-0.528)	**0.557** (0.464-0.676)	**0.659** (0.544-0.806)	**0.803** (0.640-1.02)	**0.919** (0.717-1.19)	**1.04** (0.792-1.38)	**1.17** (0.866-1.60)	**1.36** (0.960-1.93)	**1.50** (1.03-2.22)
2-hr	**0.484** (0.404-0.585)	**0.607** (0.507-0.734)	**0.772** (0.643-0.937)	**0.909** (0.750-1.11)	**1.10** (0.877-1.39)	**1.25** (0.975-1.62)	**1.41** (1.07-1.87)	**1.57** (1.16-2.14)	**1.79** (1.27-2.56)	**1.97** (1.35-2.91)
3-hr	**0.590** (0.493-0.713)	**0.741** (0.619-0.897)	**0.942** (0.784-1.14)	**1.11** (0.915-1.36)	**1.34** (1.07-1.69)	**1.52** (1.18-1.96)	**1.70** (1.29-2.26)	**1.89** (1.40-2.59)	**2.16** (1.53-3.07)	**2.36** (1.62-3.49)
6-hr	**0.772** (0.645-0.933)	**0.972** (0.811-1.18)	**1.24** (1.03-1.50)	**1.45** (1.20-1.78)	**1.75** (1.40-2.22)	**1.98** (1.55-2.57)	**2.22** (1.69-2.95)	**2.47** (1.82-3.37)	**2.80** (1.99-4.00)	**3.07** (2.10-4.53)
12-hr	**0.993** (0.830-1.20)	**1.25** (1.05-1.52)	**1.60** (1.33-1.94)	**1.88** (1.55-2.30)	**2.27** (1.81-2.88)	**2.58** (2.01-3.33)	**2.89** (2.20-3.83)	**3.22** (2.38-4.39)	**3.66** (2.60-5.22)	**4.02** (2.75-5.94)
24-hr	**1.25** (1.10-1.46)	**1.59** (1.39-1.85)	**2.03** (1.77-2.38)	**2.40** (2.08-2.83)	**2.91** (2.44-3.54)	**3.31** (2.73-4.10)	**3.72** (3.00-4.71)	**4.15** (3.27-5.39)	**4.75** (3.60-6.40)	**5.22** (3.84-7.25)
2-day	**1.54** (1.35-1.80)	**1.98** (1.73-2.31)	**2.56** (2.23-3.00)	**3.04** (2.63-3.59)	**3.70** (3.10-4.49)	**4.20** (3.47-5.20)	**4.72** (3.81-5.98)	**5.27** (4.14-6.83)	**6.00** (4.55-8.09)	**6.58** (4.84-9.14)
3-day	**1.72** (1.50-2.01)	**2.23** (1.95-2.61)	**2.91** (2.54-3.41)	**3.46** (3.00-4.09)	**4.22** (3.54-5.12)	**4.80** (3.95-5.94)	**5.39** (4.35-6.82)	**6.00** (4.72-7.78)	**6.83** (5.17-9.19)	**7.47** (5.49-10.4)
4-day	**1.86** (1.63-2.17)	**2.43** (2.13-2.84)	**3.18** (2.77-3.73)	**3.79** (3.28-4.47)	**4.62** (3.88-5.62)	**5.26** (4.34-6.51)	**5.91** (4.76-7.47)	**6.58** (5.17-8.53)	**7.48** (5.67-10.1)	**8.18** (6.01-11.4)
7-day	**2.16** (1.89-2.52)	**2.82** (2.47-3.30)	**3.70** (3.22-4.33)	**4.42** (3.82-5.21)	**5.39** (4.53-6.55)	**6.14** (5.06-7.60)	**6.90** (5.57-8.73)	**7.69** (6.05-9.97)	**8.75** (6.63-11.8)	**9.58** (7.04-13.3)
10-day	**2.37** (2.07-2.76)	**3.10** (2.71-3.62)	**4.06** (3.54-4.75)	**4.85** (4.19-5.72)	**5.92** (4.97-7.19)	**6.74** (5.56-8.34)	**7.57** (6.11-9.58)	**8.44** (6.64-10.9)	**9.60** (7.28-12.9)	**10.5** (7.72-14.6)
20-day	**2.85** (2.49-3.33)	**3.76** (3.29-4.39)	**4.94** (4.31-5.79)	**5.90** (5.11-6.96)	**7.19** (6.04-8.73)	**8.17** (6.74-10.1)	**9.16** (7.39-11.6)	**10.2** (7.99-13.2)	**11.5** (8.72-15.5)	**12.5** (9.21-17.4)
30-day	**3.44** (3.01-4.01)	**4.55** (3.97-5.31)	**5.97** (5.21-7.00)	**7.12** (6.16-8.40)	**8.64** (7.26-10.5)	**9.79** (8.07-12.1)	**10.9** (8.82-13.8)	**12.1** (9.51-15.7)	**13.6** (10.3-18.3)	**14.8** (10.9-20.5)
45-day	**4.03** (3.53-4.70)	**5.34** (4.66-6.23)	**6.99** (6.09-8.19)	**8.30** (7.18-9.79)	**10.0** (8.42-12.2)	**11.3** (9.32-14.0)	**12.6** (10.1-15.9)	**13.8** (10.9-17.9)	**15.5** (11.7-20.8)	**16.7** (12.3-23.2)
60-day	**4.68** (4.10-5.47)	**6.19** (5.41-7.23)	**8.07** (7.04-9.45)	**9.55** (8.26-11.3)	**11.5** (9.64-13.9)	**12.9** (10.6-15.9)	**14.3** (11.5-18.0)	**15.6** (12.3-20.3)	**17.4** (13.2-23.4)	**18.7** (13.7-25.9)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

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B.1.1 Runoff Factor

Estimate the area weighted runoff factor for the tributary area to the BMP using runoff factor (from Table B.1-1) and area of each surface type in the tributary area and Equation B.1-2.

Equation B.1-2: Estimating Runoff Factor for Area

$$C = \frac{\sum C_x A_x}{\sum A_x}$$

where:

C_x = Runoff factor for area X

A_x = Tributary area X (acres)

These runoff factors apply to areas receiving direct rainfall only. For conditions in which runoff is routed onto a surface from an adjacent surface, see Section B.2 for determining composite runoff factors for these areas.

Table B.1-1: Runoff factors for surfaces draining to BMPs – Pollutant Control BMPs

Surface	Runoff Factor
Roofs[1]	0.90
Concrete or Asphalt[1]	0.90
Unit Pavers (grouted)[1]	0.90
Decomposed Granite	0.30
Cobbles or Crushed Aggregate	0.30
Amended, Mulched Soils or Landscape[2]	0.10
Compacted Soil (e.g., unpaved parking)	0.30
Natural (A Soil)	0.10
Natural (B Soil)	0.14
Natural (C Soil)	0.23
Natural (D Soil)	0.30

[1]Surface is considered impervious and could benefit from use of Site Design BMPs and adjustment of the runoff factor per Section B.2.1.

[2]Surface shall be designed in accordance with SD-F (Amended soils) fact sheet in Appendix E

Evaporation Stations

Standard daily pan evaporation is measured using the four-foot diameter Class A evaporation pan. The pan water level reading is adjusted when precipitation is measure to obtain the actual evaporation. Most Class A pans are installed above ground, allowing effects such as radiation on the side walls and heat exchnges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals b 0.70 or 0.80 to more closely estimate the evaporation from naturally existing urfaces such as a shallow lake, wet soil or other moist natural surfaces.

Many stations do not measure pan evaportation during winter months. A "0.00" total indicates no measuement is taken.

Stations marked with an asterisk (*) have estimated totals computed from meteorological measurements using a form of the Penman equation.

Click on a State: Arizona, California, Colorado, Hawaii & Pacific Islands, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming

ALASKA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BROOKS RIVER	1967-1990	0.00	0.00	0.00	0.00	0.00	2.48	2.88	1.63	0.73	0.00	0.00	0.00	7.72
CENTRAL 2	1962-2005	0.00	0.00	0.00	0.00	0.00	3.97	4.00	2.43	2.19	0.00	0.00	0.00	12.59
COPPER CENTER	1961-1982	0.00	0.00	0.00	0.00	0.00	6.03	4.06	3.14	1.71	0.00	0.00	0.00	14.94
JUNEAU AP	1949-2005	0.00	0.00	0.00	0.00	3.33	3.29	3.82	3.14	1.02	0.00	0.00	0.00	14.60
MATANUSKA AES	1917-2005	0.00	0.00	0.00	0.00	4.22	4.44	3.92	3.05	1.83	0.00	0.00	0.00	17.46
MC GRATH WB AIRPORT	1939-2005	0.00	0.00	0.00	0.00	4.20	4.42	3.65	2.29	1.40	0.00	0.00	0.00	15.96
MCKINLEY PARK	1949-2005	0.00	0.00	0.00	0.00	0.00	2.96	2.55	1.75	0.53	0.00	0.00	0.00	7.79
OIL WELL ROAD E P	1967-1974	0.00	0.00	0.00	0.00	0.00	5.17	3.83	2.81	1.40	0.00	0.00	0.00	13.21
OLD EDGERTON	1970-1996	0.00	0.00	0.00	0.00	3.31	4.56	4.16	3.04	1.65	0.00	0.00	0.00	16.72
PALMER AAES	1949-2005	0.00	0.00	0.00	0.00	4.44	4.71	4.12	2.96	1.75	0.00	0.00	0.00	17.98
RAMPART 2	1963-1978	0.00	0.00	0.00	0.00	4.23	4.56	3.79	2.56	1.54	0.00	0.00	0.00	16.68
COLLEGE UNIV EXP STN	1931-2005	0.00	0.00	0.00	0.00	4.25	5.04	4.56	2.82	1.38	0.00	0.00	0.00	18.05

ARIZONA

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
BARTLETT DAM	1939-2005	3.92	4.92	7.10	10.02	13.77	16.21	15.56	13.95	12.10	9.66	5.86	4.47	117.54
BLACK RIVER PUMPS	1948-2005	0.00	0.00	0.00	6.93	8.83	10.12	7.99	7.02	5.70	3.94	0.00	0.00	50.53
DAVIS DAM # 2	1958-1977	7.49	7.46	9.75	12.78	16.71	19.48	19.87	17.91	14.64	12.03	8.40	7.80	154.32
DAVIS DAM	1948-1961	3.54	5.13	7.60	9.30	11.33	13.33	13.14	12.15	9.51	7.24	5.38	3.88	101.53
DOUGLAS	1948-2005	0.00	0.00	0.00	11.34	13.19	13.55	10.66	10.27	8.18	6.44	0.00	0.00	73.63
FORT VALLEY	1909-2005	0.00	0.00	0.00	0.00	5.86	7.37	6.03	4.91	3.35	0.00	0.00	0.00	27.52
GRAND CANYON NATL PARK	1957-1977	0.00	0.00	0.00	0.00	6.94	10.45	8.79	8.12	6.83	4.91	0.00	0.00	46.04
GRAND CANYON N P 2	1976-2005	0.00	0.00	0.00	0.00	7.46	9.80	8.94	7.29	6.10	4.45	0.00	0.00	44.04
HAWLEY LAKE	1967-1988	0.00	0.00	0.00	0.00	7.57	8.55	6.89	5.48	4.68	0.00	0.00	0.00	33.17
MANY FARMS SCHOOL	1951-1975	0.00	3.66	5.45	9.18	12.23	15.14	12.87	10.88	9.40	6.54	3.26	2.16	90.77
MC NARY 2 N	1933-2005	0.00	0.00	0.00	0.00	7.86	8.25	6.60	5.98	4.90	3.97	0.00	0.00	37.56
MESA	1896-2005	3.03	4.02	6.11	8.64	11.33	12.67	13.10	11.87	9.69	6.81	4.15	2.96	94.38
NOGALES 6 N	1952-2005	3.59	4.46	7.01	9.35	11.91	13.31	10.00	8.28	8.06	7.17	4.49	3.57	91.20
PAGE	1957-2005	0.00	2.60	5.84	8.27	10.72	12.86	13.06	11.38	8.42	5.13	2.29	0.00	80.57
ROOSEVELT 1 WNW	1905-2005	2.44	3.54	5.90	8.64	11.96	14.50	14.36	12.27	10.10	6.78	3.68	2.32	96.49
SACATON	1908-2005	3.83	5.15	7.51	10.06	13.56	14.89	13.69	12.05	10.20	7.91	4.94	3.63	107.42
SAFFORD AGRICULTRL CTR	1948-2005	2.63	3.83	7.14	10.54	13.81	15.38	13.13	10.68	8.73	5.90	3.28	2.52	97.57
SAN CARLOS RESERVOIR	1948-2005	2.25	3.27	5.66	8.40	11.70	13.94	13.43	11.40	9.23	6.31	3.53	2.18	91.30
SIERRA ANCHA	1913-1979	2.19	2.93	4.58	6.42	8.97	10.94	10.39	8.88	8.00	6.22	3.50	2.37	75.39
SNOWFLAKE 15 W	1965-1998	0.00	0.00	0.00	0.00	11.03	14.38	11.29	9.12	7.96	6.45	3.40	0.00	63.63
STEWART MOUNTAIN	1948-2005	3.52	4.56	6.94	10.04	13.11	14.27	14.44	13.10	10.69	7.95	4.53	3.08	106.23
TEMPE A S U	1953-2005	1.56	2.93	4.79	7.04	9.44	10.85	10.99	9.92	7.63	5.14	2.56	1.44	74.29
TUCSON UNIV OF ARIZONA	1894-2005	3.25	4.57	6.95	9.88	12.87	14.91	13.17	11.65	10.35	7.81	4.73	3.37	103.51
TUCSON U OF ARIZ # 1	1982-2005	3.94	4.68	7.53	10.57	14.14	16.51	14.61	12.17	10.71	8.05	4.93	3.23	111.07
WAHWEAP	1961-2005	1.95	2.77	6.30	9.42	12.82	14.94	15.26	13.31	10.06	7.06	3.69	2.60	100.18
WHITERIVER 1 SW	1900-2005	1.69	2.94	5.84	8.01	9.92	11.70	9.48	8.47	7.68	5.87	3.51	2.54	77.65
WINKELMAN 6 S	1942-1980	3.12	4.03	7.00	9.98	12.40	13.90	11.19	9.84	9.56	7.51	4.31	2.94	95.78
YUMA CITRUS STATION	1920-2005	3.58	4.36	6.81	9.17	11.75	13.19	13.85	12.28	9.51	6.91	4.43	3.37	99.21

MONTHLY AVERAGE PAN EVAPORATION (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
ANTIOCH PUMP PLANT 3	1955-2005	1.17	1.99	4.25	6.27	8.96	10.84	11.60	10.06	7.77	4.91	2.07	1.22	71.11
AUBURN DAM PROJECT	1972-1984	1.42	1.89	3.13	4.89	7.73	10.08	11.66	10.70	8.08	5.00	1.97	1.36	67.91
AVENAL 9 SSE	1955-1961	1.80	2.90	6.20	9.39	12.96	16.73	18.67	16.37	12.61	8.05	3.89	2.44	112.01
BACKUS RANCH	1948-1963	2.85	3.86	6.77	9.80	12.69	15.93	16.92	15.95	12.19	8.01	4.25	2.98	112.20
BEAUMONT PUMPING PLANT	1948-1975	2.90	3.29	4.08	5.03	6.40	8.15	10.64	9.97	7.90	5.87	3.22	2.90	70.35
BEAUMONT 1 E	1948-2001	3.10	3.73	4.99	5.23	7.60	9.31	10.97	10.66	8.85	6.53	5.16	3.95	80.08
BERRYESSA LAKE	1957-1970	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	5.72	2.48	1.66	77.00
BOCA	1948-2005	0.00	0.00	0.00	0.00	6.83	8.52	10.01	9.09	6.48	4.32	0.00	0.00	45.25
BRANNAN ISLAND	1968-1977	1.15	1.74	4.36	7.03	10.49	12.39	13.51	12.02	9.03	4.80	1.83	1.08	79.43
CACHUMA LAKE	1952-2005	2.44	3.53	4.41	6.01	7.55	8.56	9.50	8.98	7.00	5.42	3.49	2.79	69.68
CAMP PARDEE	1948-2005	0.72	1.12	2.32	4.18	7.04	9.43	11.17	9.50	6.51	3.77	1.40	0.72	57.88
CHICO EXPERIMENT STN	1906-2005	1.26	2.13	3.82	5.63	8.28	10.11	11.48	9.71	7.36	4.46	2.09	1.30	67.63
CHULA VISTA	1948-2005	2.81	3.45	5.03	6.06	6.76	6.96	7.63	7.48	6.21	5.02	3.58	2.78	63.77
COW CREEK	1948-1961	3.21	5.62	9.78	13.98	17.25	21.37	21.89	20.17	15.36	10.71	4.91	3.85	148.10
DAVIS 1 WSW	1917-2005	1.49	2.34	4.54	7.13	10.19	12.17	12.77	11.28	9.08	6.35	2.89	1.45	81.68
DEATH VALLEY	1961-2005	3.93	5.38	9.10	13.00	16.76	19.11	20.98	18.86	13.95	9.78	5.54	3.75	140.14
DUTTONS LANDING	1955-1977	1.42	2.09	3.87	5.70	7.74	9.34	9.34	8.27	6.75	4.65	2.25	1.46	62.88
FALL RIVER MILLS INTAKE	1948-2005	0.00	0.00	2.47	5.80	7.54	9.48	12.14	10.57	7.59	3.78	1.14	0.00	60.51
FERNDALE 2 NW	1963-1973	0.70	1.17	2.26	3.21	3.95	4.38	4.49	4.07	3.59	2.06	1.04	0.72	31.64
FOLSOM DAM	1955-1993	0.92	1.90	3.47	5.21	8.07	9.91	11.12	9.93	7.45	4.89	2.06	1.25	66.18
FRIANT GOVERNMENT CAMP	1948-2005	1.46	2.12	3.82	5.89	9.42	12.07	13.96	12.47	9.00	5.76	2.61	1.37	79.95
GRIZZLY ISLAND REFUGE	1971-1977	1.45	2.25	4.00	5.72	8.07	9.82	10.69	8.93	6.88	4.33	2.10	1.55	65.79
HETCH HETCHY	1931-2005	0.00	0.00	0.00	3.84	5.31	7.34	8.78	7.86	5.85	3.23	1.74	0.00	43.95
INDIO FIRE STATION	1927-2005	2.85	4.38	7.15	9.98	12.73	14.85	14.95	13.59	10.80	7.60	3.98	2.49	105.35
KETTLEMAN CITY 1 SSW	1955-2005	1.73	2.99	5.80	8.32	11.75	14.27	16.11	14.74	10.82	7.30	3.46	1.74	99.03
KNIGHTS FERRY 2 ESE	1959-1977	1.00	1.69	3.14	5.65	8.54	10.14	11.60	10.31	7.74	4.62	2.69	1.00	68.12
LAKE PILLSBURY 2	1964-1970	0.58	1.42	3.01	4.62	7.41	8.38	10.31	9.35	6.93	3.61	1.19	0.87	57.68
LAKESHORE 2	1948-1972	1.09	1.68	2.97	4.78	6.15	7.43	9.71	8.79	6.44	3.40	1.41	0.95	54.80
LAKE SOLANO	1975-2005	1.48	2.37	4.28	6.66	9.24	11.24	11.53	9.86	7.58	5.26	2.59	1.67	73.76
LAKE SPAULDING	1914-2003	0.00	0.00	0.00	0.00	4.57	6.52	8.16	6.78	4.54	1.98	0.00	0.00	32.55
LAKE SPAULDING DAM	1955-1971	0.00	0.00	0.00	0.00	7.20	9.98	12.38	11.85	8.94	6.64	0.00	0.00	56.99
LITTLE PANOCHE DET DAM	1968-1975	1.77	2.89	5.87	9.39	14.56	16.31	18.45	16.63	12.46	7.60	3.04	1.78	110.75
LODI	1948-2005	1.19	1.95	3.82	6.01	8.60	9.92	10.63	9.11	6.68	4.08	1.86	1.07	64.92
LOS BANOS DET RESV	1968-2005	1.57	2.71	5.44	9.34	14.18	16.58	17.85	15.63	11.87	7.49	3.34	1.82	107.82
MANDEVILLE ISLAND	1955-1965	1.10	2.38	4.77	6.95	8.55	10.44	11.22	9.71	7.41	5.12	2.47	1.13	71.25
MANTECA	1965-1977	1.20	1.71	4.04	6.33	9.24	10.53	11.64	10.22	7.19	4.13	1.78	1.16	69.17
MARKLEY COVE	1970-2005	1.03	1.51	3.03	4.80	7.33	9.60	10.82	9.45	6.99	4.35	1.75	1.01	61.67
MOJAVE	1948-2005	0.00	4.65	6.45	9.97	13.59	15.33	17.21	16.00	11.83	8.28	4.76	3.52	111.59
MONTICELLO DAM	1957-1970	1.02	1.83	3.24	4.96	7.35	9.36	11.20	10.07	7.56	4.82	1.98	1.08	64.47
NACIMIENTO DAM	1957-1978	1.58	2.20	3.92	5.53	7.92	9.85	11.28	10.43	7.76	5.16	2.57	1.66	69.86
NEWARK	1948-2005	1.71	2.15	4.16	5.76	7.77	8.64	9.04	8.00	6.64	4.52	2.36	1.55	62.30
NEW MELONES DAM	1979-1992	1.34	2.25	3.56	5.93	9.16	11.85	13.73	12.29	8.86	5.75	2.37	1.28	78.37
NEW MELONES DAM HQ	1992-2005	1.30	1.83	3.46	5.25	7.94	10.23	12.23	11.72	8.71	5.52	2.23	1.19	71.61
OAKDALE WOODWARD DAM	1948-1967	1.03	1.72	3.42	5.47	8.95	11.88	14.23	12.22	8.53	5.52	2.10	1.02	76.09
PLACERVILLE IFG	1955-1991	1.53	1.67	2.72	3.98	5.84	7.79	9.41	8.45	6.62	3.93	1.87	1.51	55.32
RIVERSIDE CITRUS EXP ST	1948-2005	3.32	3.59	4.86	6.28	7.33	8.59	10.88	10.28	7.84	5.85	3.81	3.03	75.66
SALT SPRINGS PWR HOUSE	1948-1998	1.84	2.47	3.27	4.86	6.49	7.92	10.30	9.95	7.89	5.18	2.68	2.26	65.11
SAN LUIS DAM	1963-2005	1.41	2.49	5.31	8.67	13.14	15.75	18.38	16.68	12.01	7.42	3.02	1.56	105.84
SHASTA DAM	1948-2005	1.50	2.08	3.17	5.05	7.28	9.18	11.36	10.36	7.55	4.85	2.29	1.63	66.30
STOCKTON MOWRY BRIDGE	1955-1965	0.72	1.58	3.87	5.97	8.47	10.95	10.82	9.56	6.60	3.93	1.70	0.74	64.91
TAHOE	1914-2005	0.00	0.00	0.00	0.00	4.27	5.23	5.98	5.35	3.16	1.57	0.00	0.00	25.56
TRACY PUMPING PLANT	1955-2005	1.53	2.47	5.30	8.20	12.01	14.88	16.92	14.55	10.64	6.57	2.93	1.48	97.48
TRINITY DAM VISTA POINT	1959-1973	0.00	0.00	2.83	3.98	6.56	8.32	10.67	9.15	5.97	2.74	0.57	0.85	51.64
TRINITY RIVER HATCHERY	1974-2005	0.58	1.00	2.77	4.43	6.78	8.32	9.71	8.91	6.15	3.20	0.99	0.51	53.35
TULELAKE	1932-2005	0.00	0.00	0.00	4.56	7.55	8.39	9.52	8.53	6.80	3.49	0.00	0.00	48.84
TURNTABLE CREEK	1948-1969	1.98	2.60	3.76	5.25	6.32	8.29	10.23	9.90	8.35	5.71	3.08	2.37	67.84
TWITCHELL DAM	1962-2005	3.08	3.33	4.47	5.89	7.36	8.15	9.22	8.69	7.42	5.92	4.07	3.14	70.74
WALNUT GROVE	1953-1961	1.53	2.90	4.74	5.73	7.76	10.04	10.22	8.81	6.40	3.60	2.10	1.32	65.15
WARM SPRINGS DAM	1973-1998	1.17	1.83	3.23	5.37	7.83	9.33	10.04	8.49	6.58	4.59	2.10	1.17	61.73
WHISKEYTOWN RESERVOIR	1960-2005	0.87	1.23	2.51	4.05	6.41	8.05	10.04	8.80	6.25	3.40	1.14	0.78	53.53
WILLOW CREEK 1 NW	1968-2005	0.58	1.35	1.81	2.74	4.73	6.50	7.53	6.05	3.79	1.94	0.75	0.92	38.69

COLORADO

MONTHLY AVERAGE PAN EVAPORATI N (INCHES)

	PERIOD OF RECORD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	N VO		DEC	YEAR
AKRON 4 E	1918-2005	0.00	0.00	0.00	7.30	9.29	11.43	13.26	11.16	9.09	6.16	0.0	0	0.00	67.69
ALAMOSA WSO AP	1948-2005	0.00	0.00	0.00	7.06	9.01	10.08	9.16	7.81	6.40	4.39	0.0	0	0.00	53.91
ARBOLES	1957-1963	0.00	0.00	0.00	5.41	7.95	9.56	9.78	8.61	6.52	0.00	0.0	0	0.00	47.83
BONNY LAKE	1949-2005	0.00	0.00	0.00	7.26	8.69	10.86	11.78	10.61	8.12	6.12	4.57		0.00	68.01

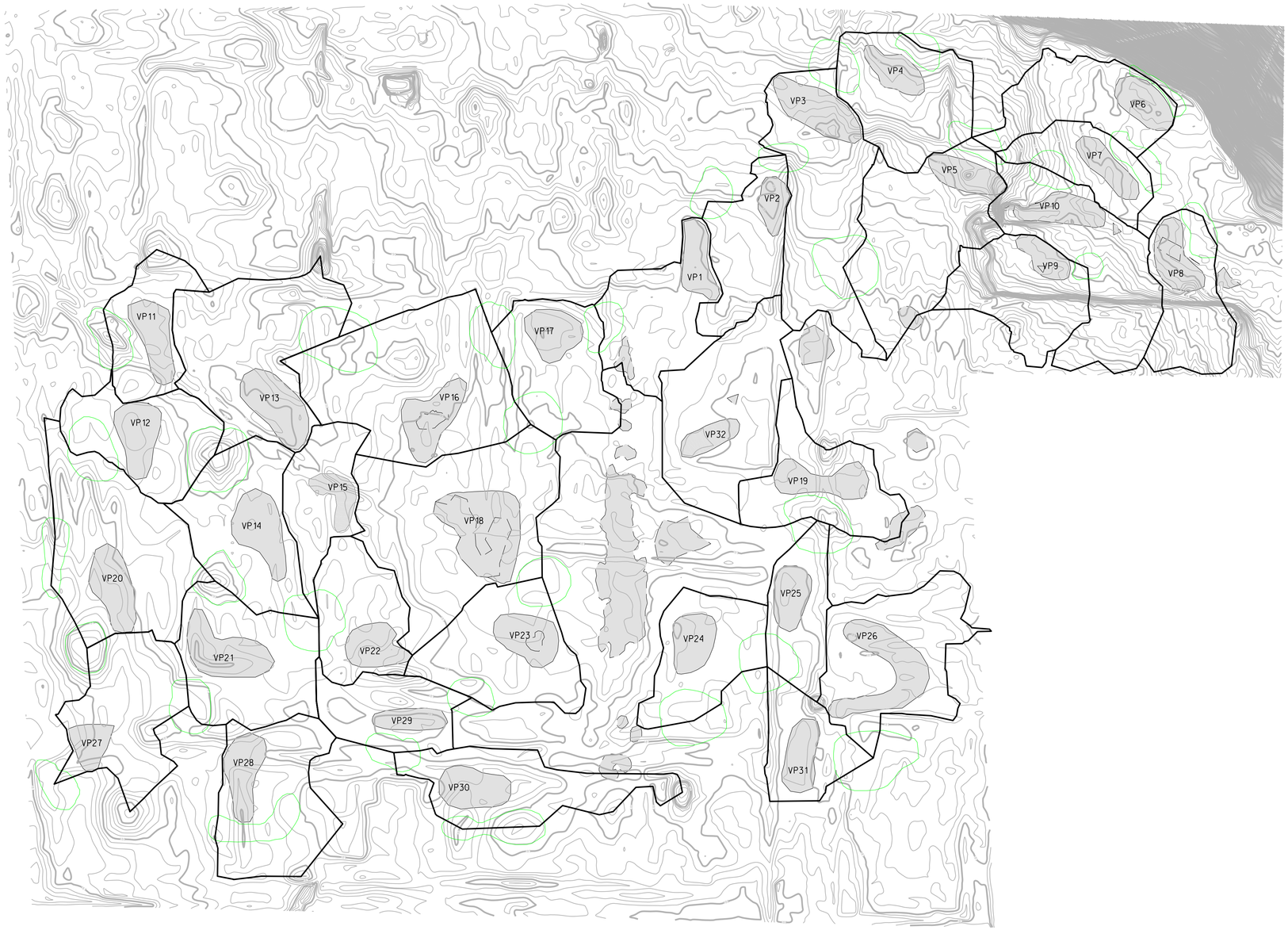
Map Pocket 1

Drainage Exhibit

For

La Media Road Widening

Vernal Pools



LEGEND:

- SUBBASIN BOUNDARY
- MIMA MOUND
- VERNAL POOL
- VP19 VERNAL POOL ID
- EXISTING VERNAL POOL

NOTES:

1. REFER TO THE HYDROLOGIC ANALYSES TABLE IN ATTACHMENT 1 FOR THE VERNAL POOL AREAS.

N

40 20 0 40 80 120

GRAPHIC SCALE 1" = 40'

DRAINAGE EXHIBIT FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATION PHASE II VERNAL POOLS

(POST-PROJECT)

Date: November 6, 2019

J-18509-A Revised: November 15, 2019

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

J-18509-AW

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C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigationWaterResources\SD Corp5tds 2005.descript
15-NOV-2019

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEP5B1L 5004(212)

APPENDIX M

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT-WETLANDS

LONG-TERM MAINTENANCE AND MONITORING AGREEMENT – WETLANDS

This **60-Month Long-Term Maintenance and Monitoring Agreement (LTMMA)** is made and entered into by and between the City of San Diego (City), a municipal corporation, and TC Construction Company, Inc. (Contractor), who may be individually or collectively referred to herein as a "Party" or the "Parties."

RECITALS

A. Concurrent with execution of this LTMMA, the Parties entered into a general contract (Construction Contract) for the construction of **La Media Road Improvements (Project), WBS number S-15018, Bid No. K-23-2060-DBB-3.**

B. In accordance with the Construction Contract, the Contractor shall enter into this LTMMA with the City for the purpose of implementing and fulfilling long-term maintenance requirements in accordance with the City of San Diego Municipal Code and the Contract Documents for the specified elopement(s) of **La Media Road Improvements,** (Maintenance Requirements).

C. The Contractor is ready and willing to fulfill its maintenance requirements in accordance with the terms of this LTMMA.

NOW, THEREFORE, in consideration of the above recitals and the mutual covenants and conditions set forth herein, and for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby set forth their mutual covenants and understandings as follows:

INTRODUCTORY PROVISIONS

A. **Recitals Incorporated.** The above referenced Recitals are true and correct and are incorporated into this LTMMA by this reference.

B. **Exhibits Incorporated.** All Exhibits and Attachments referenced in this LTMMA are incorporated into this LTMMA by this reference.

C. **Contract Term.** This LTMMA shall be effective upon completion of the Plant Establishment Period (PEP) as described in **Section 6-1.1** of **ATTACHMENT E – Supplementary Special Provisions** and **Section 802** of the 2021 GREENBOOK AND WHITEBOOK and it shall be effective until the completion of the Work as described below.

D. **Terms and Conditions.** This LTMMA is subject to the terms and conditions of the Construction Contract included in the 2021 GREENBOOK, WHITEBOOK, Part 1 and Part 8, and Special Provisions (**Contract Document-Attachment C)** except as otherwise stated in this LTMMA.

E. Partial Release of Payment Bond and Performance Bond.

1. Performance of Contract in Two Phases. There are two separate phases of Work to be performed by the Contractor under this Contract. The first phase covers the Work involved in the original agreement as described in this agreement ("Phase 1 Work"). The second phase covers the work involved in the long-term maintenance of the Re-vegetation/Restoration Area after Phase 1 Work has been completed ("Phase 2 Work").

2. Bond Handling for Contract Phases. The Payment Bond and the Performance Bond covering Phase 1 Work on this Contract shall remain in full force and effort until completion of that phase is certified. The original Payment Bond and the original Performance Bond covering Phase 1 Work on this Contract shall continue in full force and effort for Phase 2 Work, however the value of each bond may be reduced as follows:

i. Completion by the Contractor of all Phase 1 Work shall be evidenced solely by the City Engineer affirming in writing that to the best of their knowledge that all Phase 1 Work has been completed by the Contractor in strict conformity with all City-approved plans and revisions, and that the Phase 1 Work completed by the Contractor meets all applicable standards ("Notice of Completion").

ii. Upon issuance by the City Engineer of the Notice of Completion for Phase 1 Work, the Payment Bond for this Project, and the Performance Bond for this Project, may be partially released, and thereby reduced for the Work performed under Phase1. The remaining payment and performance bond will cover the full cost of Phase 2 Work on this Project, which will be the amount specified in "Section 4: COMPENSATION" in Section 4.1 of this LTMMA.

3. No Partial Release Upon Default. No Partial Performance Bond Release and Reduction shall be given to the Contractor if the Performance Bond and/or this Agreement is in default on Phase 1 Work.

SECTION 1 - MAINTENANCE CONTRACT SUMMARY

1.11. General. The Contractor shall fulfill the Project's Maintenance Requirements (Work) as identified in the scope of work attached as **Exhibit A** in a manner satisfactory to the City.

The Contractor shall provide all equipment, labor, and materials necessary to perform the **Work** as described in **Exhibit A**, at the direction of the City.

1.12. Schedule of Work. The Contractor shall follow the Schedule of Work (Schedule) for the maintenance and monitoring period provided in the Plans.

After receiving notification from the City, the Contractor shall create a comprehensive Schedule of Work (Schedule) for performance of this LTMMA for the City's approval. The Schedule shall include routine work, inspection, and infrequent operations such as repairs, fertilization, aerification, watering, and pruning.

The City will approve the Schedule prior to the commencement of the Work. The City may require the Contractor to revise the Schedule. The Contractor shall not revise the Schedule unless the revisions have received the prior written approval of the City.

1.13. Commencement of Work & Maintenance Period. This LTMMA shall commence when the City approves of the Work of the Plant Establishment Period and sends notice of the approval to the Contractor in accordance with **Part 8, Section 802** of the Construction Contract and shall continue for **60** months. A copy of the approval form is attached as **Exhibit B**.

1.14. License. The Contractor shall hold the following licenses in good standing:

1.14.1. **C-27** State Contractor's License.

1.14.1.1. Alternatively, the Contractor shall retain the services of a Subcontractor with a **C-27** State Contractor's License.

1.14.2. Pest Control Advisor's License.

1.14.2.1. Alternatively, the Contractor shall retain the services of a licensed Pest Control Advisor.

1.14.3. Registration with the County Agriculture Commission.

1.14.4. Qualified Applicator's Certificate for Category B. This shall apply to any person supervising the use of pesticides, herbicides, or rodenticides.

1.14.5. City of San Diego Business License.

Prior to performing the Work, the Contractor shall complete and submit to the City the License Data Sheet. **See Exhibit C**.

1.15. Hours of Performance. The Contractor shall perform the Work between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday (Working Hours). The City may, in its sole discretion, grant permission to the Contractor to perform Work during non-Working Hours. Maintenance functions that generate excess noise (operations of power equipment which would cause annoyance to area residents for example) shall not begin before 7:00 a.m.

SECTION 2 - ADMINISTRATION

2.11. Contract Administrator. PURCHASING & CONTRACTING DEPARTMENT, PUBLIC WORKS DIVISION (PWD) is the Contract Administrator for the LTMMA. The Contractor shall perform the Work under the direction of a designated representative of Purchasing & Contracting Department, Public Works Division. The City will communicate with the Contractor on all matters related to the administration of this LTMMA and the Contractor's performance of the Work rendered hereunder. When this LTMMA refers to communications to or with the City, those communications shall be with the City, unless the City or this LTMMA specifies otherwise. Further, when this LTMMA requires an act or approval by City, that act or approval will be performed by the City.

2.12. Local Office. The Contractor shall maintain a local office with a company representative who is authorized to discuss matters pertaining to this LTMMA with the City and shall promptly respond and be available during Normal Working Hours. A local office is one located in San Diego County that can be reached by telephone and facsimile. An answering service in conjunction with a company email address for the designated company representative may fulfill this requirement. A mobile telephone shall not fulfill the requirement for a local office. All calls to the Contractor from the City shall be returned within a 1-hour period.

2.13. Emergency Calls. The Contractor shall have the capability to receive and to respond immediately to calls of an emergency nature. The City shall refer emergency calls to the Contractor for immediate disposition. The Contractor shall provide the City with a 24 hour emergency telephone number for this purpose.

2.14. Staffing. The Contractor shall furnish supervisory and working personnel capable of promptly accomplishing all Work required under this LTMMA on schedule and to the satisfaction of the City.

2.15. Contractor Inspections. The Contractor shall perform inspections of the Work site and shall prepare and submit to the City a Punchlist and dates of correction. The Punchlist shall include a comprehensive report of Work performed at the Work site to ensure 100% cover.

SECTION 3: WORK SITE MAINTENANCE

3.9. Use of Chemicals. The Contractor shall submit to the City for approval sample labels and MSDS for all chemical herbicides, rodenticides, and pesticides proposed for use under this LTRMC. Materials included shall be limited to chemicals approved by the State of California Department of Agriculture.

The use of any chemical shall be based on the recommendations of a licensed pest control advisor. Annual PCA Pesticide Recommendations are required for each pesticide proposed to be used for the Work site covered by this LTRMC. The use of chemicals shall conform to the current San Diego County Department of Agriculture regulations.

No chemical herbicide, rodenticide, or pesticide shall be applied until its use is approved, in writing, by City as appropriate for the purpose and area proposed.

The Contractor shall submit a monthly pesticide use report to the City along with the Contractor's invoices for payment. This report shall include a statement of all applications of herbicides, rodenticides, and pesticides, detailing the chemical used, undiluted quantity, rate of application, applicator's name, and the date and purpose of the application. For months in which no pesticides are applied, state "No Pesticide Used" on the report.

3.10. Irrigation Water. The Contractor shall diligently practice water conservation, including minimizing run-off or other waste. The Contractor shall turn off irrigation systems, if any, during periods of rainfall and at such other times when suspension of irrigation is desirable to conserve water and to remain within the guidelines of good horticultural landscape maintenance practices in accordance with the instructions from the Project Biologist. The Contractor's failure to properly manage and conserve water may result in deductions from the monthly payment to be made to the Contractor or other penalties under this LTMMA.

If the Contractor causes excessive use or waste of irrigation water, the estimated cost of that water shall be deducted from the monthly payment. Further, any monetary fines or other damages assessed to City for the Contractor's failure to follow water conservation regulations imposed by the City, the Public Utilities Department of the City of San Diego, and, where appropriate, the State of California, the County Water Authority, or other legal entities shall be solely the responsibility of the Contractor and may be deducted from the monthly payment to be made to the Contractor under this LTMMA.

3.11. Payment for Water. The Contractor shall pay for the water used in the maintenance of the Work site and this cost is included in the price of this LTMMA.

3.12. Satisfactory Progression. If the Revegetation/Restoration Area is not progressing towards the required performance criteria, as defined in the Scope of Work, in accordance with the Work Schedule, and as determined by City, the City may accordingly adjust monthly payments to the Contractor.

SECTION 4: COMPENSATION

4.7. Maximum Compensation. The compensation for this LTMMA shall not exceed $**315,000.00** (Contract Price).

4.8. Method of Payment and Reports. The payments will be made monthly in direct proportion that each month bears to the total value of the Contract Price. As conditions precedent to payment, the Contractor shall submit a detailed invoice and report of maintenance Work performed every month. The Contractor's failure to submit the required reports or certified payrolls as described in the Construction Contract shall constitute a basis for withholding payment by the City.

4.9. **Final Payment.** The Contractor shall not receive final payment until the following conditions have been completed to the City's satisfaction:

1.9.1. The item(s) of the Work subject to this maintenance coverage as specified in **Exhibit A** (Maintenance Items) have been determined to be in compliance with the Construction Contract and this LTMMA.

1.9.2. The Contractor has provided to the City a signed and notarized Affidavit of Disposal, a copy of which is attached to the Construction Contract, stating that all brush, trash, debris, and surplus materials resulting from the Work have been disposed of in a legal manner.

1.9.3. The Contractor has provided a final work summary report to the City.

1.9.4. The Contractor has performed comprehensive and successful testing and checks of the Maintenance Items.

SECTION 5: BONDS AND INSURANCE

5.5. **Contract Bonds.** Prior to the commencement of Work, the Contractor, at its sole cost and expense, shall provide the following bonds issued by a surety authorized to issue bonds in California satisfactory to the City:

1.5.1. A Payment Bond (Material and Labor Bond) in an amount not less than the Contract Price for this Bid item, to satisfy claims of material suppliers and mechanics and laborers employed by it on the Work. The Payment Bond shall be maintained by the Contractor in full force and effect until the Work is accepted by City and until all claims for materials and labor are paid, and shall otherwise comply with the California Civil Code.

1.5.2. A Performance Bond in an amount not less than the Contract Price for this bid item to guarantee the faithful performance of all Work within the time prescribed in a manner satisfactory to the City and to guarantee all materials and workmanship will be free from original or developed defects. The Performance Bond shall remain in full force and effect until performance of the Work is completed as set forth in this LTMMA.

5.6. **Insurance.** The Contractor shall maintain insurance coverage as specified in **Section 5-4, "INSURANCE"** of the Construction Contract at all times during the term of this LTMMA.

The Contractor shall not begin the Work under this LTMMA until they have complied with the following:

1.6.1. Obtain insurance certificates reflecting evidence of insurance:

7. Commercial General Liability

8. Commercial Automobile Liability

9. Worker's Compensation

1.6.2. Confirm that all policies contain the specific provisions required in **Section 5-4, "INSURANCE"**.

The Contractor shall submit copies of any policy upon request by the City.

The Contractor shall not modify any policy or endorsement thereto which increases the City's exposure to loss for the duration of this LTMMA.

SECTION 6: MISCELLANOUS

6.27. Illness and Injury Prevention Program. The Contractor shall comply with all the mandates of Senate Bill 198 and shall specifically have a written Injury Prevention Program on file with the City in accordance with all applicable standards, orders, or requirements of California Labor Code, Section 6401.7. This Program shall be on file prior to the performance of any Work.

6.28. City Standard Provisions. This LTMMA is subject to the same standard provisions and Contractor Certification requirements as the Construction Contract.

6.29. Taxpayer Identification Number. I.R.S. regulations require the City to have the correct name, address, and Taxpayer Identification Number (TIN) or Social Security Number (SSN) on file for businesses or persons who provide services or products to the City. This information is necessary to complete Form 1099 at the end of each tax year. As such, the Contractor shall provide the City with a Form W-9 upon execution of this LTMMA.

6.30. Assignment. The Contractor shall not assign the obligations under this LTMMA, whether by express assignment or by sale of the company, nor any monies due or to become due, without the City's prior written approval. Any assignment in violation of this section shall constitute a Default and is grounds for immediate termination of this LTMMA, at the sole discretion of City. In no event shall any putative assignment create a contractual relationship between the City and any putative assignee.

6.31. Independent Contractors. The Contractor and any Subcontractors employed by Contractor shall be independent contractors and not agents of the City. Any provisions of this LTMMA that may appear to give the City any right to direct the Contractor concerning the details of performing the Work, or to exercise any control over such performance, shall mean only that the Contractor shall follow the direction of the City concerning the end results of the performance.

6.32. Covenants and Conditions. All provisions of this LTMMA expressed as either covenants or conditions on the part of the City or the Contractor shall be deemed to be both covenants and conditions.

6.33. Jurisdiction and Venue. The jurisdiction and venue for any suit or proceeding arising out of or concerning this LTMMA, the interpretation or application of any of its terms, or any related disputes shall be the County of San Diego, State of California.

6.34. Successors in Interest. This LTMMA and all rights and obligations created by it shall be in force and effect whether or not any Parties to this LTMMA have been succeeded by another entity and all rights and obligations created by this LTMMA shall be vested and binding on any Party's successor in interest.

6.35. Integration. This LTMMA and the exhibits, attachments, and references incorporated into this LTMMA fully express all understandings of the Parties concerning the matters covered in this LTMMA. No change, alteration, or modification of the terms or conditions of this LTMMA, and no verbal understanding of the Parties, their officers, agents, or employees shall be valid unless made in the form of a written change agreed to in writing by both Parties or by an amendment to this LTMMA agreed to by both Parties. All prior negotiations and agreements shall be merged into this LTMMA.

6.36. Counterparts. This LTMMA may be executed in counterparts, which when taken together shall constitute a single signed original as though all Parties had executed the same page.

6.37. No Waiver. Any failure of either the City or the Contractor to insist upon the strict performance by the other of any covenant, term, or condition of this LTMMA, nor any failure to exercise any right or remedy consequent upon a breach of any covenant, term, or condition of this LTMMA, shall constitute a waiver of any such breach or of such covenant, term, or condition. No waiver of any breach shall affect or alter this LTMMA, and each and every covenant, condition, and term hereof shall continue in full force and effect to any existing or subsequent breach.

6.38. Severability. The unenforceability, invalidity, or illegality of any provision of this LTMMA shall not render any other provision of this LTMMA unenforceable, invalid, or illegal.

6.39. Signing Authority. The representative for each Party signing on behalf of a corporation, partnership, joint venture or governmental entity hereby declares that authority has been obtained to sign on behalf of the corporation, partnership, joint venture, or entity and agrees to hold the other Party or Parties hereto harmless if it is later determined that such authority does not exist.

WETLANDS

IN WITNESS WHEREOF, this Contract is executed by the City of San Diego, acting by and through its Purchasing & Contracting Department Director in accordance with Municipal Code section 22.3102, and by Contractor.

Dated this 1st day of December, 2022.

THE CITY OF SAN DIEGO

By: _____

Matthew Vespi
Chief Financial Officer
Office of the Chief Financial Officer

I HEREBY CERTIFY I can legally bind TC Construction Company, Inc., and that I have read this entire contract, this 28th day of November, 2022.

By: _____

Printed Name: Austin Cameron

Title: president

I HEREBY APPROVE the form of the foregoing Contract this

9th day DECEMBER of 2022.

Mara W. Elliott, City Attorney

By: /Ryan P. Gerrity

Printed Name: RYAN P. GERRITY
Deputy City Attorney

EXHIBIT A

SCOPE OF WORK

I. **Location of Work.** The location of the Work to be performed (Mitigation Area) is shown on Specifications and Drawings numbered **100228-01-D** through **100228-06-D** (Specifications), which are incorporated into this Contract by this reference as though fully set forth herein.

II. **Description of Work.** The Contractor shall maintain and monitor the Revegetation/Restoration Area during the Monitoring Program in accordance with this Contract. The Revegetation/Restoration Area shall meet the success criteria specified in the Wetland Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 14, 2022 incorporated herein as Exhibit D at each of the milestones listed in the Schedule for the maintenance and monitoring period. The Work includes regular maintenance including trash removal, weeding, and watering of native plant material and all other maintenance listed in this Contract and as required to maintain the Mitigation Area in a useable condition and to maintain the plant material in a healthy and viable state.

The Work also includes qualitative and quantitative biological monitoring of the Mitigation Area according to the schedule, methods, and qualifications specified in the Mitigation Plan. The monitoring work shall include all reporting tasks specified in the Wetland Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 14, 2022 (Exhibit D).

III. **Method of Performing Work.**

The method for performing the work is outlined in the Wetland Mitigation Plan for the La Media Road Improvement Project San Diego, California dated June 14, 2022.See Exhibit D below.

EXHIBIT B

INSERT A COPY OF THE ENGINEER'S FIELD NOTIFICATION WHICH ACCEPTS THE PLANT ESTABLISHMENT PERIOD (PEP) AND ESTABLISHES THE COMMENCEMENT DATE OF THE MONITORING PROGRAM, SEE THE 2021 WHITEBOOK, SECTION 802

EXHIBIT C

LICENSE DATA SHEET

State Contractor License Classification and Number:_____

Name of License Holder:_____

Expiration Date:_____

City of San Diego Business License Number:_____

Expiration Date:_____

EXHIBIT D

Wetland Mitigation Plan for the La Media Road Improvement Project

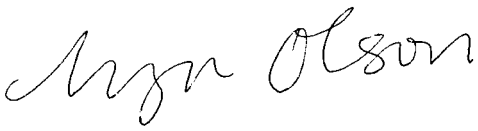
RECON

Wetland Mitigation Plan for the La Media Road Improvement Project San Diego, California

Prepared for
City of San Diego
Engineering & Capital Projects Department
525 B Street, Suite 750, MS 908A
San Diego, CA 92101

Prepared by
RECON Environmental, Inc.
3111 Camino del Rio North, Suite 600
San Diego, CA 92108
P 619.308.9333

RECON Number 9227
June 14, 2022



Meagan Olson, Restoration Ecologist

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FIGURES

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TABLES

ATTACHMENT

Acronyms

APN	assessor parcel number
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
City	City of San Diego
DSD	Development Services Department
DSM	digital surface model
MHPA	Multi-Habitat Planning Area
MMC	Mitigation Monitoring Coordination
MSCP	Multiple Species Conservation Program
PEP	Plant Establishment Period
PRD	Parks and Recreation Department
project	La Media Road Improvement Project
E&CP	Engineering & Capital Projects Department
RECON	RECON Environmental, Inc.
RWQCB	Regional Water Quality Control Board
sUAV	small unmanned aerial vehicle
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VPHCP	Vernal Pool Habitat Conservation Plan
VPMMP	Vernal Pool Management and Monitoring Plan

1.0 Introduction

The City of San Diego (City) Engineering & Capital Projects Department is proposing the La Media Road Improvement Project (project), to widen La Media Road from State Route 905 (SR-905) to Siempre Viva Road, widen the segment of Airway Road that crosses La Media Road, and implement drainage improvements at the intersection of La Media Road. The project is located within the Otay Mesa neighborhood of the city of San Diego, California. The project is located within and adjacent to habitat preserved within the City's Multi-Habitat Planning Area (MHPA). Proposed mitigation areas that occur adjacent to the existing MHPA would be added to the MHPA preserve through a boundary line adjustment, so that the entire mitigation site would be within the MHPA.

This mitigation plan (plan) details the process for mitigating impacts to wetland and non-native grassland habitat suitable for burrowing owl foraging for the project in accordance with the California Environmental Quality Act (CEQA), the City's Multiple Species Conservation Program (MSCP), as implemented through the Land Development Code – Biology Guidelines (City of San Diego 2018), and the City's Vernal Pool Habitat Conservation Plan (VPHCP; City of San Diego 2019).

Impacts to jurisdictional resources from this project were analyzed using the project-specific biological technical report and updated jurisdictional waters/wetland delineation report (RECON 2021a and 2021b). As currently planned, the project will cause permanent and temporary impacts to 1.78 acres of wetland habitat. Specifically, project construction would temporarily impact 0.21 acre and permanently impact 1.53 acres of wetland habitats, and an additional 0.04 acre of wetland impacts would occur as a result of minor grading within the wetland mitigation site in order to establish appropriate hydrology within the wetland establishment areas.

Of the 1.53 acres of permanent construction impacts, 0.15 acre would occur to vernal pool habitat (Table 1). Impacts to vernal pool habitat are being mitigated through a combination of vernal pool restoration and enhancement at a vernal pool mitigation site located on eight one-acre City-owned parcels in western Otay Mesa per the City's VPHCP (City of San Diego 2019) as well as the enhancement of 0.24 acre of vernal pool habitat included in this plan. The vernal pool mitigation is discussed further in the Vernal Pool Mitigation Plan for the La Media Road Improvement & Fire-Rescue Air Operations Phase II Project (RECON 2022).

The remaining 1.38 acres of permanent impacts to wetland habitat will occur to freshwater marsh, emergent wetland, and southern willow scrub habitat and will be mitigated at a 2:1 ratio through a combination of establishment and enhancement, as discussed in this plan. Wetland impacts are shown in Tables 2 and 3.

Table 1 Mitigation for Permanent Impacts to Vegetation Communities								
	Outside MHPA			Inside MHPA			Total	Total
Vegetation Community	Total	Ratio[1]	Mitigation	Total	Ratio[1]	Mitigation	Impacts	Mitigation
Wetland Communities								
Vernal pools	0.14[2]	5.6:1	0.784	0.01[2]	5.6:1	0.056	0.15[2]	0.84[3]
Freshwater marsh	0.24	2:1	0.48	0.40	2:1	0.80	0.64	1.28
Emergent wetland	0.14	2:1	0.28	0.39	2:1	0.78	0.53	1.06
Mule fat scrub	0.00	2:1	–	0.00	2:1	–	–	–
Southern willow scrub	0.15	2:1	0.30	0.06	2:1	0.12	0.21	0.42
Subtotal	**0.67**		**1.844**	**0.86**		**1.756**	**1.53**	**3.60**
Subtotal (without vernal pools)							***1.38***	***2.76***
Tier I – III Communities[4]								
Diegan coastal sage scrub	0.43	1:1	0.43	–	1:1	–	0.43	0.43
Non-native grassland	3.15	0.5:1	1.58	1.20	1:1	1.20	4.35[5]	2.62
Subtotal	**3.58**		**2.01**	**1.20**		**1.20**	**4.78**	**3.05**
TOTAL	**4.25**	–	**3.854**	**2.06**	–	**2.956**	**6.31**	**6.65**

[1]Ratios account for mitigation site occurring within the MHPA; temporary impacts to wetland communities would be mitigated per Table 2A of the City's Biology Guidelines; impacts to vernal pools and wetlands mitigated per communication with the RWQCB and requirements of the RWQCB 401 certification (RWQCB 2021).

[2]The entire area of each impacted vernal pool (including the portion outside the project footprint) is considered a permanent impact.

[3]Mitigation addressed in the Vernal Pool Mitigation Plan (RECON 2022), with 0.24 acre of vernal pool enhancement included in this plan.

[4]Impacts to Tier II and III communities would be mitigated with restoration of maritime succulent scrub as described in the vernal pool mitigation plan (RECON 2021c).

[5]Only 4.16 acres of non-native grassland impacts are considered occupied burrowing owl foraging habitat.

Impacts to United States Army Corps of Engineers (USACE), California Department of Wildlife (CDFW), or Regional Water Quality Control Board (RWQCB) waters will require a Section 404 permit authorization from USACE, a 1600 Streambed Alteration Agreement from CDFW, and a 401 State Water Quality Certification from RWQCB. Mitigation for temporary impacts will occur on-site with restoration of the impacted areas. Mitigation for permanent impacts will occur off-site and are described in this plan. Impacts to City wetlands are expected to qualify for a wetland deviation from the Environmentally Sensitive Lands (ESL) regulations (City of San Diego 2018) under the Essential Public Projects Option. Table 2 includes the acreage of potential jurisdictional impacts and the required mitigation.

Table 2 Mitigation for Impacts to Potential Jurisdictional Resources[1]					
	Impact			Mitigation[2]	
Jurisdictional Areas	Permanent	Temporary	Total	Ratio	Acreage[3]
USACE Jurisdictional Areas (404)					
Non-wetland Waters of the U.S.	1.24	0.19	1.43	2:1[5]	2.86
Wetland Waters of the U.S.	0.29[4]	0.05	0.34	2:1[5]	0.68
CDFW Jurisdictional Areas (1602)					
Wetland Waters of the state	1.53	0.25	1.78	2:1	3.56
RWQCB Jurisdictional Areas (401)					
Wetland Waters of the state	1.53	0.25	1.78	2:1	3.56

[1]All areas are presented in acres rounded to the nearest 0.01.
[2]Mitigation would occur in-kind with a minimum 1:1 establishment component, and the remainder consisting of restoration or enhancement. Mitigation ratio assumes mitigation site would occur within the same watershed. Final mitigation ratios will be determined in consultation with USACE, RWQCB, and CDFW.
[3]Includes mitigation for temporary and vernal pool impacts, which are both addressed in separate restoration plans. This plan addresses 2.76 acres of required wetland mitigation.
[4]Includes 0.14 acre of permanent impacts to wetlands and 0.15 acre of permanent impacts to vernal pools.
[5]To be finalized after acceptance of USACE mitigation ratio checklists and USACE 404 permit authorization.

Impacts to Diegan coastal sage scrub and non-native grassland will be mitigated at ratios consistent with Table 3 of the City's Biology Guidelines (City of San Diego 2018) through restoration and preservation of maritime succulent scrub within currently degraded habitat at the vernal pool mitigation site, as described in the Vernal Pool Mitigation Plan for the La Media Road Improvement & Fire-Rescue Air Operations Phase II Project (RECON 2021c). Any additional mitigation credits not needed for this project will be available for future City projects.

The project will not result in impacts to burrowing owl breeding habitat; however, the non-native grassland within the mitigation site is considered occupied foraging habitat and, therefore, the native grassland, vernal pool, and wetland enhancement areas of the mitigation site will be enhanced and maintained as habitat appropriate for burrowing owl foraging, as described in this plan.

1.1 Project Location

The mitigation site is located within the Otay Mesa neighborhood in the city of San Diego, California (Figure 1). The mitigation site lies within Section 34 in Township 18 South, Range 1 West of the U.S. Geological Survey (USGS) 7.5-minute Otay Mesa quadrangle (Figure 2; USGS 1996) and is presented on the City's 800-foot-scale map number 138-1761 (Figure 3). The mitigation site is located southwest of the intersection of La Media Road and Airway Road and lies on portions of assessor parcel numbers (APNs) 646-110-05 and 646-110-06. It is immediately adjacent to improvement areas for the proposed project, which is planned to occur along La Media Road, between State Route 905 and Siempre Viva Road, and along portions of Airway Road and Siempre Viva Road where they intersect La Media Road (Figure 4). The mitigation site is situated almost entirely within, as well as adjacent to, habitat preserved within the City's MHPA (see Figure 4).

RECON

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FIGURE 1
Regional Location

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

Map Source: USGS 7.5 minute topographic map series, Otay Mesa quadrangle, 1996, T18S R01W

0 Feet 2,000

Mitigation Site Boundary

RECON

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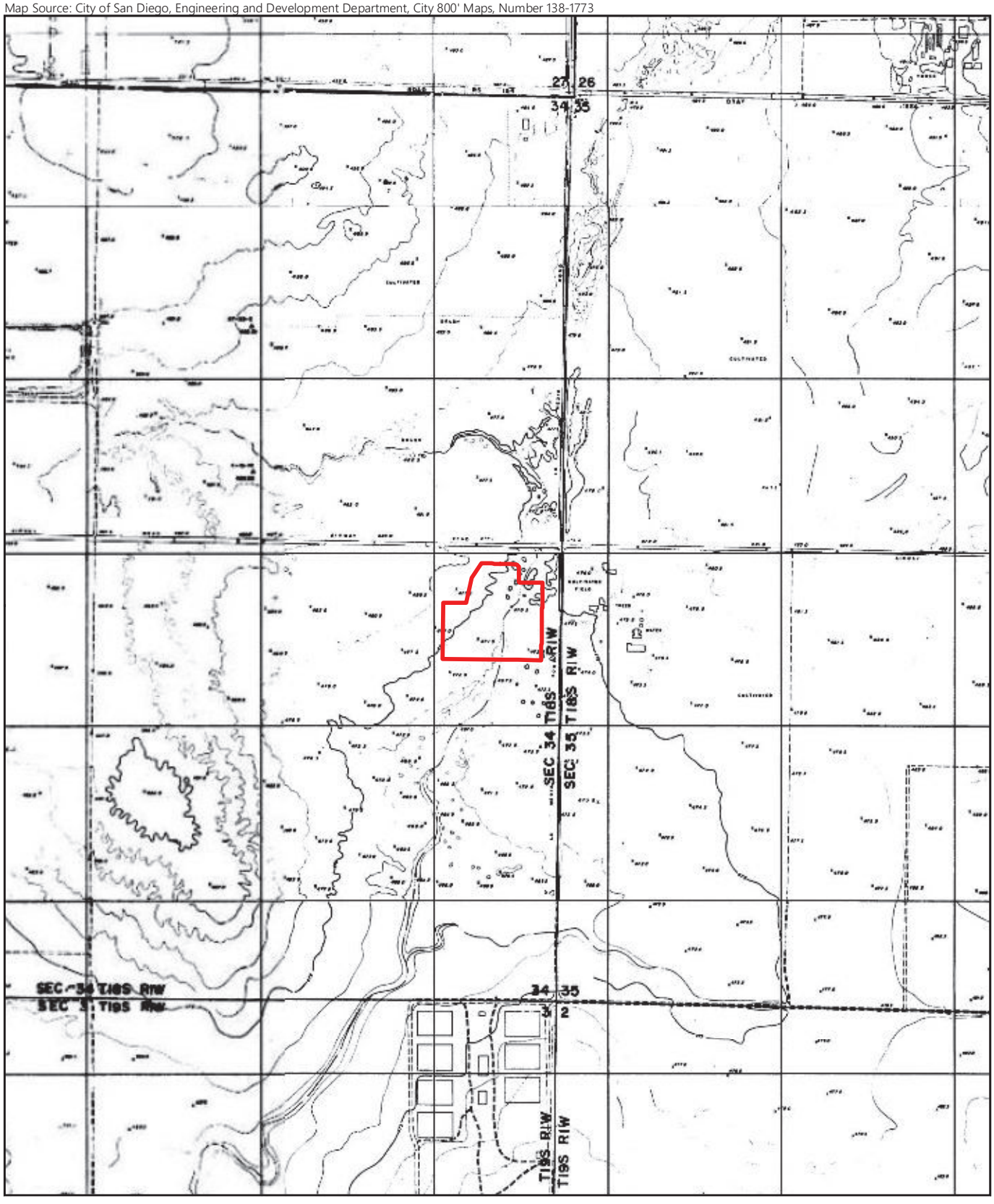
FIGURE 2
Mitigation Site Location on USGS Map

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

Map Source: City of San Diego, Engineering and Development Department, City 800' Maps, Number 138-1773



Mitigation Site Boundary

RECON

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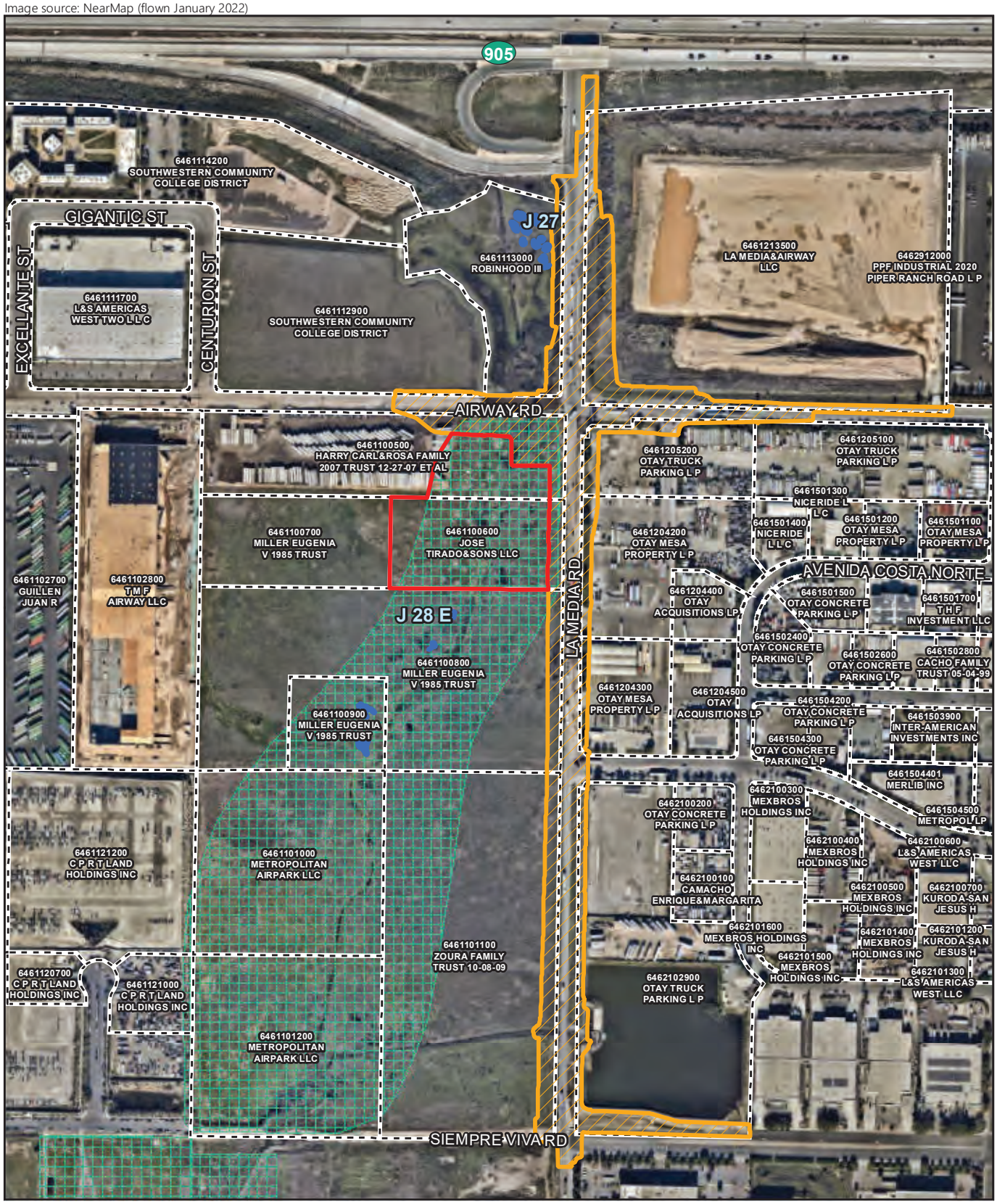
La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 3

Mitigation Site Location on City 800' Map

Image source: NearMap (flown January 2022)



Mitigation Site Boundary
La Media Road Improvement Project Boundary
VPHCP Vernal Pools
Multi-Habitat Planning Area
Parcel Boundary

0 Feet 500

RECON

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FIGURE 4
Mitigation Site Location and Surrounding Land Use

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

1.2 Restoration Goals and Objectives

The goal of this plan is to mitigate permanent impacts to 1.38 acres of wetland habitat and 4.16 acres of occupied burrowing owl foraging habitat caused by the project. To meet these requirements, this plan describes the restoration methods and techniques to establish 1.38 acres of wetland, establish 1.53 acres of riparian habitat, enhance 0.67 acre of wetland habitat, enhance 1.81 acre of native grassland habitat, enhance 0.24 acre of vernal pool basin, and preserve 0.08 acre of existing native grassland within the 6.05-acre mitigation site (Table 3). In addition, 0.34 acre of temporary impacts in adjacent areas to the north and east of the mitigation site will be restored at a 1:1 ratio per the methods described in this plan.

The terms "establishment", "restoration" (including "re-establishment" and "rehabilitation"), and "enhancement" as used in this plan are defined per the USACE regional compensatory mitigation guidelines (USACE 2015) as follows:

1. Establishment (creation): "Manipulation of the physical, chemical, or biological characteristics present at an upland site to develop an aquatic resource that did not previously exist. Establishment results in a gain in aquatic resource area and functions." For a portion of the mitigation proposed in this plan, establishment would involve the conversion of non-native grassland to wetland or riparian habitat.

2. Restoration: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. For the purpose of tracking net gains in aquatic resources area, restoration is divided into two categories: re-establishment and rehabilitation."

   Re-establishment: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions."

   Rehabilitation: "Manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing the natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function but does not result in a gain in aquatic resource area."

3. Enhancement: "Manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area." For the enhancement proposed in this plan, mitigation would involve the removal of non-native weed species, introduction of vernal pool endemic and wetland seed, and improvement of adjacent habitat to improve aquatic functionality of vernal pools and wetlands.

Establishment will be defined as conversion of one habitat type or vegetation community to another, more desirable type (i.e., conversion of non-native grassland to wetland habitat through grading,

container plant and seed installation, and maintenance). Enhancement will be defined as improving an existing habitat type or vegetation community (i.e., through weed removal, maintenance, and potentially some plant or seed installation).

Table 3
Proposed Mitigation
(acres)

Impacted Habitat	Mitigation Required	Mitigation			
		Establishment	Enhancement	Preservation	Restoration
Permanent impacts to wetland/jurisdictional habitat	2.76[1]	2.91[2]	Wetland: 0.67[3] Vernal Pool: 0.24[4] Grassland: 1.81[5]	-	
Permanent impacts to burrowing owl foraging habitat	2.62		2.72[6]	0.08 (Native Grassland)	
Temporary impacts to adjacent wetland and upland habitats	0.34				0.34

[1]Does not include required mitigation for permanent impacts to vernal pools or temporary impacts to wetlands
[2]Consists of creating 1.38 acres of wetland and 1.53 acres of riparian within 2.91 acres of non-native grassland
[3]Includes existing freshwater marsh (0.01 acre) and emergent wetland (0.66 acre).
[4]Includes existing vernal pools (0.05 acre) and potential vernal pools (0.19 acre).
[5]Includes existing non-native grassland (1.56 acres), and urban/developed land 0.25 acre).
[6]Includes all wetland, vernal pool, and grassland enhancement above.

No burrowing owls or potentially active burrows were detected in the survey area during focused burrowing owl surveys (RECON 2021a); however, previous survey efforts identified five occupied burrows in the non-native grassland southwest of the intersection of La Media Road and Airway Road, but outside the project footprint. Therefore, this non-native grassland is considered occupied foraging habitat. The project will impact 4.16 acres of occupied foraging habitat (1.07 acres within the MHPA and 3.09 acres outside the MHPA) and is required to provide a total of 2.62 acres of mitigation. This mitigation plan provides 2.72 acres of mitigation, consisting of the enhancement of wetland (0.67 acre), native grassland (1.81 acres), and vernal pool (0.24 acre) noted above. The guidelines outlined in the MSCP Subarea Plan Area Specific Management Directives will be implemented within the wetland and riparian establishment and vernal pool, wetland, and native grassland enhancement areas of the mitigation site to maintain these sites as habitat appropriate for burrowing owl foraging (Appendix A of City of San Diego 1997a).

Management Directives require that enhancement measures include vegetation management to enhance foraging habitat. The mitigation site design includes restoration of non-native grassland habitat to native grassland habitat through light topographic recontouring to create mounded topography, seeding of low-growing herbaceous plant species and weed maintenance to maintain the native grassland as suitable for owl foraging. The vernal pool and wetland enhancement areas of the site will be enhanced through weed removal and the addition of native, low-growing plant species seed to improve these areas for owl foraging.

While impacts to vernal pools caused by the project development are being mitigated at the La Media Road Vernal Pool Mitigation Site located in western Otay Mesa (RECON 2022), vernal pools within the mitigation site will also be enhanced. The vernal pools located within the mitigation site are located outside of the VPHCP Preserve and not within any vernal pool complex identified in the VPHCP (City of San Diego 2019). Complex J 27 occurs to the north of the mitigation site, north of Airway Road, and complex J 28 E occurs south of the mitigation site (see Figure 4). Although the vernal pools within the mitigation site are not within an identified complex, the management directives identified for J 27 (no management level) and J 28 E (management level 3) will be used to guide the enhancement of the mitigation site vernal pools (City of San Diego 2020). The vernal pools will be improved from their current condition through weed and trash removal and vernal pool species seed introduction.

2.0 Existing Conditions

2.1 Project Site Environmental Conditions

The project site consists primarily of existing roadways, with commercial developments on the parcels southeast of the intersection of La Media Road and Airway Road intersection, active construction northeast of the intersection, and undeveloped land west of La Media Road.

The project site is largely flat, with the exception of a series of manufactured drainage ditches along the perimeters of the parcels north of Airway Road. The drainage ditches in the northeast parallel the roadways and flow under La Media Road through an earthen bottom culvert approximately 250 feet north of Airway Road. This culvert meets a drainage ditch that flows north-south on the west side of La Media Road. The combined drainage flows through another earthen-bottom culvert under Airway Road, approximately 100 feet east of La Media Road. The drainage then flows to the southwest away from the project site and through the proposed mitigation site. A large detention basin occurs east of La Media Road in the southern portion of the survey area. High flows from the detention basin are released through a rip-rap overflow channel to the west, through a culvert under La Media Road, and into a manufactured east-west earthen drainage ditch that eventually meets the combined drainage mentioned above, 600 feet west of La Media Road.

Ten vegetation communities were identified in the biological technical report (RECON 2021a) and include vernal pool, emergent wetland, freshwater marsh, mule fat scrub, southern willow scrub, Diegan coastal sage scrub, disturbed coastal sage scrub, non-native grassland, disturbed, and urban/developed. Of those ten, impacts to seven are considered significant and require mitigation. Mitigation for impacts to emergent wetland, freshwater marsh, mule fat scrub, and southern willow scrub are addressed in this plan.

2.2 Mitigation Site Description

The mitigation site consists of portions of two undeveloped parcels (APNs 646-110-05 and 646-110-06) the City intends to purchase from private owners. The project will impact land to the north and east of the mitigation site, including portions of the parcels on which mitigation will occur. The areas

immediately south and west of the mitigation site are located on undeveloped private land. The MHPA runs through and south of the mitigation site (see Figure 4). The mitigation site has been subjected to some recent and historic disturbances (e.g., off-highway vehicle use, roadway debris, and trash dumping) but remains largely as disturbed open space. Land uses to the west of the proposed mitigation site include trucking storage and non-native grassland. The mitigation design includes restoring areas of the storage pad. While vernal pools are found on-site, the area is not part of the VPHCP complex system, although Vernal Pool Management and Monitoring Plan (VPMMP; City of San Diego 2020) complexes occur north and south of the mitigation site and enhancement of vernal pools within the mitigation site will follow the requirements of the VPHCP. Easements located within the site include the easements on which roadway improvements will occur, no additional easements are found within the site. In addition, no water or mineral right permits or licenses exist for the site.

2.3 Soil Characteristics

Two soil series are mapped within the mitigation site: Huerhuero loam and Stockpen gravelly clay loam (Figure 5; U.S. Department of Agriculture [USDA] 1973). Huerhuero loam is the dominant soil series, underlying most of the site. This soil series includes moderately well-drained soils with clay subsoils. It occurs on gently sloping, undulating sites and often forms mima mounds in less disturbed areas. It has moderate water-holding capacity, and slow to medium runoff, with slight to moderate erosion potential. Stockpen gravelly clay loam is present on the eastern third of the mitigation site. It is a moderately well-drained, moderately deep soil type consisting of marine deposits. It has very low water permeability, low water-holding capacity, and runoff is slow, with only slight erosion hazard.

Both Huerhuero and Stockpen soil series are considered hydric soils by the USDA Natural Resources Conservation Service (USDA 2019) so the soils are expected to be suitable for wetland restoration.

A wetland delineation was conducted within the wetland mitigation site to assess the extent of jurisdictional resources and map their boundaries. Wetland sample points were recorded within the wetland establishment areas. These areas do not currently support wetlands. However, weak hydric soil (redox features) indicators were observed for sample points that occurred in the topographically lowest portions of the establishment areas. The presence of weak indicators here supports the assumption that grading will increase the likelihood of developing strong hydric soil indicators.

2.4 Hydrology

The wetland mitigation site is primarily flat with a drainage running from north to south through the center of the site. In addition, there are several basins on the eastern third of the site. During biological surveys conducted by RECON in 2019 and 2020, three pools with vernal pool vegetation were mapped (Figure 6).

Image Source: NearMap (Flown January 2022)

Mitigation Site Boundary

10-inch Contours

Soil Type

Huerhuero loam, 2 to 9 percent slopes

Stockpen gravelly clay loam, 2 to 5 percent slopes

0 Feet 100

RECON

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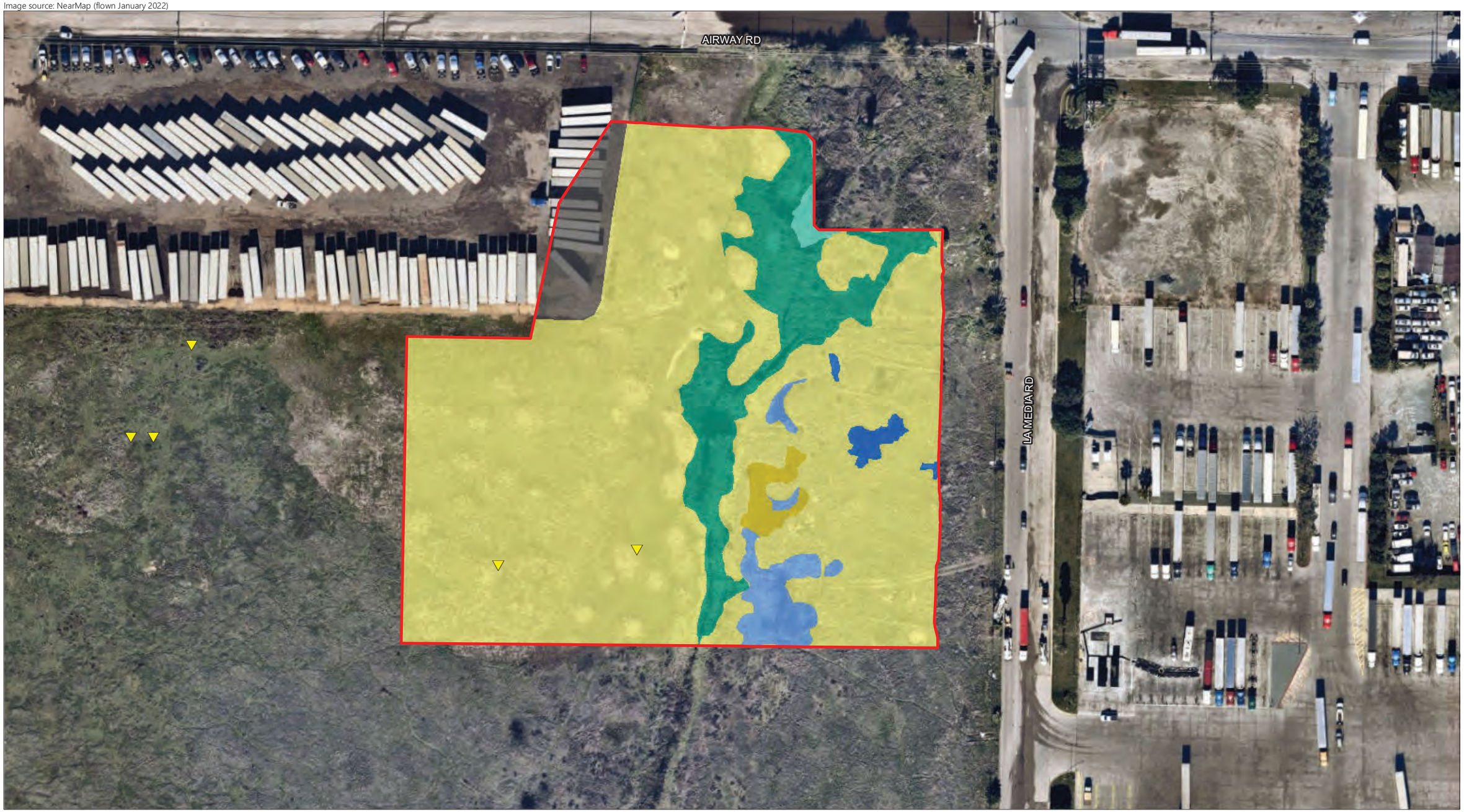
La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 5

Mitigation Site Soil Map

Image source: NearMap (flown January 2022)



Mitigation Site Boundary

Western Burrowing Owl
Athene cunicularia
(Occupied Burrow)*

Vegetation Community

- Vernal Pool
- Potential Vernal Pool
- Native Grassland
- Emergent Wetland
- Freshwater Marsh
- Non-native Grassland
- Urban/Developed

0 Feet 100

RECON

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 6
Mitigation Site Existing Biological Resources

The existing wetland habitat within the mitigation site was delineated using both wetland delineation data forms and Ordinary High Water Mark data forms, with a combination of a break in slope and change in vegetation generally defining the lateral extent of this area. Although little to no hydrology indicators were observed outside the existing wetland areas, grading will expand surface water flow throughout the establishment area during flood events, which is expected to support the formation of hydrology indicators in the establishment areas.

2.5 Biological Conditions

RECON Environmental, Inc. (RECON) biologists conducted a general biological survey of the mitigation site on July 27, 2020.

2.5.1 Vegetation Communities

The mitigation site is located on a flat open field dominated by non-native vegetation composed primarily of annual grasses, with patches of native grassland and wetland habitat, particularly in the eastern half of the site. The area surrounding the project site generally contains flat topography with similar vegetation to the mitigation site (see Figure 4). There are six vegetation communities within the mitigation site: non-native grassland (4.936 acres), emergent wetland (0.711 acre), urban/developed (0.251 acre), vernal pool (0.050 acre), freshwater marsh (0.034 acre), and native grassland (0.075 acre; see Figure 6).

Non-native grassland. Non-native grassland covers the majority of the mitigation site. Overall vegetation cover is dense, with approximately 70 percent cover of non-native species. Typical species present include annual grasses, such as rattail sixweeks grass (*Festuca* [=*Vulpia*] *myuros*), slender wild oat (*Avena barbata*), as well as non-native annual forbs such as Crete weed (*Hedypnois cretica*), bristly ox-tongue (*Helminthotheca chioides*), and fennel (*Foeniculum vulgare*). Native cover is less than 50 percent, characterized by scattered native shrubs, including California buckwheat (*Eriogonum fasciculatum*) and broom baccharis (*Baccharis sarothroides*).

Emergent wetland. Emergent wetland is a persistent wetland community characterized by low-growing, perennial wetland species (Oberbauer et al. 2008). It is the most common wetland vegetation community on the mitigation site. The emergent wetland is characterized by a mix of native and non-native plant species, including sedge (*Cyperus sp.*), curly dock (*Rumex crispus*), Dallis grass (*Paspalum dilatatum*), and cocklebur (*Xanthium strumarium*). Other species include annual beard grass (*Polypogon monspeliensis*), bristly ox-tongue, and fennel.

Urban/developed. Urban/developed land within the mitigation site consists of a fenced and graded storage yard for big rig trailers. This area is largely unvegetated, except along the outer edges, where there is abundant Russian thistle (*Salsola tragus*) and crown daisy (*Glebionis coronaria*), with lesser amounts of slender wild oat and soft chess (*Bromus hordeaceus*).

Vernal pool. RECON identified three vernal pools within the mitigation site. These vernal pools were identified based on the presence of vernal pool indicator plants, such as dwarf woollyheads (*Psilocarphus brevissimus* var. *brevissimus*), American pillwort (*Pilularia americana*), toad rush (*Juncus bufonius*), and pale spikerush (*Eleocharis macrostachya*). Four additional basins were identified and

lacked vernal pool indicators at the time of the survey, which was conducted in late July, when many vernal pool indicator species were not identifiable. As such, all seven basins within the mitigation site are treated as potential vernal pools.

Freshwater marsh. Freshwater marsh consists of perennial emergent monocots, generally occurring in areas with long-standing or permanent fresh water and little current flow. One patch of freshwater marsh is present in the northeast corner of the mitigation site. This patch extends outside the mitigation site into an area that will be impacted by implementation of storm water management features for the project. The dominant plant species found within the freshwater marsh include southern bulrush (*Schoenoplectus californicus*), Olney's three-square bulrush (*Schoenoplectus americanus*), and broad-leaved cattail (*Typha latifolia*), with lesser amounts of San Diego sedge (*Carex spissa*), sedge, and curly dock.

Native grassland. A grassland habitat is distinguished as native grassland if it supports at least 5 percent cover by native grass species (Sawyer et al. 2009). Therefore, many native grasslands often have a large component of non-native grasses. This vegetation community occurs in one patch in the southeastern quadrant of the wetland mitigation site, intermixed with two potential vernal pool basins. This patch consists of a dense patch (over 75 percent cover) of salt grass (*Distichlis spicata*), with lesser amounts of purple needle grass (*Stipa pulchra*), annual beard grass, slender wild oat (*Avena barbata*), and rattail sixweeks grass.

2.5.2 Wildlife Species

Given the small overall area of the wetland mitigation site, the wildlife list used for this Plan are based on the Biological Technical Report for the La Media Road Improvement Project (RECON 2021a) modified based on habitats, conditions, and observations made on the wetland mitigation site. A total of 32 animal species are included: 5 invertebrates, 1 fish, 3 reptiles, 18 birds, and 5 mammals. Most of the species detected are common in non-native grasslands and disturbed areas, although several species common in wetland areas were also found.

Two fairy shrimp species – versatile fairy shrimp (*Branchinecta lindahli*) and San Diego fairy shrimp (*Branchinecta sandiegonensis*) – have been found in basins located 800 to 1,200 feet north of the project site. No fairy shrimp surveys were conducted within the wetland mitigation site.

2.5.3 Jurisdictional Wetlands and Waters

Based on the July 27, 2020 biological survey, there are potential wetlands under USACE, RWQCB, CDFW, and City jurisdiction on the wetland mitigation site. These areas include vernal pools, freshwater marsh, and emergent wetland. As discussed in Section 2.5.1, vernal pool indicator plants were found in only three of the seven potential vernal pool basins. However, the biological survey was conducted during the summer, and vernal pool indicator plants were largely desiccated or dead, making determination of vernal pool or hydrophytic status difficult. Additionally, conditions were too dry to confirm with certainty whether some areas were jurisdictional wetlands. As noted above, a wetland delineation was conducted within the wetland mitigation site on January 27, 2021 to verify the extent of jurisdictional boundaries, which are shown as the boundaries of wetland vegetation communities in Figure 6.

2.6 Cultural Resources

RECON archaeologists conducted a record search with the California Historical Resources Information System in March 2019. A total of 38 cultural resource records were found within a 0.5-mile search radius. Of these records, three are historic-period resources, two are multi-component resources, and 33 are prehistoric. The historic-period resources include a ranch, roadway, and religious building. The multicomponent resources are a lithic scatter with foundations, a cistern and trash scatter, a shell and lithic scatter with foundations, and a trash scatter. The prehistoric resources include 16 isolated artifacts, 15 lithic scatters, and 2 shell scatters. None of these resources are listed within the mitigation site.

RECON conducted a field survey on August 5, 2020. No cultural material was observed during the survey; however, ground visibility was very low as a result of dense vegetative cover.

2.7 Rationale for Expecting Success

2.7.1 Restoration Goals

The goals for this mitigation project are to create and enhance wetland, vernal pool, and native grassland habitat suitable for burrowing owl foraging. Wetland habitat will be created in areas that are currently degraded uplands, mostly mapped as non-native grassland. Wetland establishment will occur through the removal of non-native vegetation, alteration of site topography, introduction of native plants, and ongoing maintenance to ensure that implementation tasks are successful. Specifically, the ground surface will be graded in a way that will expand surface water flow throughout the establishment area during flood events, which will support the formation of wetland indicators (hydric soil, hydrology, and wetland vegetation).

Areas that currently support emergent wetland and vernal pool habitats will be enhanced to higher quality habitat through removal of non-native plant species and introduction of native seed in order to reduce competition with native species and increase native species vegetative cover and richness. Grading is also proposed in the northwestern corner of the mitigation site where a compacted dirt storage yard currently exists. This area will be graded to a more natural topography and enhanced as native grassland. Enhancement throughout the mitigation site is also designed to mitigate impacts to western burrowing owl by improving the habitat quality for owl foraging. Native grassland habitat will be enhanced for owl foraging in areas that are currently non-native grasslands.

The restoration activities aim to restore and enhance wetland and native grassland habitat in an area that is immediately adjacent to where impacts to wetlands will occur. Restoration activities will result in one contiguous patch of native habitat within the MHPA. Currently, the site supports some wetland habitat but is dominated by non-native grasslands. The methods described in this plan are intended to further enhance these areas and restore additional areas to native habitat.

2.7.2 Restoration Site Suitability

The proposed location of the mitigation site is immediately southwest of the project, in an area dominated by non-native grassland, with emergent wetland running north to south through the middle of the site, and patches of vernal pools and native grassland to the east of the emergent wetland (see Figure 6). The existing wetland habitat within the mitigation site is degraded with a high coverage of non-native vegetation. These degraded areas will be enhanced through removal of non-native vegetation and will be contiguous with areas proposed for wetland establishment.

Hydraulic analyses were conducted to inform the design of the mitigation site (Attachment 1). The hydraulic analyses included comparisons of the water surface elevations and velocities between existing and proposed conditions (Rick Engineering Company 2021). The location of the wetland and riparian establishment areas was determined based on the inundation limits for 50 percent of a 2-year storm event (Rick Engineering Company 2021). Areas that the analysis indicated would be inundated under these conditions are anticipated to be capable of developing hydrology and hydric soil indicators and supporting hydrophytic vegetation.

Native grassland habitat will be restored on the eastern and western edges to provide burrowing owl foraging habitat with connectivity to the non-native grasslands located west and south of the site. In total, these areas will create one contiguous patch of higher quality habitat with diverse vegetation layers and plant diversity that supports wetland and grassland wildlife.

The proposed mitigation site is suitable for restoration because of the following factors:

1. It is located on City-owned lands (or lands that will be purchased by the City) within and adjacent to the MHPA;
2. The surrounding areas to the west and south are anticipated to be maintained as open space;
3. It supports wetland hydrology;
4. It contains adequate site access;
5. It is in proximity to a water source;
6. It is in close proximity to the impact site;
7. It contains wetland habitat adjacent to the restoration areas;
8. It lacks utility or other easements; and
9. It lies outside any brush management zone.

Public roads occur near the proposed mitigation site (see Figure 4) and will facilitate both short- and long-term maintenance access for restoration activities. After completion of the restoration effort, long-term maintenance and management of the site will be executed by the City's Parks and Recreation Department (PRD) as part of their Open Space management program. No utility easements are present within the mitigation site (mitigation credit is not allowed within any easements) and potential future development in adjacent areas was taken into consideration when identifying the mitigation site.

2.7.3 Restoration Viability

The viability of the proposed mitigation was assessed during the preparation of this plan per the City's Land Development Code – Biology Guidelines (City of San Diego 2018). The assessment included consideration of the site's connectivity to larger planned open space, the surrounding land uses, and sensitivity of wetlands to change. While there are developed areas to the north and east, and there is potential for future development to the west, land uses to the south are largely planned as open space within the City's MHPA (see Figure 4). In addition, any adjacent development would be required to comply with the Land Use Adjacency Guidelines in the Multiple Species Conservation Program (MSCP) Subarea Plan (City of San Diego 1997a). These guidelines apply to projects that are adjacent to the MHPA and include restrictions on drainage of urban runoff, release of toxic materials, lighting, noise, public access, invasive non-native species, brush management, and grading within the MHPA. Since the proposed mitigation site is located within the MHPA, these guidelines would provide protections for the wetlands from indirect impacts. The future MHPA boundary line adjustment for the southwestern portion of the mitigation site, adjacent to but not currently within the MHPA, will increase the acreage of the MHPA, offering the same protections for MHPA lands. Upon completion of the MHPA boundary line adjustment, the location of the mitigation site within the MHPA, connecting to the existing MHPA north and south of the mitigation site, will reduce fragmentation of this preserve system and increase viability and longevity of the habitat quality. The design of the mitigation site includes several modifications to preserve the restored habitat from the adjacent road and intersection development and adjacent non-native grasslands. Modifications include clusters of large trees along the north and east mitigation site boundary to provide visual and sound barriers from Airway and La Media roads. The western and southern mitigation site boundaries will be planted with dense stands of transitional riparian species to provide a weed buffer to prevent encroachment of non-native vegetation. In addition, the planned riparian establishment area runs north to south through the center of the site, with native grassland enhancement planned for the western and eastern boundaries providing buffers from the adjacent road and parcels.

3.0 Roles and Responsibilities

3.1 Project Proponent and Financial Responsibility

The project proponent (City of San Diego Engineering & Capital Projects Department [E&CP]) will be responsible for retaining (1) a qualified wetland restoration specialist with over seven years of experience monitoring wetland habitat restoration to oversee the entire installation and monitoring of the mitigation program in coordination with City Development Services Department (DSD) staff and (2) a qualified installation/maintenance contractor with documented success in restoration of wetland habitat restoration and maintenance. Contact information for the City's E&CP is provided below:

Contact: City of San Diego
Engineering & Capital Projects Department
525 B Street, Suite 750
San Diego, CA 92101
Office: 619-533-3629

The City E&CP will be responsible for financing the installation, five-year maintenance program, and biological monitoring of the proposed mitigation described in the plan. Mayoral and/or City Council approval are required to obtain funding for the implementation and maintenance of this project. These formal approvals provide financial assurances to effectively implement the project for the minimum five-year requirement. All contracts are processed through the City's purchasing and contracting process; contracts have insurance and bond requirements to ensure projects are funded through successful completion. Long-term financial assurances are discussed in Section 8.0.

3.2 Responsible Agencies

The City DSD will be responsible for issuing any necessary permits and reviewing and approving this plan.

Contact: City of San Diego
Development Services Department
1222 First Avenue, MS 301
San Diego, CA 92101-4101
Office: 858-654-4237mailto:

Due to the location of the mitigation site on City-owned preserve lands, ongoing coordination with the City's PRD and MSCP departments will occur. These City departments will receive annual reports and will inspect and provide input on significant milestones involved in the implementation of this plan.

Contact: City of San Diego
Parks and Recreation Department
202 C Street, 5th Floor, MS 5D
San Diego, CA 92101
Office: 619-685-1314

City of San Diego
Planning Department
Multiple Species Conservation Program
9485 Aero Drive
San Diego, CA 92123

3.3 Wetland Restoration Specialist

Overall supervision of the installation and maintenance of this restoration effort will be the responsibility of a wetland restoration specialist. The wetland restoration specialist must have at least seven years of wetland restoration and maintenance experience and be approved by the resource agencies and the City. The wetland restoration specialist will oversee the efforts of the installation/maintenance contractor for the life of the restoration (i.e., until project signoff). Specifically, the wetland restoration specialist will educate all construction and maintenance personnel about restoration goals and requirements; inspect plant material; directly oversee wetland grading, planting, seeding, weeding, and other maintenance activities; and conduct regular monitoring and annual assessments of the restoration effort. The wetland restoration specialist will provide the E&CP Project Manager and contractor with a written monitoring memo, including a list of items in need of attention, after qualitative monitoring visits (see Section 7.1 for discussion of qualitative monitoring). The wetland restoration specialist will prepare and submit annual monitoring reports.

3.4 Installation/Maintenance Contractor

The City E&CP Project Manager will hire a qualified restoration contractor with at least seven years of applicable restoration experience, i.e., wetland restoration and native and non-native plant identification. The contractor will be a firm holding a valid C-27 Landscape Contracting License from the State of California, a valid Pest Control Business License, and a Qualified Applicator Certificate or Qualified Applicator License, with Category B, which will allow them to perform the required work for this restoration effort. The contractor may be from the same firm as the wetland restoration specialist. The E&CP Project Manager may change contractors at their discretion.

The restoration contractor will be responsible for initial weed control/dethatching, fencing/barrier installation, irrigation installation, and planting and seeding during installation, as well as maintenance of the restoration site during the 120-day plant establishment period (PEP) and five-year maintenance and monitoring period.

Following installation, the restoration contractor will submit marked-up as-built plans for all implementation activities to the E&CP Project Manager. The restoration contractor will be held responsible for meeting all PEP success criteria until formal sign-off of the PEP has been obtained from the wetland restoration specialist, E&CP Project Manager, and City DSD staff.

Following formal sign-off of the PEP, the restoration contractor will be responsible for maintaining the mitigation site for a minimum of five years. During this period, the contractor will service the entire mitigation site according to the maintenance schedule (Section 5.0, below). Services will include, but not be limited to, weed control, irrigation maintenance, trash removal, watering, dead plant replacement, reseeding, and pest and disease management. All activities conducted will be seasonally appropriate and approved by the wetland restoration specialist and E&CP Project Manager. The contractor will meet with the wetland restoration specialist and E&CP Project Manager at the site when requested and will perform all checklist items in a timely manner as directed.

3.5 Grading Contractor

The installation contractor will be responsible for any required grading as part of the restoration effort. If the installation contractor is not capable of performing the grading itself, they will hire a qualified grading contractor to perform the work. The grading contractor must have at least five years of wetland restoration experience. The grading contractor must have demonstrated at least three projects with successful wetland establishment, as determined by the site's ability to support wetland hydrology and vegetation. The grading contractor will be a firm holding a valid General Engineering or C-27 Landscape Contracting License from the State of California that will allow them to perform the required work for this restoration effort. In addition, the machine operator performing the grading activities will also be experienced in restoration work. The E&CP Project Manager may change contractors at their discretion.

During grading, the grading contractor will be responsible for topographic reconstruction and implementation of any best management practices required during grading.

3.6 Wetland Biologist

The wetland biologist will work closely with the wetland restoration specialist to direct restoration. The wetland biologist and wetland restoration specialist may be the same person provided all qualifications are met. The wetland biologist will have at least five years of wetland restoration experience and will be approved by the City and resource agencies. The wetland biologist will directly supervise all work to be conducted in or adjacent to wetlands and sensitive habitats.

3.7 Native Plant Nursery

The restoration contractor will be responsible for seed collection and container plant propagation. If the restoration contractor cannot perform the work in-house, seed collection will be conducted by a nursery that specializes in native plants and contract seed collection and growing. The nursery will be responsible for providing brief updates on the progress of seed collection and propagation activities to the wetland restoration specialist and City E&CP biologist.

4.0 Implementation Plan

This section describes the restoration design and how it will be implemented. The project has been designed to create 1.38 acres of wetland habitat, create 1.53 acres of riparian habitat, enhance 0.67 acre of wetland habitat, enhance 1.81 acres of native grassland habitat, enhance 0.24 acre of vernal pool basin, and preserve existing native grassland habitat on-site. The wetland, native grassland and vernal pool enhancement areas have been designed to mitigate impacts to western burrowing owl foraging habitat by enhancing these areas through weed removal and the addition of native, low-growing plant species seed to improve these areas for owl foraging.

The mitigation site boundaries, the establishment and enhancement areas, the preservation areas, and the conceptual mitigation design are shown in Figure 7. Figure 7 also depicts where roadway

improvement culverts will run northeast to southwest, under the La Media and Airway Roads intersection, and into the mitigation site. Implementation of mitigation efforts will be conducted under the direction of a qualified wetland restoration specialist as defined in Section 3.3. All restoration and enhancement activities will commence the first summer–fall season prior to, or concurrently with, the initiation of project impacts, as feasible with project construction. Implementation activities are described in Section 4.3 and five-year maintenance activities are presented in Section 5.0. Performance standards are outlined in Section 6.0 and monitoring activities are discussed in Section 7.0.

4.1 Preliminary Design

Mitigation would occur adjacent to the project site within the parcels to be purchased by the City. Mitigation would consist of improvements to wetland habitat through establishment/restoration and enhancement efforts. Establishment of wetland habitat will occur on non-native grassland through grading of the site to improve wetland hydrology, weed maintenance, irrigation system installation (if possible), container plant and/or cutting installation, and seeding. Establishment of riparian habitat would also occur in areas of existing non-native grassland and would include minor site grading to blend elevations between the wetland establishment and the native grassland enhancement areas. Additional riparian establishment activities include weed maintenance, irrigation system installation, container plant and/or cutting installation, and seeding. The establishment of wetland and riparian habitat will occur through the conversion of non-native grassland to habitat that supports obligate wetland and facultative wetland plant species (USDA 2020). These establishment areas will be graded to improve existing site topography to achieve two objectives; (1) better distribute water flows that enter the site after the completion of the road improvements and (2) improve flow conveyance through the site. Newly established topography within the site will be blended with existing elevations adjacent to the site. Wetland establishment areas are areas that were identified in the hydraulic analysis (see Attachment 1) as being within the inundation limits, or ordinary high water mark, of the low flow channel after the completion of grading and, therefore, would be capable of supporting hydrophytic vegetation and developing hydric soils. The riparian establishment areas are areas that, after grading, are outside the modeled ordinary high water mark (see Attachment 1) and although they might not necessarily develop hydric soils, these areas will be capable of supporting riparian vegetation. Grading will be conducted per the La Media Road Wetland Mitigation Grading Plans (Rick Engineering 2022). Enhancement of wetland habitat will occur through seeding and weed maintenance. It is not anticipated that installation of container plants and/or cuttings will be necessary for the wetland enhancement areas, although supplemental plant installation may be recommended as a remedial measure during the PEP or maintenance and monitoring period. Enhancement of native grassland habitat will occur through minor grading, weed maintenance, irrigation system installation (if possible), and seeding. Existing native grassland and vernal pools and watersheds will be further enhanced through weed maintenance and seed dispersal. All areas will be maintained throughout the five-year maintenance and monitoring period.

Restoration and enhancement will occur throughout the entire mitigation site. A native wetland component will traverse through the center of the site, transitioning to native grasslands that are suitable for burrowing owl foraging. Pockets of vernal pools will occur within the native grassland areas on the east side third of the site.

Image source: NearMap (flown January 2022)

Mitigation Site Boundary

Temporary Impact Restoration (0.34 acre)

Roadway Improvement Culverts

10-inch Contours

Proposed Wetland Design

Wetland Establishment (1.38 acres)

Riparian Establishment (1.53 acres)

Wetland Enhancement (0.67 acre)

Vernal Pool/Wetland Enhancement (0.24 acre)

Watersheds

Native Grassland Preservation (0.08 acre)

Native Grassland Enhancement (1.81 acres)

0 Feet 100

RECON

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La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

FIGURE 7

Conceptual Wetland Mitigation Design

4.2 Avoidance and Minimization Measures

This mitigation plan has been designed to avoid impacts to sensitive resources. During mitigation implementation, avoidance and minimization measures will be implemented to avoid impacts to existing vernal pools, native habitats, and sensitive bird species. General avoidance and minimization measures will be implemented as follows:

Mitigation Design

1. Any development adjacent to the MHPA shall be constructed to slope away from the extant pools to be avoided, to ensure that runoff from the project does not flow into the pools.

2. Permanent protective fencing will be installed along any interface with developed areas and/or use of other measures approved by the City of San Diego to deter human and pet access to on-site habitat. Fencing will be shown on the development plans and should have no gates (except to allow access for maintenance and monitoring of the mitigation area) and be designed to prevent intrusion by pets. Signage for the mitigation area will be posted and maintained at conspicuous locations. The requirement for fencing and/or other preventative measures is further discussed in Section 4.3.5.

Mitigation Implementation

1. Prior to implementation activities, the wetland biologist shall supervise the placement of orange construction fencing or equivalent along the limits of disturbance adjacent to sensitive habitats and verify compliance with any other project conditions. This will include flagging native plants and creating buffers to protect sensitive biological resources (including nesting birds) during construction. Appropriate steps/care should be taken to minimize attraction of nest predators to the site.

2. Temporary silt fencing will be installed at the limits of the mitigation site (including implementation staging areas and access routes) to prevent impacts to adjacent wetlands (including vernal pools) and the spread of silt from the mitigation construction zone into adjacent habitats outside of the mitigation site. Fencing will be installed in a manner that does not impact native vegetation and existing resources. Final construction plans will include photographs that show the fenced limits of impact. If work inadvertently occurs beyond the fenced or demarcated limits of impact, all work will cease until the problem has been remedied to the satisfaction of the resource agencies and the City. Temporary construction fencing will be removed upon project completion.

3. Impacts from fugitive dust during grading will be avoided and minimized through watering and other appropriate measures.

4. The qualified wetland specialist that has been approved by the City will be on-site as needed during implementation activities to ensure compliance with all mitigation measures identified in the CEQA environmental document. The biologist will perform the following duties:

    a. Oversee installation of and inspect the fencing and erosion control measures within or upslope of wetland restoration and enhancement areas as needed, including daily during all rain events to ensure that any breaks in the fence or erosion control measures are repaired immediately.

    b. Periodically monitor the work area to ensure that work activities do not generate excessive amounts of dust.

    c. Train all contractors and construction personnel on the biological resources associated with this project and ensure that training is implemented for construction personnel. At a minimum, training will include discussions of (1) the purpose for resource protection; (2) native species and their habitats; (3) the conservation measures that must be implemented during implementation to conserve the wetland species, including strictly limiting activities, vehicles, equipment, and construction materials to areas that require grading; (4) environmentally responsible construction practices as outlined in measures 4, 5, and 6 below; (5) the protocol to resolve conflicts that may arise at any time during the construction process; and (6) the general provisions of the project's mitigation monitoring and reporting program, the need to adhere to the provisions of the federal Endangered Species Act, and the penalties associated with violating the federal Endangered Species Act.

    d. Submit regular monthly letter reports to the City of San Diego Mitigation Monitoring and Coordination (MMC) and City MSCP staff during mitigation implementation and a final as-built report within 60 days following completion of implementation. The final report will include as-built construction drawings with an overlay of habitat that was restored and other relevant summary information documenting that authorized impacts were not exceeded and that general compliance with all conservation measures was achieved.

4. The following conditions will be implemented during project implementation:

    a. Employees will strictly limit their activities, vehicles, equipment, and implementation materials to the fenced project footprint.

    b. The project site will be kept as clean of debris as possible. All food-related trash items will be enclosed in sealed containers and regularly removed from the site.

    c. Disposal or temporary placement of excess fill, brush, or other debris will be limited to areas within the fenced project footprint.

5. All equipment maintenance, staging, and dispensing of fuel, oil, coolant, and any other such activities will occur in designated areas as approved by the wetland biologist. These designated areas will be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering the vernal pools or their

watersheds and should be shown on the construction plans. Fueling of equipment will take place within existing disturbed areas greater than 100 feet from the vernal pools or their watersheds. Contractor equipment should be checked for leaks prior to operation and repaired as necessary. A spill kit for each piece of construction equipment should be on-site to be used in the event of a spill. "No-fueling zones" will be designated on construction plans.

6. Grading activities immediately adjacent to wetlands will be timed to avoid wet weather to minimize potential impacts (e.g., siltation) to the vernal pools unless the area to be graded is at an elevation below the pools. To achieve this goal, grading adjacent to wetlands will comply with the following:

    a. Grading will occur only when the soil is dry to the touch both at the surface and one inch below. A visual check for color differences (i.e., darker soil indicating moisture) in the soil between the surface and one inch below indicates whether the soil is dry.

    b. After a rain of greater than 0.2 inch, grading will occur only after the soil surface has dried sufficiently as described above and no sooner than two days (48 hours) after the rain event ends.

    c. To prevent erosion and siltation from storm water runoff due to unexpected rains, best management practices (i.e., silt fences) will be implemented as needed during grading.

    d. If rain occurs during grading, work will stop and resume only after soils are dry, as described above.

    e. Grading will be done in a manner to prevent runoff from entering preserved habitats.

    f. If necessary, water spraying will be conducted at a level sufficient to control fugitive dust but not to cause runoff into preserved habitats.

    g. If mechanized grading is necessary, grading will be performed in a manner to minimize soil compaction (i.e., use the smallest type of equipment needed to feasibly accomplish the work).

7. To avoid any direct impacts to coastal California gnatcatcher (*Polioptila californica californica*), least Bell's vireo (*Vireo bellii pusillus*), white-tailed kite (*Elanus leucurus*), northern harrier (*Circus hudsonius)*, Cooper's hawk (*Accipiter cooperii*), western burrowing owl (*Athene cunicularia*), coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), southern rufous-crowned sparrow (*Aimophila ruficeps canescens*), any species identified as a listed, candidate, sensitive, or special status species in the MSCP, or nesting migratory birds and raptors protected by MBTA and the CDFG code 3503/3503.5, removal of habitat that supports active nests in the mitigation site should occur outside the breeding season for these species (February 1 to September 15). If removal of habitat in the mitigation site must occur during the breeding season, an approved biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds on the proposed area of disturbance. The pre-construction survey shall be conducted within 10 calendar days prior to the start of construction activities (including removal of vegetation). The wetland biologist shall submit the results of the

pre-construction survey to the City for review and approval prior to initiating any construction activities. If nesting birds are detected, a letter report or mitigation plan in conformance with the City's Biology Guidelines (i.e., appropriate follow up surveys, monitoring schedules, construction and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided. The report or mitigation plan shall be submitted to the City for review and approval and implemented to the satisfaction of the City. The City's MMC Section and Biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction.

4.3 Implementation Activities

Implementation activities include seed collection and plant propagation, non-native weed biomass dethatching, topographic recontouring/grading, barrier/signage installation, irrigation system installation, wetland vegetation salvage, and plant and seed installation. The implementation schedule is shown in Table 4. Implementation will commence prior to or concurrently with the start of construction of the project.

All final specifications and topographic-based grading, planting, and irrigation plans will have 0.5-foot contours.

Table 4
Implementation Schedule

Task	Time of Year
Seed Collection	Spring/summer for annual seed, summer/fall for perennial seed
Cutting Collection	Winter
Non-native Weed Dethatching	Summer/fall
Topographic Recontouring/Grading	Summer/fall (after dethatching)
Barrier/Signage Installation	Fall
Irrigation System Installation	Fall
Wetland Plant Salvage	Summer/fall (prior to start of wet season)
Plant and Seed Installation	Winter (after the start of the wet season)

4.3.1 Seed Collection

Seed collection should begin at the onset of the project and should be conducted within the impact areas and mitigation site vicinity. Species recommended for collection are shown in Table 5 and will be used for container plant propagation and hand seeding.

Seed should be collected first from areas to be impacted by project construction activities, and from within the mitigation site itself. If adequate seed cannot be obtained on-site, seed collected within San Diego County at a similar elevation to the mitigation site or obtained from commercial sources may be acceptable with consultation with the wetland restoration specialist and the City E&CP Biologist. The sources of all plant material and seed will be provided to the City prior to dispersal.

Plant propagation should begin as soon as possible by a qualified native plant nursery as defined in Section 3.7. Seed collected or procured for the project will be used for container plant propagation in the species and quantities discussed in Section 4.2.7. Container plants will be inoculated with mycorrhizae (mutualistic fungi) by using native soil that contains fungi and other microorganisms. Providing the necessary microorganisms can increase outplanted plants survival rates (Allen 1988).

Table 5
Plant Species Targeted for Collection

Plant Species	Common Name	Habitat Type[1]	Arid West Wetland Status[2]
Anemopsis californica	yerba mansa	FWM	OBL
Ambrosia psilostachya	western ragweed	FWM, SWS, VP	FACU
Artemisia douglasiana	mugwort	FWM, SWS	FAC
Artemisia palmeri	San Diego sagewort	SWS	n/a
Baccharis salicifolia	mule fat	SWS	FAC
Bolboschoenus maritimus	alkali bulrush	FWM	OBL
Bothriochloa barbinodis	cane bluestem	NG	n/a
Bromus carinatus	California brome	NG	n/a
Distichlis spicata	salt grass	FWM, NG	FAC
Eleocharis macrostachya	pale spike rush	FWM, VP	FACW[3]
Eryngium aristulatum	San Diego button-celery	VP	n/a
Eschscholzia californica	California poppy	NG	n/a
Eriophyllum confertiflorum	Golden yarrow	NG	n/a
Heliotropium curassavicum	salt heliotrope	EW	FACU
Iva hayesiana	San Diego marsh elder	SWS	FACW
Juncus acutus ssp. *leopoldii*	southwestern spiny rush	EW, SWS	FACW
Juncus bufonius	toad rush	VP	n/a
Juncus dubius	mariposa rush	EW	FACW
Juncus mexicanus	Mexican rush	EW	FACW
Lasthenia californica	goldfields	NG	n/a
Lupinus succulentus	arroyo lupine	NG	n/a
Malvella leprosa	alkali mallow	NG, VP	n/a
Muhlenbergia rigens	deergrass	SWS	FAC
Oenothera elata ssp. *hookeri*	Hooker's evening primrose	SWS	FACW
Plantago erecta	dot-seed plantain	NG, VP	n/a
Plantago elongata	plantain	VP	n/a
Psilocarphus brevissimus	dwarf woollyheads	VP	n/a
Pluchea odorata	salt marsh fleabane	EW, SWS	FACW
Pluchea sericea	arrow-weed	SWS	FACW
Rosa californica	California rose	SWS	FAC
Rumex salicifolius	willow dock	EW	FACW
Salix exigua	narrow-leaved willow	SWS	FACW
Salix gooddingii	Goodding's black willow	SWS	FACW
Salix laevigata	red willow	SWS	FACW
Salix lasiolepis	arroyo willow	SWS	FACW

Table 5 Plant Species Targeted for Collection			
Plant Species	Common Name	Habitat Type[1]	Arid West Wetland Status[2]
Schoenoplectus californicus	California bulrush	EW	OBL
Sidalcea malviflora	prairie mallow	NG	n/a
Sporobolus airoides	alkali sacaton	NG	n/a
Stipa pulchra	purple needlegrass	NG	n/a
Vitis girdiana	wild grape	SWS	FAC

[1]Habitat Type:
EW=emergent wetland
FWM=freshwater marsh
SWS=southern willow scrub
NG=native grassland
VP=vernal pool

[2]Wetland Indicator Status per USDA plant database (USDA 2020):
FAC= facultative
FACU= facultative upland
FACW= facultative wetland
OBL= obligate wetland

[3]Wetland status not provided in USDA database; assumed to be FACW.

4.3.2 Cutting Collection

Native wetland species that occur in the impact area and are appropriate for propagation from cuttings will be collected prior to construction activities. Anticipated species to be collected include mule fat (*Baccharis salicifolia*), willows (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), and western sycamore (*Platanus racemosa*).

All cuttings will be collected in 5- to 6-foot segments from secondary branches of living trees. After collection, cuttings will be placed in enough water to cover at least half to three-fourths of the cutting. Once root buds begin to develop, after approximately 7 to 10 days, the cuttings should be transplanted either within the mitigation site or into containers to be cared for at a local native plant nursery until the mitigation site is ready for plant installation. If plants require care for longer than six months, the nursery will provide the wetland restoration specialist and City E&CP Biologist quarterly (every three months) progress updates with photos to document plant health.

4.3.3 Non-native Weed Dethatching

To prepare the site for installation of native plant and seed material, areas of dense non-native weed material will be removed from the mitigation site. Outside of the riparian bird breeding season (March 15 through September 15), crews familiar with native and non-native plants will remove the non-native weed material throughout the mitigation site through the use of mowers, line trimmers, and rakes. If non-native weed removal must occur during the bird breeding season, a nesting bird survey will be conducted by a qualified biologist before work begins. Cut material will be raked into piles, removed from the site, and taken to a landfill or put into a green waste dumpster for disposal.

Removal of the non-native weeds will aid in preparing the site for grading, creating space for container plants and hand seeding of native annual species, and reducing future weed growth.

4.3.4 Topographic Recontouring/Grading

Topographic recontouring, or grading, at the site will be implemented to create topography that supports wetland habitat and burrowing owl foraging. The wetland establishment areas of the site where the elevation might be slightly higher than desired will be gently contoured to aide in the establishment of wetland indicators (hydric soils, hydrology, and hydrophytic vegetation). The intent of grading within the wetland establishment areas will be to create a meandering drainage system with a broad active floodplain and the ability to capture and retain water as it flows from the preserved wetlands north of Airway Road, under the intersection of Airway and La Media roads, and into the wetland mitigation site (see Figure 7). Grading will be done in a manner that blends the created topography of the mitigation site with the surrounding areas; newly created elevations will blend with existing grades located outside the mitigation site. The urban/developed area currently supporting a storage yard will be graded to create a gently sloping topography that blends with the native grassland enhancement area south of the storage pad as well as the wetland establishment area to the east. The intent of grading in the native grassland enhancement areas will be to enhance existing topography to be suitable for owl foraging and capable of supporting native grassland vegetation.

The grading will be conducted under the direction of the wetland restoration specialist, as described in Section 3.3. Areas that are to remain unaffected by grading activities will be marked prior to implementation. The grading will be implemented using a small bulldozer or skidsteer, as deemed appropriate by the grading contractor. After grading, appropriate erosion control (i.e., fiber rolls, gravel bags) will be installed in strategic locations within the site to prevent erosion.

After grading, high resolution aerial photography will be captured using a professional small unmanned aerial vehicle (sUAV). Using industry standard photogrammetry software and procedures, a digital surface model (DSM) will be generated using the data collected by the sUAV. The as-built grading plans and report figures will include wetland boundaries and 0.5-foot contours, both of which will be derived from the DSM, and will be replotted at 1 inch equals 40 feet.

4.3.5 Barrier/Signage Installation

Protection of the mitigation site from human disturbance is essential for success. Of particular importance is protection of the mitigation site from pedestrians, off-road vehicles, and trash dumping. After grading, a temporary fence will be erected and maintained around the perimeter of the mitigation site to bar unauthorized access. Prior to irrigation system and container plant installation, the mitigation site will be permanently fenced with a combination of chain-link and three-strand barbless wire fencing in consultation with the City. Chain-link fencing will be installed on the north and east project limits. High traffic levels on the adjacent La Media and Airway roads present an increased probability of trespassing. Three-strand barbless wire will be installed on the western and southern limits where the mitigation site transitions into non-native grasslands to allow for wildlife movement through the site.

Signs will be installed to provide notice that the area is an ecological preserve, notify that trespassing is prohibited, and cite penalties for trespass violation, including liability for repair of any damage to soil or biological resources within the barrier. Signs in both Spanish and English will be mounted at approximately 200-foot intervals around the mitigation site.

4.3.6 Irrigation System Installation

If a point of connection to a reliable water source is available at the time of mitigation implementation, a temporary aboveground irrigation system will be installed within areas planned to receive container plants at the installation contractor's discretion and with the approval of the City E&CP Biologist. The irrigation system will be field fit to provide adequate irrigation coverage to all installed container plants. Quick couplers will be installed within the irrigation system to allow for hand watering of container plants or seedlings that may require additional supplemental irrigation. Quick couplers will also provide on-site water for mixing of herbicides. To encourage deep rooting of riparian tree species, irrigation bubblers may also be recommended and installed at individual trees or at tree planting clusters.

If a reliable point of connection is not available at the time of container plant installation, all container plants and germinating upland seed will be watered by water truck and hoses. In this case, the water truck would fill up at the closest fire hydrant using the appropriate water meter (either City of San Diego or Otay Water District).

4.3.7 Plant Installation

Planting will occur after the irrigation system installation has been deemed fully operational and after the first significant rainfall of the wet season. See Table 4 for the seeding and planting schedule.

Approximately 1.38 acres of wetland habitat and 1.53 acres of riparian habitat will be created from non-native grassland. In addition, approximately 0.67 acre of wetland, and 0.32 acre of native grassland and vernal pools and their watersheds will be enhanced. The container plant palette for the wetland and riparian establishment areas is listed in Table 6. Establishment areas will receive plant and seed material; enhancement areas will receive seed material but will only receive plant material as an adaptive management strategy during the PEP and/or maintenance and monitoring period (see Section 5.8).

All plant material will be installed in a way that mimics natural plant distribution. In general, plant species will be installed based on water requirements, with obligate and facultative wetland species installed at lower elevations of the mitigation site and facultative species installed at higher elevations along the margins of the wetland establishment and enhancement areas (see Table 4). Container plants will be installed using standard horticultural practices, using a hole at least twice the diameter of the root ball. All plants will be thoroughly watered in their pots before planting, as will the soil in all planting holes. If an irrigation system with automatic timers is not installed on-site, each container plant will be installed with a 2- to 3-inch berm, or watering basin, approximately 24 inches in diameter around the edge of the plant to hold irrigation water.

Cuttings will be installed in locations within the mitigation site where holes can be dug deep enough to reach the water table. Installing cuttings in a manner that allows for constant access to water helps ensure cutting survival and establishment.

Table 6
Container Stock for the Wetland Establishment Area[1]

Scientific Name	Common Name	Size	Number per Acre
Wetland Establishment Plant Installation			
Anemopsis californica	yerba mansa	1-gallon	125
Ambrosia psilostachya	western ragweed	1-gallon	100
Artemisia douglasiana	mugwort	1-gallon	100
Bolboschoenus maritimus	saltmarsh bulrush	Plug	75
Distichlis spicata	salt grass	Rose-pot	100
Iva hayesiana	San Diego marsh-elder	1-gallon	100
Juncus acutus ssp. *leopoldii*	southwestern spiny rush	1-gallon	150
Juncus dubius	mariposa rush	Rose-pot	100
Juncus mexicanus	Mexican rush	1-gallon	125
Pluchea odorata	salt marsh fleabane	1-gallon	50
Pluchea sericea	arrow-weed	1-gallon	25
Salix exigua	narrow-leaf willow	Cutting or 1-gallon	75
Salix gooddingii	Goodding's black willow	Cutting or 1-gallon	50
Salix laevigata	red willow	Cutting or 1-gallon	75
Salix lasiolepis	arroyo willow	Cutting or 1-gallon	100
Schoenoplectus californicus	southern bulrush	Plug	75
		TOTAL	1,425
Riparian Establishment Installation			
Ambrosia psilostachya	western ragweed	1-gallon	100
Artemisia douglasiana	mugwort	1-gallon	100
Artemisia palmeria	San Diego sagewort	1-gallon	100
Baccharis salicifolia	mule fat	Cutting or 1-gallon	75
Muhlenbergia rigens	deer grass	1-gallon	100
Rosa californica	California rose	1-gallon	50
Salix gooddingii	Goodding's black willow	Cutting or 1-gallon	75
Salix laevigata	red willow	Cutting or 1-gallon	50
Salix lasiolepis	arroyo willow	Cutting or 1-gallon	50
Vitis girdiana	desert wild grape	1-gallon	50
		TOTAL	750

[1]Although container planting is not proposed in the wetland enhancement area, these species may be installed as remedial measures.

4.3.8 Hand Seeding

The wetland and riparian establishment and wetland enhancement areas of the site will be hand-seeded with native seed collected for the project or purchased from the approved native plant nursery. Table 7 includes a recommended seed list and appropriate quantities; this list may be adjusted based on the results of seed collection and in consultation with the wetland restoration specialist and City E&CP Biologist. The same seed mix will be installed within both habitats

throughout the mitigation site. The areas to receive seed will be lightly raked prior to seeding to ensure good soil to seed contact. All species of seed will be mixed together with an inert material, such as sand or rice hulls, and applied to the freshly raked areas through hand broadcasting. If no irrigation system is installed, seed will be applied during the late winter months, immediately prior to (within 48 hours) of a forecasted rain event of 0.25 inch or more. If an irrigation system is installed on-site, seeding may occur at any time after the first significant rainfall event of the winter season.

Table 7 Seed Mix for the Wetland Restoration Areas		
Scientific Name	Common Name	Pounds per Acre
Anemopsis californica	yerba mansa	4.0
Ambrosia psilostachya	western ragweed	3.0
Artemisia douglasiana	Douglas mugwort	4.0
Eleocharis macrostachya	pale spike rush	2.0
Juncus dubius	mariposa rush	4.0
Muhlenbergia rigens	deergrass	3.0
Oenothera elata ssp. *hookeri*	Hooker's evening primrose	2.0
Rumex salicifolius	willow dock	2.0
Vitis girdiana	wild grape	1.0
	TOTAL	25.0

The species listed in Table 8 will be hand seeded within the vernal pools and their watersheds. The seed will be dispersed by hand but will not be raked to prevent disturbing the soil crust of the pools and their watersheds.

Table 8 Seed Mix for the Vernal Pools and Vernal Pool Watersheds		
Scientific Name	Common Name	Pounds per Acre
Ambrosia psilostachya[1]	western ragweed	3.0
Distichlis spicata[1]	saltgrass	4.0
Eleocharis macrostachya[2]	pale spike rush	2.0
Eryngium aristulatum[2]	San Diego button-celery	as available
Heliotropium curassavicum[1]	salt heliotrope	4.0
Juncus bufonius[1]	toad rush	4.0
Malvella leprosa[2]	Alkali mallow	as available
Plantago elongata[2]	Plantain	as available
Psilocarphus brevissimus[2]	Dwarf woollyheads	as available
Stipa pulchra[1]	purple needlegrass	5.0
	TOTAL	29.0[3]
[1]Species to be seeded adjacent to vernal pools and within their watersheds. [2]Species to be seeded within vernal pool basins. [3]Total seed quantity based on availability.		

4.3.9 Hydroseeding

The native grassland areas of the site will be hydroseeded with native seed collected for the project or purchased from the approved native plant nursery. A hydroseed mixture of wood fiber mulch, a light tackifier, and the native seed shown in Table 9 will be applied within the native grassland areas. The seed list and appropriate quantities may be adjusted based on the results of seed collection and in consultation with the wetland restoration specialist and City E&CP Biologist. Hydroseeding will be conducted during the early winter months (December – January).

Table 9
Hydroseed Mix for Native Grassland Enhancement Area

Scientific Name	Common Name	Pounds per Acre
Bromus carinatus	California brome	3.0
Bothriochloa barbinodis	cane bluestem	5.0
Distichlis spicata	saltgrass	2.0
Eschscholzia californica	California poppy	5.0
Eriophyllum confertiflorum	golden yarrow	2.0
Lasthenia californica	goldfields	3.0
Lupinus succulentus	arroyo lupine	2.0
Plantago erecta	dot-seed plantain	3.0
Psuedognaphalium canescens	Wright's cudweed	2.0
Malvella leprosa	alkali mallow	2.0
Sidalcea malviflora	prairie mallow	2.0
Sporobolus airoides	alkali sacaton	3.0
Stipa pulchra	purple needlegrass	8.0
	TOTAL	42.0

4.4 As-Built Reporting

At the completion of implementation, the installation will be approved by the City DSD and E&CP Biologist. The installation/maintenance contractor will submit an as-built report within 90 days of the completion of implementation that documents implementation activities and the dates they were completed. The report may be a brief letter report and will include but not be limited to dates of on-site work, final plant and seed lists and quantities, photos, and figures with the wetland boundaries and 0.5-foot contours, derived from the sUAV survey and DSM.

4.5 120-day PEP

The 120-day PEP will begin once the implementation activities are approved by the City, likely once all container plants and native seed have been installed. The PEP will last for 120 calendar days and will consist of all maintenance activities and methods discussed in Section 5.0. Regular (at least once per week) qualitative monitoring will be conducted to assess native container plant establishment and non-native weed germination and make recommendations for maintenance activities, as needed (Table 10). At the end of the PEP, any dead container plants will be replaced in-kind and the

mitigation site will be free of non-native weed species. At the completion of the PEP, the wetland restoration specialist will prepare a letter report for submittal to the City to document activities conducted during the PEP, assess site progress towards final success criteria, and recommend approval of the PEP. Year 1 of the maintenance and monitoring period will begin after successful completion of the PEP and any required remedial container plant installation has been completed.

Table 10
Maintenance Schedule

Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Weed Control (herbicide treatment)	As needed	Monthly[1]	Monthly[1]	5 to 6 times per year[1]	4 to 5 times per year[1]	4 times per year[1]
Watering	As needed	As needed	As needed	As needed	--	–
Supplemental Planting/ Seeding	At end of PEP	Fall/Winter	Fall/Winter	–	–	–
Trash Removal	As needed	As needed	As needed	As needed	As needed	As needed
Barrier/Sign Maintenance	As needed	As needed	As needed	As needed	As needed	As needed
Footpath Decompaction/ Seeding	--	–	–	–	–	End of project
[1]Minimum frequency						

5.0 Maintenance Plan

Regular maintenance of the mitigation site will be required during the five-year maintenance and monitoring period to establish native container plants and control non-native weeds. The need for weeding is expected to decrease substantially toward the end of the maintenance and monitoring period provided sufficient restoration progress has been achieved. Maintenance activities will include weed control, watering, supplemental planting and seeding, erosion control, trash removal and barrier/sign maintenance, and footpath decompaction. Maintenance activities will be performed per the schedule in Table 9.

5.1 Weed Control

Weed control will be performed consistent with the following:

1. All herbicide and pesticide use will be under the direction of a licensed qualified applicator and will be applied by personnel trained to apply herbicide. All weeding personnel will be educated to distinguish between native and non-native species to ensure that local native plants are not inadvertently killed.

2. Herbicide will only be applied when wind speed is less than five miles per hour, and spray nozzles will be of a design to maximize the size of droplets, to reduce the potential for drift of herbicide to non-target plants. Application of herbicide will not occur if rain is projected within 12 hours of the scheduled application.

3. Only herbicides approved for use in aquatic systems will be used in areas of the site where standing water is present.

4. Weeding will be done at a frequency and duration to ensure that weeds are not allowed to flower and set seed within the site. During the growing season this may be as frequently as every other week, depending on weather patterns. Any weeds that have set seed will be removed by hand and disposed of off-site.

5. Native grassland areas will also be managed as burrowing owl foraging habitat. Management will be conducted in consultation with the wetland and City biologists and may include cutting or mowing of areas to maintain open habitat suitable for owl foraging.

5.2 Watering

Irrigation system operation or hand watering will be performed consistent with the following:

1. The irrigation frequency and duration will be done in a manner to mimic natural rainfall, and encourage deep root establishment, but not enough to create runoff.

2. Irrigation will be carefully tapered off during the summer months to allow plants to experience their typical summer dormancy and avoid potential root rot or excessive soil shrinking and swelling that can damage plant roots.

3. Irrigation will be discontinued at least two years prior to the completion of the five-year maintenance and monitoring period.

5.3 Supplemental Planting and Seeding

Remedial planting and seeding will be performed consistent with the following:

1. Container plants will be replaced, as needed, within the site. All dead plants will be replaced during years 1 and 2 after initial plant installation, unless their function has been replaced by natural recruitment.

2. Areas of the site where native plants and seed struggle to recruit will be remedially planted or seeded during Years 1 and 2.

3. Remedial planting will be conducted to increase vegetative cover.

4. Remedial seeding will be conducted to increase native species richness.

5.4 Erosion Control

Erosion control will be performed consistent with the following:

1. Rills and gullies will be repaired as necessary.

2. Erosion control devices, i.e., biodegradable fiber rolls and gravel bags, or jute netting, will be installed per the manufacturer instructions.

3. Significant erosion from high water flows may require consultation between the wetland restoration specialist and the City to determine an appropriate solution.

5.5 Trash Removal and Barrier/Sign Maintenance

Trash removal and barrier/sign maintenance will be performed consistent with the following:

1. Trash and other debris will be removed as necessary.

2. All fencing and signs will be checked and repaired as necessary.

3. Other site problems, such as vehicle damage and trespassing, will be reported to the City or other adjacent landowners with recommendations for remedial measures.

5.6 Footpath Decompaction and Seeding

Footpath decompaction and seeding will be performed consistent with the following:

1. At the completion of the five-year maintenance and monitoring period and prior to final sign-off, foot paths and access routes that have developed within the site as a result of maintenance and monitoring activities will be lightly decompacted by hand tools and hydroseeded with the species and quantities shown in Table 5. Any footpath areas that have developed soil crusts will not be decompacted, and seed will be applied in these areas by hand. Hydroseeding is recommended for areas where soil crust has not developed to provide additional mulch and soil binders to encourage seed germination.

5.7 Pest Management

Although the presence of invasive shot hole borer (ISHB) is unlikely due to the limited number of target tree species currently present on-site, all native trees will be inspected for signs of ISHB, as well as fungal pathogens throughout the restoration process to ensure early detection of potential infestation. Any evidence of ISHB will be confirmed by a certified arborist and, if confirmed, diseased branches/trees will be removed, chipped to a size of less than one inch, and the mulch material left on-site to decompose. Tools used for handling diseased plant material will be sterilized with a 5 percent bleach solution after use.

Herbivory of native plants is a natural and common occurrence on restoration sites; however, if herbivory is resulting in plant mortality that prohibits the site from achieving final success criteria, remedial measures will be taken. Anti-herbivory measures may include caging or fencing of individual plants, plant species that appear to be particularly targeted by herbivores, or areas of the site where herbivory is particularly problematic. Caging or fencing may include mesh chicken wire and landscape staples or rebar installed around individual plants or silt fencing installed around clusters of plants. Any cage or fence material will be buried at the base to a depth of no less than six inches to preclude herbivores from burrowing under the cage or fence.

5.8 Adaptive Management Approach

An adaptive management approach will be implemented in the event that areas of the site are not attaining the desired habitat values. Adaptive management is defined, for the purposes of this project, as a flexible, iterative approach to the long-term management of biological resources that is directed over time by the results of ongoing monitoring activities and direct observation of environmental stressors that are producing adverse results within the mitigation site.

Achieving the key goals of the mitigation program and establishing self-sustaining native habitats will be the focus of all adaptive management decisions. Adaptive management measures will be based on qualitative data gathered in the field throughout the five-year maintenance and monitoring period. and may include recontouring to improve wetland hydrology, collection and dispersal of plant cuttings or seed, additional weed control efforts, and other actions deemed appropriate through consultation with the City and resource agencies. Examples of potential remedial measures that may be employed during the mitigation project are included in Table 11.

Table 11
Remedial Actions

Problem	Potential Solution
High annual weed cover	Increased weed control visits
High perennial weed cover	Selective herbicide application, additional manual removal
Low native species cover	Additional container plant or cutting installation
Low species richness	Additional seeding of underrepresented species (may focus on annual species)
Minimal native plant growth	Additional watering and/or reconfiguration of irrigation system
Minimal tree growth/ establishment	Installation of modified irrigation components at tree locations, continued watering until trees can self-sustain
Wetland hydrology not confirmed in wetland establishment areas	Additional site grading to improve hydrology

If an interim performance standard (see Section 6.0) is not met in any year or if the final performance standards are not met, the wetland restoration specialist will prepare an analysis of the cause(s) of failure and, if deemed necessary by resource agencies and the City, propose remedial actions for approval. In particular, if during Years 1 and 2, groundwater well monitoring does not determine that the site is flooded or the water table is within 12 inches of the soil surface for more than 14 consecutive days, remedial actions will be conducted within the wetland establishment areas (see Sections 6.5.1 and 7.4 for details regarding groundwater wells). Adaptive management actions may include additional grading to improve hydrology within the mitigation site. The approach to remedial grading within the wetland establishment areas will be determined based on observations made during qualitative and groundwater monitoring and may include grading to enhance site topography, improve water movement, encourage more complex drainage patterns, or other actions recommended by the wetland restoration specialist and resource agencies.

In addition, the wetland restoration specialist will remain in close contact with the City E&CP Project Manager and restoration contractor to discuss potential pro-active restoration actions that should

occur during each year, to guide the project to final success. If any of the enhanced or restored habitat has not met a performance standard during the initial five-year period, the maintenance and monitoring obligations will continue until the City deems the mitigation successful.

6.0 Performance Standards

The mitigation will be deemed successful once the final performance standards are achieved. These standards include native and non-native vegetation cover and native plant species richness. Standards for the wetland and riparian establishment and wetland enhancement areas will be identical and will be compared to the same values taken from a reference site, which will define the target vegetation and establish target values for vegetative cover, species richness, and weed abundance. In addition, the wetland establishment and enhancement areas will also be expected to meet the three wetland criteria, containing positive indicators of hydric soils, hydrology, and hydrophytic vegetation. Depending on climatic conditions, the development of hydric soil may take longer than the five-year monitoring period. If the wetland establishment area meets the hydrophytic vegetation and hydrology criteria and evidence of hydric soil development is observed, the mitigation will be deemed successful. Standards for the native grassland areas will be compared to values established based on the definition of native grassland per the Draft Vegetation Communities of San Diego County (Oberbauer 2008), which states that habitat is considered to be native grassland when the vegetative cover is made up of 20 percent native species, and non-native annual species may exceed native grasses in cover.

Each of the performance standards will be evaluated following the completion of quantitative monitoring (described in Section 7) to determine if the annual performance standards have been met and to assess the progress towards the final performance standard. The final assessment of success will be based on the combined performance over the five-year maintenance and monitoring period.

6.1 Location of Reference Site

A proposed reference site has been identified within the Otay River Valley that mimics the complex habitat composition, topography, and hydrology of mitigation site. The proposed reference site is between Beyer Boulevard and Beyer Way, approximately seven miles northwest of the mitigation site (see Figure 1). The site measures approximately 10 acres of City-owned property and is accessible from the north and south via public trails (Figure 8). The proposed reference site is in excellent condition with a variety of wetland and riparian communities, diverse native species, and few non-native species. Impacts from unauthorized public uses (i.e., trash, vandalism, and/or unauthorized trails) appear minimal. Vegetation communities and surface cover observed within the proposed reference site include southern willow scrub, mule fat scrub, freshwater marsh, emergent wetland, and open water (see Figure 8). Adjacent upland communities are in excellent condition. Native species observed within the proposed reference site include Goodding's black willow, arroyo willow, mule fat, blue elderberry (*Sambucus nigra* ssp. *caerulea*), San Diego marsh-elder, San Diego sagewort (*Artemesia palmeri*), southern cattail (*Typha domingensis*), and broom baccharis. Non-native species cover was low and included salt cedar (*Tamarix ramosissima*), date palm (*Phoenix dactylifera*), Mexican fan palm (*Washingtonia robusta*), and pampas grass (*Cortaderia selloana*). A site visit to the proposed reference site was conducted the day after a rain event; the site was flooded during the visit and water was observed flowing throughout the channel. The use of a reference site will aid in the documentation of annual and seasonal changes that may occur during the course of the mitigation implementation and maintenance. The selection of the reference site will be approved by the City E&CP Biologist.

6.2 Wetland Vegetation Performance Standards

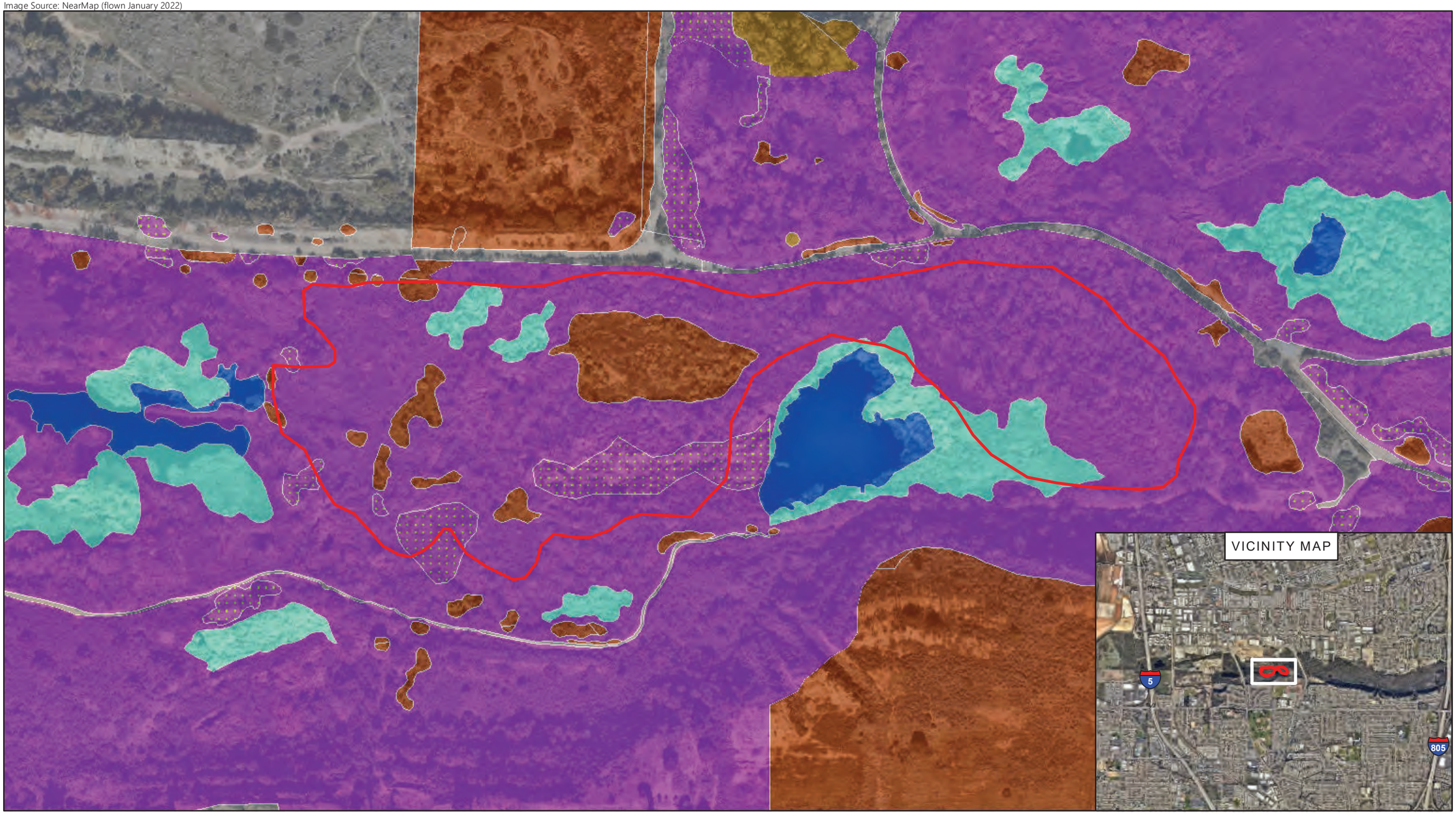
The performance standards will be based on comparison with the reference site described above, and will include target values for container plant survivorship, vegetation cover, species richness, and non-native weed abundance. Yearly target values for the performance standards are presented in Table 12.

Table 12
Wetland and Riparian Establishment /Wetland Enhancement Performance Standards (percentage)

Year	Container Plant Survival	Percent Cover– Native Tree/Shrub Species[1]	Percent Cover– Native Herbaceous Species[1]	Species Richness[1]	Percent Cover– Non-native Species[1,2]
1	80	10	40	N/A	10
2	80	20	50	40	10
3	--	30	60	50	10
4	--	50	70	60	10
5	--	60	80	85	10

[1]Relative to reference site values.
[2]No California Invasive Plant Council (Cal-IPC) High or perennial species will be present (Cal-IPC 2020).

Image Source: NearMap (flown January 2022)



Reference Site (9.69 acres)

Vegetation Community

- Freshwater Marsh
- Southern Willow Scrub
- Disturbed Southern Willow Scrub
- Open Water
- Eucalyptus Woodland
- Disturbed Habitat
- Urban/Developed

0 Feet 150

RECON

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FIGURE 8
Reference Site Existing Conditions

6.2.1 Plant Survivorship, Vegetation Cover, and Species Richness Performance Standards

The plant survivorship, vegetation cover, and species richness performance standards for the wetland and riparian establishment and wetland enhancement areas are as follows:

- Container plant survival will be 80 percent of the initial plantings for Years 1 and 2. After Years 1 and 2, all dead plants will be replaced unless their function has been replaced by natural recruitment.

- At the end of the five-year maintenance and monitoring program, the relative percent cover values will be 60 percent of the reference site for tree/shrub cover and 80 percent of the reference site for herbaceous cover.

- At the end of the five-year maintenance and monitoring period, 85 percent of the native plant taxa are shared with the reference site.

- At the end of the five-year maintenance and monitoring period, the wetland establishment and enhancement areas should contain three wetland criteria: hydric soils, hydrology, and hydrophytic vegetation, as determined through a wetland delineation (details in Section 7.2). However, the development of hydric soil may take longer than the five-year monitoring period and if hydrophytic vegetation and hydrology are identified and evidence of hydric soil development is observed, the mitigation will be deemed successful.

6.2.2 Non-native Weed Cover Performance Standards

The relative cover of non-native species within the wetland and riparian establishment and wetland enhancement areas of the mitigation site will not exceed 10 percent of the non-native weed cover observed at the reference site and no California Invasive Plant Council (Cal-IPC) List High or perennial species (Cal-IPC 2020) will be present at the end of the five-year maintenance and monitoring period.

6.3 Native Grassland Vegetation Performance Standards

The performance standards for the native grassland areas of the site will be absolute and based on the definition of the target habitat type as defined per the Draft Vegetation Communities of San Diego County (Oberbauer 2008). Standards will include target values for vegetation cover, species richness, and non-native weed abundance. Yearly target values for the performance standards are presented in Table 13.

Table 13 Native Grassland Performance Standards (percentage)				
Year	Percent Cover– Native Herbaceous Species[1]	Native Species Richness[1]	Percent Cover– Non-native Broadleaf Species[1,2]	Percent Cover – Non-native Grass Species[1,2]
1	5	4	10	40
2	10	5	10	40
3	15	6	10	40
4	20	7	10	40
5	20	8	10	40
[1]Absolute values. [2]No Cal-IPC High or perennial species will be present (Cal-IPC 2020).				

6.3.1 Vegetation Cover and Species Richness Performance Standards

The vegetation cover and species richness performance standards are as follows:

- At the end of the five-year maintenance and monitoring program, the percent cover values will be 20 percent for native grass and herb cover.
- At the end of the five-year maintenance and monitoring period, eight native plant taxa will be present.

6.3.2 Non-native Weed Cover Performance Standards

The non-native weed cover performance standards are as follows:

- Throughout the monitoring period, non-native broadleaf species within the restoration site will not exceed 10 percent cover.
- Throughout the monitoring period, non-native annual grass species will not exceed 40 percent cover.
- No Cal-IPC List High or perennial species (Cal-IPC 2020) will be present.

6.4 Vernal Pool Vegetation Performance Standards

The performance standards for the vernal pools and their watersheds will be based on the management goals outlined in the VPHCP (City of San Diego 2020) for the complexes adjacent to the mitigation site, which include a focus on non-native weed removal and control. In addition, absolute values for vegetation cover and species richness have been developed to demonstrate enhancement of the pools from baseline conditions. The vernal pools present within the wetland

mitigation site are dominated by non-native weed species with some of the pools supporting clusters of vernal pool indicator plants, such as dwarf woollyheads, American pillwort, toad rush, and pale spikerush. These pools will benefit from the introduction of native vernal pool species seed and an increase in native vegetative cover and species richness is anticipated; however, the control of non-native species will provide the greatest benefit to these pools. Yearly target values for the performance standards are presented in Table 14.

Table 14
Vernal Pool Performance Standards
(percentage)

Year	Percent Cover– Native Vernal Pool Species[1]	Native Species Richness[1]	Percent Cover– Non-native Broadleaf Species[1,2]	Percent Cover – Non-native Grass Species[1,2]
1	5	3	10	20
2	10	4	10	20
3	15	4	10	20
4	20	5	10	20
5	20	5	10	20

[1]Absolute values.
[2]No Cal-IPC High or perennial species will be present (Cal-IPC 2020).

6.4.1 Vegetation Cover and Species Richness Performance Standards

The vegetation cover and species richness performance standards are as follows:

- At the end of the five-year maintenance and monitoring program, the percent cover values will be 20 percent for native vernal pool species cover.
- At the end of the five-year maintenance and monitoring period, five native plant taxa typical of vernal pool ecosystems will be present.

6.4.2 Non-native Weed Cover Performance Standards

The non-native weed cover performance standards include absolute values and are as follows:

- Throughout the monitoring period, non-native broadleaf species within the vernal pools and their watersheds will not exceed 10 percent cover.
- Throughout the monitoring period, non-native annual grass species will not exceed 20 percent cover.
- No Cal-IPC List High or perennial species (Cal-IPC 2020) will be present.

6.5 Wetland Establishment Hydrology Performance Standards

In addition to vegetative performance standards, the mitigation site will be evaluated for wetland hydrology within the wetland establishment areas. Wetland hydrology will be measured through the monitoring of groundwater wells and through a wetland delineation. In addition, all site monitoring visits will include observations of surface hydrology indicators.

6.5.1 Groundwater Wells

Shallow groundwater monitoring wells will be established and monitored within the wetland establishment area of the mitigation site to evaluate wetland development. At least two wells will be installed within the wetland establishment area, one at the north end (upstream) and one at the southern end (downstream). Exact locations of wells will be determined after the completion of grading and as approved by USACE. Wells will be installed to a depth of 15 inches below the soil surface and follow the design and installation as described in the Technical Standard for Water-Table Monitoring of Potential Wetland Sites (USACE 2005). The wells will be installed in October following the completion of grading but prior to the start of the rainfall season. The wells will be monitored to determine that the site is flooded or the water table is within 12 inches of the soil surface for more than 14 consecutive days during three of the five monitoring years.

6.5.2 Wetland Delineation

During Years 3 and 5 of the maintenance and monitoring period, the wetland establishment areas should contain evidence of the three wetland parameters: hydric soils, hydrology, and hydrophytic vegetation. However, the development of hydric soil may take longer than the five-year monitoring period and if hydrophytic vegetation and hydrology are identified and evidence of hydric soil development is observed, the mitigation will be deemed successful.

6.6 Photographic Documentation

Permanent photopoints will be placed within the restoration site. Representative photographs will be taken at each photopoint to visually document the development of vegetation cover over the monitoring period.

7.0 Monitoring Requirements

A minimum commitment of five years of monitoring of the restoration site will be completed. Restoration monitoring will include qualitative maintenance monitoring and monitoring for performance standards, including semi-quantitative vegetation monitoring, complete flora and fauna inventories, and photographic documentation. The monitoring schedule is presented in Table 15.

Table 15 Monitoring Schedule						
Task	120-day PEP	Year 1	Year 2	Year 3	Year 4	Year 5
Qualitative Monitoring	Weekly	Every other week during the growing season (Jan – May)	Every other week during the growing season (Jan – May)	Monthly	Monthly	Monthly
Photograph Documentation	Monthly	As-needed	Spring	Spring	Spring	Spring
Semi-quantitative (vegetation monitoring)	None[1]	Spring	Spring	Spring	Spring	Spring
Groundwater monitoring	Winter/ spring[2]	Winter/ spring[2]	Winter/ spring[2]	Winter/ spring[2]	Winter/ spring[2]	Winter/ spring[2]
Wetland Delineation	--	--	--	Spring	--	Spring

[1]Semi-quantitative monitoring to begin in Year 1.
[2]Groundwater monitoring wells may be monitored manually or through the use of water-level data loggers.

7.1 Qualitative Monitoring

Qualitative monitoring of the mitigation site will be performed to guide maintenance activities and will be conducted as follows:

1. Qualitative monitoring will occur every other week during the growing season in Years 1 and 2 (January – May), monthly thereafter with additional visits conducted during the growing season, as needed to ensure project success (see Table 15). Monitoring will include, but not be limited to, assessment of container plant health, native seed germination, weed presence, and unauthorized trespassing. Monitoring results will be used to determine the timing and frequency of maintenance activities.

7.2 Quantitative Monitoring

Overall native and non-native cover (i.e., trees, shrubs, herbaceous species) and species richness will be evaluated for the wetland and native grassland areas as well as for the wetland reference site. These parameters will be measured using the point-intercept transect monitoring method to measure development towards the individual performance standards for each habitat type (see Tables 10 and 12). Approximately one transect per every five acres will be randomly positioned throughout the mitigation site. Transect monitoring methods will follow the protocol published by the California Native Plant Society (CNPS) in *A Manual of California Vegetation* (Sawyer et al. 2009). Due to the increasing density of riparian vegetation over time and the difficulty and resulting destruction that occurs when trying to access vegetation along a 50-meter transect, this method has been revised to employ a 20-meter-long transect centered in a 20-meter-by-5-meter plot. Vegetation will be sampled by the point method at every half meter (0.5-meter intervals) along the

transect line to determine species and cover. The percent cover of a species will be determined by dividing the number of intercepts by that species by the total number of sample points. The surveyor will note the species encountered and classify their height (i.e., herb, shrub, or tree) at each interval, as described in the CNPS field sampling protocol (CNPS 1995).In addition, native species present within each target habitat type will be counted to determine native species richness. Dead container plants will also be counted within the wetland establishment areas to determine container plant survival.

7.3 Wetland Delineation

A wetland delineation will be conducted during the early spring months during Years 3 and 5 (see Table 14). Delineations conducted during the early spring provide the best opportunities to observe hydrology indicators and identify hydrophytic vegetation. The wetland delineation will follow the guidelines set forth by the USACE, including the 1987 *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008).The wetland establishment and enhancement areas will be expected to meet the three wetland criteria, containing positive indicators of hydric soils, hydrology, and hydrophytic vegetation. Depending on climactic conditions, the development of hydric soil may take longer than the five-year monitoring period. If the wetland establishment area meets the hydrophytic vegetation and hydrology criteria and evidence of hydric soil development is observed, the mitigation will be deemed successful.

7.4 Groundwater Well Monitoring

Groundwater will be monitored by measuring the water level within the groundwater wells. Monitoring will be manual or performed by water-level data loggers, as approved by the USACE. Water-level measurements will be taken one week after the installation of the wells (wells to be installed in October following grading), and then continue daily after the first rainfall event of the season. Measurements will continue until 14 days of consecutive inundation is observed. Monitoring will follow the methods described in the Technical Standard for Water-Table Monitoring of Potential Wetland Sites (USACE 2005).

7.5 Wildlife Usage

A list of wildlife species observed using the mitigation site will be prepared and included in the annual reports. Species lists will be compiled annually and will include observations made during qualitative and quantitative monitoring visits.

7.6 Reporting

Annual reports that assess attainment of yearly interim and progress toward the final performance standards for the mitigation site will be submitted to the City by December 1 of each year. The exact submittal date may vary based on mitigation site implementation dates and permit requirements. The City will be responsible for submitting these reports to the appropriate resource agencies. The

reports will also summarize the project's compliance with all applicable mitigation measures and permit conditions. A final monitoring report will be prepared and submitted to the City for use in the notification of completion and final acceptance of the mitigation effort.

8.0 Long-term Management and Financial Assurances

The USACE regional compensatory mitigation guidelines (USACE 2015) require that after the successful completion of mitigation, compensatory mitigation sites "must be provided long-term protection and funding for long-term management." The following sections describe how City recordation of MSCP lands offer the same protections of a conservation easement and how the long-term funding of the MSCP offers the same financial assurances as a non-wasting endowment.

Long-term maintenance and monitoring of the approved mitigation land shall be conducted by the City PRD Open Space Division, who would serve as the long-term management entity. The Open Space Division is responsible for management of MHPA lands and is comprised of an interdisciplinary team of biologists, park rangers, pesticide applicators, ground maintenance managers and workers, planners, and directors. Management of MHPA lands would occur in accordance with the MSCP program and MSCP Implementing Agreement, which obligates the City to protect and manage lands within the MHPA for purposes of habitat and species conservation.

Section 21.3 of the Implementing Agreement states that "notwithstanding the stated term as herein set forth, the Parties agree and recognize that once Take of a Covered Species has occurred and/or their habitat modified within the Subarea, such Take and habitat modification will be permanent. The Parties, therefore, agree that the preservation and maintenance of the habitat provided for under this Agreement shall likewise be permanent and extend beyond the term of this Agreement." Therefore, although the term of the MSCP is 50 years (1997 – 2047), the preservation of lands within the MHPA, especially in areas where preserved lands are specifically required due to a permanent impact/take, is explicitly permanent. The City has established protections for lands within the MHPA, in conformance with the Implementing Agreement, through Section 143.0101 of the City's Land Development Code (Environmentally Sensitive Lands Regulations). This section of the Land Development Code incorporates Sections 1.4.1 and 1.4.2 of the MSCP Subarea Plan that restricts uses within the MHPA in a similar fashion as a conservation easement or deed restriction. The Land Development Code also incorporates Section 1.4.3 of the MSCP Subarea Plan that restricts land uses adjacent to the MHPA, including potential adverse drainage conditions, toxic chemical uses, lighting, noise, and invasive species. The MSCP is discussed in more detail in Section 8.2, below. These restrictions provide greater site protection and ensure more long-term sustainability than typical conservation easements and/or deed restrictions.

The mitigation site mostly lies within the City MSCP's MHPA, with only a small portion of the southwestern edge being outside the MHPA. Areas of the mitigation site that occur adjacent to the existing MHPA would be added to the MHPA preserve through a boundary line adjustment. After signoff of successful restoration, the site will be preserved in perpetuity as part of the MHPA. The mitigation site contains emergent wetland, freshwater marsh, and vernal pools; therefore, long-term management will follow the guidelines of both the City MSCP and City VPHCP. The MSCP and VPHCP

guidelines are summarized in Sections 8.1 and 8.2 and include requirements for long-term management of the mitigation site with respect to ownership, long-term maintenance (i.e., planting, weed control, barriers-fencing, lighting, drainage, signage-public information and education, trash removal), funding, prohibitions, corrective measures for unforeseen circumstances, monitoring, and responsible parties (i.e., City of San Diego). The extensive preserve management responsibilities included in the MSCP and VPHCP provide for the long-term management of the City-owned mitigation site as part of the MHPA, which provides long-term site protection through the City's program for long-term preserve management. Upon successful restoration, the City will meet the conservation mechanism requirement through implementation of the MSCP Conditions of Coverage and by including a copy of permits, restrictions, and conditions in the property file for the parcels in which the mitigation site lies. These documents are recorded on the property Action Sheet Log with the City's Department of Real Estate and Airport Management who manages all City properties. The Action Sheet Log is managed and maintained by Real Estate Assets Records Management Agent. Prior to any real estate action on a particular property, the Agent must check the Action Sheet Log to ensure that the requested action is in compliance with any guidelines pertaining to the property. This Action Sheet Log provides the same protections of a conservation easement.

8.1 Funding

In lieu of a non-wasting endowment, funding for maintenance would come from the annual operating budget used to manage Parks and Recreation Open Space lands, including specific habitat monitoring and management required by the MSCP and VPHCP. Each year, the City PRD prepares and submits their projected annual budget to the Mayor for presentation to the public and City Council. Budget items related to regulatory compliance are prioritized above other projects to ensure the City is in compliance with all federal and state regulations. The City's General Fund, Environmental Growth Fund, and Special Funds in the PRD long-term accounts provide for maintenance and management of the MHPA with approval from the City Council. PRD's fiscal year (FY) 2023 annual budget for Open Space includes $15.08 million for the management of approximately 27,000 acres of open space and preserve lands (City of San Diego 2022), or $558 per acre. An annual estimated cost of $558 per acre provides for approximately $3,375 per year or 52 labor hours for the 6.05-acre mitigation site. After successful completion, the mitigation site will be dominated by wetland and riparian vegetation. Riparian areas generally require less maintenance as compared to other habitat types and, therefore, this funding is sufficient to conduct annual maintenance. This annual allocation provides for the management and maintenance of existing City preserves as well as additional open space that may be incorporated as additional acquisitions are completed.

8.2 MSCP: City of San Diego Subarea Plan

The City will be responsible for implementing measures that comply with the following sections.

8.2.1 Site Protection

The City MSCP is a comprehensive conservation planning program that was developed to preserve habitat and open space within the region, in perpetuity. In 1997, the City, USFWS, and CDFW entered into the MSCP Implementing Agreement to establish the MHPA. The MSCP provides land use

considerations and management directives that ensure the protection of lands and biological resources located within the MHPA. The USFWS and CDFW oversee the biological monitoring program. After the boundary line adjustment, the mitigation site will be located entirely within the MHPA and the land use considerations and management directives outlined in the MSCP will also guide the long-term management of the mitigation site and ensure the long-term protection of the site. The MSCP and MSCP Implementing Agreement restricts uses within the MHPA similar to a conservation easement, including the implementation of preserve guidelines, land use adjacency guidelines, planning policies, and design guidelines. The mitigation site is preserved in perpetuity in conformance with the MSCP Implementing Agreement and as codified in the City Land Development Code for Environmentally Sensitive Lands Regulation, which serves to protect lands within the MHPA from direct and indirect habitat degradation. Per Section 21.3 of the Implementing Agreement, the preservation of lands within the MHPA, especially in areas where preserved lands are specifically required due to a permanent impact/take is explicitly permanent, which meets the USACE requirement for site protection. Furthermore, a copy of permits, restrictions, and conditions are recorded on the property Action Sheet Log with the City's Department of Real Estate and Airport Management to ensure preservation by the City in perpetuity.

Section 1.4.1 of the City MSCP lists land uses that are compatible with the biological objectives of the MSCP and that may therefore be implemented within the MHPA. Section 1.4.2 provides planning policies and design guidelines to be applied in the review and approval of any development project within or adjacent to the MHPA. In addition, Section 1.4.3 provides further guidelines for land uses adjacent to the MHPA to ensure minimal indirect impacts to the MHPA from nearby activities. These restrictions provide greater site protection and ensure a higher degree of long-term sustainability than a typical conservation easement and/or deed restrictions because they provide a framework for continued resource protection within the mitigation parcels, and apply to adjacent areas in addition to the site itself.

Section 1.5 of the MSCP also provides directives for site protection as part of its management goals and objectives. The MSCP states that management of lands preserved as part of the MSCP through mitigation and other means is necessary to adequately protect the species and habitats that have been set aside. MSCP management objectives include protecting existing and restored biological resources from intense or disturbing activities within and adjacent to the MHPA. Based on these objectives, the MSCP recommends managements directives for mitigation, restoration, recreation, trash removal, adjacency management issues, invasive species control and flood control activities. Directives are organized according to priorities, which determine funding and direct efforts. Priority 1 directives are focused on resource protection in the MHPA.

Finally, the MSCP outlines management directives for protection of sites specifically located in the Otay Mesa area. These include Priority 1 directives restricting use of motorized vehicles within the MHPA and requiring trash and hazardous materials removal. The MSCP encourages coordination with border patrol to aid in identifying and preventing these types of disturbances to habitat.

8.2.2 Monitoring Patrols

The primary objective of long-term habitat monitoring is to identify changes in habitat quality and function that may indicate areas where active management is needed. Changes in site conditions

that would prompt active management activities include an increase in non-native invasive species, erosion, trash, vandalism, and trespassing. Monitoring patrols will evaluate the mitigation site for these changes on an annual basis as part of the City's Park and Recreation Department Open Space Management Program.

8.2.3 Weed Control

Monitoring visits will determine the need for treatment of non-native invasive species within the mitigation site. Treatment should prioritize removing non-native invasive perennial species including but not limited to giant reed (*Arundo donax*), tamarisk (*Tamarix ramosissima*), pampas grass (*Cortaderia selloana*), castor bean (*Ricinus communis*), and artichoke thistle (*Cynara cardunculus*). Removal methods may include hand pulling, cutting, mechanical removal, and herbicide application. If herbicides are necessary, all safety and environmental regulations shall be observed. The City MSCP recommends beginning removal upstream and/or upwind, and timing removal based on the biology of each species (i.e., time of flowering and reproductive capacity). Removal activities should be avoided during the reproductive seasons of sensitive species and should avoid or minimize impacts to sensitive species and native habitats.

8.2.4 Litter and Trash Removal

The City MSCP emphasizes that dumping, litter, and vandalism are major issues requiring consideration for management within the Otay Mesa area.

The City will remove litter and trash from the mitigation area on an as needed basis, which will be determined during monitoring visits. Signage shall be posted around the site to prevent and help report littering and dumping, and penalties for littering and dumping shall be imposed.

No permanent storage of hazardous materials or equipment is permitted within the MHPA. Storage of materials in nearby areas that may impact the mitigation area due to potential leakage should follow applicable regulations.

8.2.5 Access Control

The City MSCP states that lands acquired through mitigation may preclude public access in order to satisfy mitigation requirements. No public access will be permitted within the mitigation site. The City will be responsible for preventing and removing anyone trespassing onsite. No unauthorized vehicles will be allowed in the mitigation area.

The MSCP stresses that illegal immigration and border patrol activities are major issues for the Otay Mesa area. Border patrol should restrict vehicle use to existing access roads as much as possible. While access into the site is not anticipated, the MSCP recommends providing educational materials and training to border patrol agents working near the Otay Mesa border area to encourage sensitive behavior towards native habitats and to discourage any unnecessary off-road vehicle use in sensitive areas.

8.2.6 Other Environmental Stressors

Other environmental stressors with the potential to impact the long-term condition of the mitigation site include fire, flooding, and erosion. The City should monitor for any of these stressors during site visits and devise remedial actions in response when needed to support the site's ecological functions. Consultation with other regulatory agencies may be required depending on the type of stressor. Remedial actions will follow all relevant local, state, and federal regulatory guidance.

8.2.7 Biological Monitoring

The City's Biological Monitoring Plan for the Multiple Species Conservation Program (monitoring plan (City of San Diego 1997b) identifies monitoring and reporting requirements for the entire MSCP Preserve system. Long-term monitoring efforts within the MHPA are the joint responsibility of the City, the U.S. Fish and Wildlife service, and CDFW. Monitoring includes a combination of habitat assessment through satellite imagery, on-ground visual inspections by the habitat reserve manager, and quantitative monitoring. The City summarizes the management and monitoring actions completed each year as part of the MSCP Annual Report. The MSCP Annual Report is provided to USFWS and CDFW in accordance with the MSCP Implementing Agreement to detail progress towards the City's conservation goals in the MSCP.

8.3 Vernal Pool Habitat Conservation Plan

The mitigation site is located entirely within the City MHPA and will therefore be monitored and managed according to the general MSCP requirements listed in Section 8.1. The MSCP defers to adopted regulations for management guidelines specific to vernal pool sites and covered species. Such guidance is provided by the VPHCP, although the mitigation site is not included within a VPHCP preserve area.

Long-term management and monitoring of conserved vernal pools is necessary for their preservation, as pressures from the surrounding urbanized landscape preclude them from sustaining themselves naturally. Therefore, after the successful restoration of the vernal pool basins and associated uplands, the vernal pool complex will be managed at the stewardship level pursuant to the guidelines of the VPHCP. Stewardship activities identified in the VPHCP for the mitigation site are intended to maintain habitat conditions and covered species populations within the vernal pool complex. The City implements the VPHCP strategy through its VPMMP (City of San Diego 2020), which intended to provide the framework for site specific management plans that fulfill the objectives of the VPHCP.

The VPHCP expects that an adaptive management approach will be employed for long-term maintenance and monitoring. The VPMMP's approach to adaptive management distinguishes between three monitoring and management levels, whose application depend on the habitat conditions and population status of covered species within a vernal pool complex. VPHCP standards and goals are considered achieved if complexes are maintained at Management Level 1 – meaning that the complex has stable or increasing covered species populations and management activities aim to maintain existing habitat conditions.

Management activities under Level 1 will include annual (or more frequent) trash and debris removal; fence and signage maintenance; monitoring and adaptive measures for edge effects; fire suppression and fire damage repair; access patrol, enforcement, and trespass damage repair; monitoring and repair of topographic damage; and weed control within and around the vernal pools.

The City will be responsible for implementing measures that comply with the following sections.

8.3.1 Monitoring

The monitoring methods developed for the VPMMP use data collected on site to assess the conditions of each vernal pool complex. If the data shows that VPMMP standards are not being met then management actions must be changed. Several existing monitoring methods have been adapted and integrated into the vernal pool monitoring approach, including the Hydrogeomorphic Model, California Rapid Assessment Method, and U.S. Fish and Wildlife Service protocols. The VPMMP discusses these in detail.

Monitoring activities under Management Level 1 include qualitative and quantitative monitoring. Qualitative monitoring is conducted three times annually during the wet season by visual assessment, regardless of management level. Qualitative monitoring assesses threats, pool inundation and fairy shrimp viability and reproduction.

Quantitative monitoring includes a one-time baseline hydrological survey, annual covered plant surveys, as needed fairy shrimp density surveys (based on qualitative observations), and as needed topographic disturbance assessments. The VPMMP provides additional details on survey methods and requirements specific to each management level.

8.3.2 Adaptive Management Triggers

The required management level (Level 1, 2, or 3) for the mitigation site is determined by comparing monitoring results to VPMMP standards. While quantitative monitoring is conducted annually, regardless of precipitation, annual survey results are only comparable to VPMMP standards during years when rainfall is at least 55% of the average rainfall for the area.

The VPMMP outlines the complete list of triggers capable of causing a move between management levels. Adaptive management triggers that would cause the vernal pool mitigation site to move from Management Level 1 to Management Level 2 include the following:

1. An average decline of one cover class for any covered plant species present in the pools assessed over three years with adequate rainfall.

2. An average increase of one cover class in combined non-native cover in vernal pools over a three year period, regardless of rainfall (only for complexes with at least 10% non-native cover).

3. A 20 percent decline in density of the covered shrimp species, over three years.

4. A change in the vernal pool hydrological network (i.e., inlet and outlet features) and water storage functions such that the maximum depth of ponding is increased or decreased by more than 10 percent (but less than 20 percent) from the recorded baseline.

8.3.3 Trash and Debris Removal

The vernal pool mitigation site will be kept free of trash and debris through annual or as-needed removal.

8.3.4 Fencing and Signage

Fencing and signage will be installed per the avoidance and minimization measures described in Section 4.2 of this plan. Monitors will assess the conditions of fencing and other site protection measures during qualitative monitoring visits to verify that the site is secured, and appropriate signage is in place. If problems are identified, recommendations for repair or replacement will be made and implemented (e.g., replacement of locks, gates, signs, or fence repairs).

8.3.5 Edge Effects Maintenance

The mitigation site will be inspected for the following edge effects; irrigation runoff, invasive species, and herbicide application, from landscaping activities; water quality and increased ponding relating to water drainage; dust production; dumping, and other issues within the complex or on adjacent properties.

Management of edge effects may include changes in irrigation designs or schedules, modification of landscape species, erosion-control measures, dust-suppression measures, and other adaptive efforts. The City will contact adjacent property owners or managers to address any issues caused by adjacent land uses.

8.3.6 Fire and Fire Suppression Damage Repair

Fire or disturbance from fire suppression may cause the following impacts to the site: loss of native habitat; weed invasion; and erosion. Following a fire, quantitative data should be evaluated to identify short- and long-term impacts. Damage resulting from fire suppression may include fence damage and contamination from fire suppressant chemicals and should be addressed immediately.

8.3.7 Trespass Damage Repair

Monitors will assess the mitigation site for evidence of trespass or illegal off-highway vehicle activity. Unauthorized trails appearing within the mitigation site will be closed and signage installed. The City will resolve any impacts that alter the site's hydrology.

8.3.8 Topographic Disturbance Repair

The vernal pools within the mitigation site will be monitored for topographic disturbance or altered hydrology from vehicle damage, and trespass. Monitors will evaluate pool integrity and hydrologic function, shape and size of any disturbances relative to the overall pool, depth and duration of ponding, and whether there is any need for repairs and/or further watershed analysis. Repairs may be conducted by hand or using mechanical equipment depending on the scale of the disturbance. Major repairs should be reserved for the dry season to minimize disturbance to on-site resources. Minor topographic damage such as footprints and small tire ruts will be repaired with hand tools.

8.3.9 Weed Control

Monitors will look for the presence of non-native plants and wildlife and note their presence during qualitative monitoring visits. Weed control visits will be conducted twice per spring to maintain acceptable non-native cover levels within vernal pools occupied by covered species, and to prevent the spread of additional invasive non-native species into covered species pools.

9.0 Notification of Completion

If the final success criteria have been met at the end of the five-year monitoring program, notification of these events would be provided with the fifth-year report. If the final success criteria have not been met, the fifth-year report will discuss the possible reasons and recommendations for remedial measures to cause the site to meet the criteria. If the mitigation site has not met the performance standards, the City's maintenance and monitoring obligations will continue, until the City MMC and E&CP deem the mitigation program as successful or contingency measures must be implemented (see Section 5.7, Adaptive Management Approach).

Following achievement of the final success criteria and receipt of the final annual report to the City MMC and E&CP, the City MMC and resource agencies will provide written approval of the completion of the mitigation effort.

10.0 References Cited

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ATTACHMENT 1

Hydraulic Letter for Wetland Mitigation at La Media Road

April 23, 2021

Ms. Meagan Olson
Project Manager
Recon Environmental
1927 Fifth Avenue
San Diego, California 92101

SUBJECT: HYDRAULIC LETTER FOR WETLAND MITIGATION AT LA MEDIA ROAD
(RICK ENGINEERING COMPANY JOB NUMBER 18509-A)

Dear Ms. Olson:

This letter has been prepared in support of the proposed wetland mitigation for the La Media Road Widening & Fire Rescue Air Operation Phase II projects (herein referred to as the "project"). This letter report includes applicable excerpts from the project Drainage Study titled "Drainage Study for Grading and Improvement Plans for La Media Road & Airway Road" (herein referred to as the "project drainage study"), dated February 21, 2020, and any revisions, thereafter, prepared by Rick Engineering Company.

Purpose:

Roadway improvements along La Media Road will occur adjacent to the existing pavement along a fixed alignment of the roadway resulting in impacts to an existing un-vegetated channel to accommodate the road and parkway improvements required by the City. The aforementioned un-vegetated channel was determined to be connected to the Pacific Ocean via Mexico and the Tijuana River, and are under the jurisdiction of the United States Corp of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Game (CDFG); therefore, mitigation for the impacted un-vegetated channels will be required to occur on-site. The intent of the creation of the low-flow channel that will run just west of La Media Road low-flow channel is to enhance existing emergent wetlands and support creation of riparian vegetation. The low-flow channel subject to the hydraulic analyses of this report will provide mitigation at the ordinary high-water mark for the 50% of the 2-year storm event. The low-flow channel will be soft at the bottom. The sides will be re-vegetated with native/naturalized upland grasses and forbs.

This letter has been prepared to summarize data the results of the hydraulic analyses in regard to the grading of the low-flow channel. The hydraulic analysis includes comparison of water surface elevations (WSEL's) and velocities between the existing condition, improvements per the project drainage study and the project. Applicable excerpts from the project Drainage Study are attached showing the existing condition as well as the project condition after the widening of La Media Road.

Design Criteria:

The scope of work for the project is to perform hydraulic analysis of the proposed low-flow channel to provide mitigation for impacts to existing jurisdictional waters resulting from the overall La Media Road project and to show this grading does not negatively impact the water surface elevations upstream.

The U.S. Army Corps of Engineers HEC-River Analysis System (HEC-RAS) version 5.0.7 was used to model the hydraulic characteristics of the channel for this study. The hydraulic characteristics of the channel have been analyzed based on peak flow of 50% of 2-year and 100-year storm event. The 50% of the 2-year storm event was performed to determine the "ordinary high-water mark". Also, the 50% of 2-year storm event was selected to represent more frequent typical low flow event and is based on what is regionally identified as the low flow threshold for geomorphically significant storm events. 100-year flow rates were utilized to determine the impacts of the project on upstream and downstream infrastructure.

The relevant cross-sections for the project from the project drainage study are 5671.065 which represents the upstream section and 5327.56, which represents the downstream section. An additional cross-section, 5521.065 was created to represent the mid-section of the project. The cross-section 5521.065 was added to both the existing condition and improvements per the project drainage for the purpose of comparison.

Analysis of Results:

Based on the results of the hydraulic analysis, it is anticipated that the proposed grading of the low-flow channel will not result in the increase of the velocity and WSEL across the three (3) cross-sections mentioned in the section "Design Criteria". Table 1 compares the pre-project and post-project WSEL's and flow rates for common stations. The WSEL from pre-project to post-project at station 5327.565 does not show any increase. The WSEL from pre-project to post-project at stations 5671.065 and 5521.065 both show a decrease of0.1 ft. Results of the HEC-RAS analysis for the capacity condition is provided in Attachment 2. Refer to Map Pocket 1 for the proposed condition hydraulic workmap. Refer to Attachment 1 for applicable information from the project Drainage Study including the existing condition hydraulic workmap.

Table 1 - Comparison of Pre vs Post WSEL's and Discharge Rates

Station	100-Year Peak Discharge Rate – Pre-Project (cfs*)	100-Year Peak Discharge Rate – Post-Project (cfs*)	100-Year WSEL – Pre-Project (ft)	100-Year WSEL – Post-Project (ft)	Post-Project – Pre-Project (ft)
5671.065	2,620	2,610	474.5	474.4	-0.1
5521.065	2,620	2,610	474.1	474.0	-0.1
5327.565	2,620	2,610	473.6	473.6	0.0

* cfs = cubic feet per second

To determine the inundation limits of the area, "ordinary high-water mark", 50% of the 2-year storm event was calculated. The limits of this area have been delineated and shown on the exhibit in Map Pocket 1. Table 2 below shows the existing emergent wetland area, the area impact by the widening of La Media Road, and the area inundated by the 50 percent of 2-year storm event within the mitigation area.

Table 2 – Existing and Proposed Riparian Vegetation

Existing Emergent Wetland (acres)[1,2]	Area Impacted by La Media Road Widening (acres)[2]	Post-Project Inundation Limits[3] (acres)
0.74	**1.59**	**3.2**

Notes:

1. Existing emergent wetland area to be enhanced in the post-project condition.
2. Refer to Wetland Mitigation Plan for the La Media Road Widening Project San Diego, California, dated February 16, 2021 by Recon
3. The inundation limits are per the 50 percent of 2-year storm event within the mitigation area.

Conclusion:

This letter report was created to support the La Media Road Wetland Mitigation effort and it specifically summarizes the hydraulic analysis that is applicable to the proposed low-flow channel. This includes a comparison of the WSEL's across three (3) cross-sections. The WSEL and velocities from pre-project to post-project at the three (3) stations 5671.065, 5327.565 and 5521.065 do not show any increase. Hence, no impacts to upstream and downstream facilities is anticipated. Also, "ordinary high-water marks" was determined by analyzing the 50% of the 2-year storm event. It is anticipated that the proposed project enhances existing emergent wetlands and supports the creation of riparian vegetation.

If you have any questions related to this letter, please contact Eric Hengesbaugh or me at (619) 291-0707.

Sincerely,

RICK ENGINEERING COMPANY

Brendan Hastie
R.C.E. #65809, Exp. 9/21
Principal

BH:BV:vs:k/files/text/18509-A.001

Attachments/Exhibits

Attachment 1

Excerpts from Appendix B of report titled, “Drainage Study for Grading and Improvement Plans for La Media Road & Airway Road” dated February 21, 2020 (and any revisions thereafter)

DRAINAGE STUDY
FOR
GRADING AND IMPROVEMENT PLANS
FOR
LA MEDIA ROAD & AIRWAY ROAD

FINAL ENGINEERING

PROJECT ADDRESS: La Media Road and Airway Road, San Diego CA

Job Number 18429
(Formerly: Job Number 15818-B)

July 20, 2015
Revised: June 28, 2019
Revised: February 21, 2020
Revised: October 23, 2020
Revised: January 29, 2021
Revised: February 22, 2021

RICK ENGINEERING COMPANY

RICK
ENGINEERING COMPANY
rickengineering.com

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Figures:

Appendices:

Map Pockets:

Map Pocket 1: Drainage Study Map for Grading and Improvement Plans for La Media Road & Airway Road

Map Pocket 2: HEC-1 Study Area Watershed Map for Grading and Improvement Plans for La Media Road, Metropolitan Airpark

Map Pocket 3: HEC-RAS Pre-Project Conditions Map for Grading and Improvement Plans for La Media Road, Metropolitan Airpark

Map Pocket 4: HEC-RAS Post-Project Conditions Map for Grading and Improvement Plans for La Media Road, Metropolitan Airpark

Electronic Files:

Electronic Files for H&H Calculations (Model Files and Output)

3.2.2 Hydraulic Results

Pre-Project Condition

The HEC-RAS output summary tables, profile plot, cross-section plots, and generated report for the Pre-Project Condition are included in Appendix C. The HEC-RAS exhibit for the Pre-Project Condition is located Map Pocket 3. As shown on the existing condition workmaps, in the existing condition the culverts under La Media Road and Airway Road are significantly undersized. As a result, both roads are overtopped resulting in the inundation of a large section of the roads.

The same Manning's n-values were utilized for both the Pre-Project condition and Post-Project condition in order to compare impacts to water surface elevations resulting from grading/improvements alone. Appendix E presents a summary of water surface elevations and velocities for pre-project and post-project HEC-RAS analysis.

Post-Project Condition

The HEC-RAS summary tables, profile plot, cross section plots, and generated report for the Post-Project Condition are located in Appendix D. The HEC-RAS exhibit for the Post-Project Condition is located Map Pocket 4.

In the proposed condition, La Media and Airway Roads are elevated and widened to their ultimate road width, the Caltrans culvert outfall is relocated from the east side to the west side of La Media Road, and the culverts conveying flow under La Media and Airway Roads are realigned and increased in capacity. The proposed improvements eliminate roadway overtopping for the 100-year storm event. Appendix E presents a summary of the change in water surface elevations (WSEL) that would result in the proposed condition.

There are increases in WSEL at cross sections along the east and west sides of La Media Road north of Airway Road. Along the east side of La Media Road, the increases are largely due to the grading required to bring La Media Road to its ultimate road width because the flow along this reach is generally reduced as a result of the proposed alignment revision to the Caltrans culvert. In this area future improvements are in process for the property adjacent to the channel that will elevate the property above the 100-year storm event WSELs. These improvements will negate any negative impacts to this property due to increased WSELs. Additionally, due to the reduced flow rate, at the upstream end of this reach WSELs are reduced resulting in lower flood risk upstream of the modeled reach.

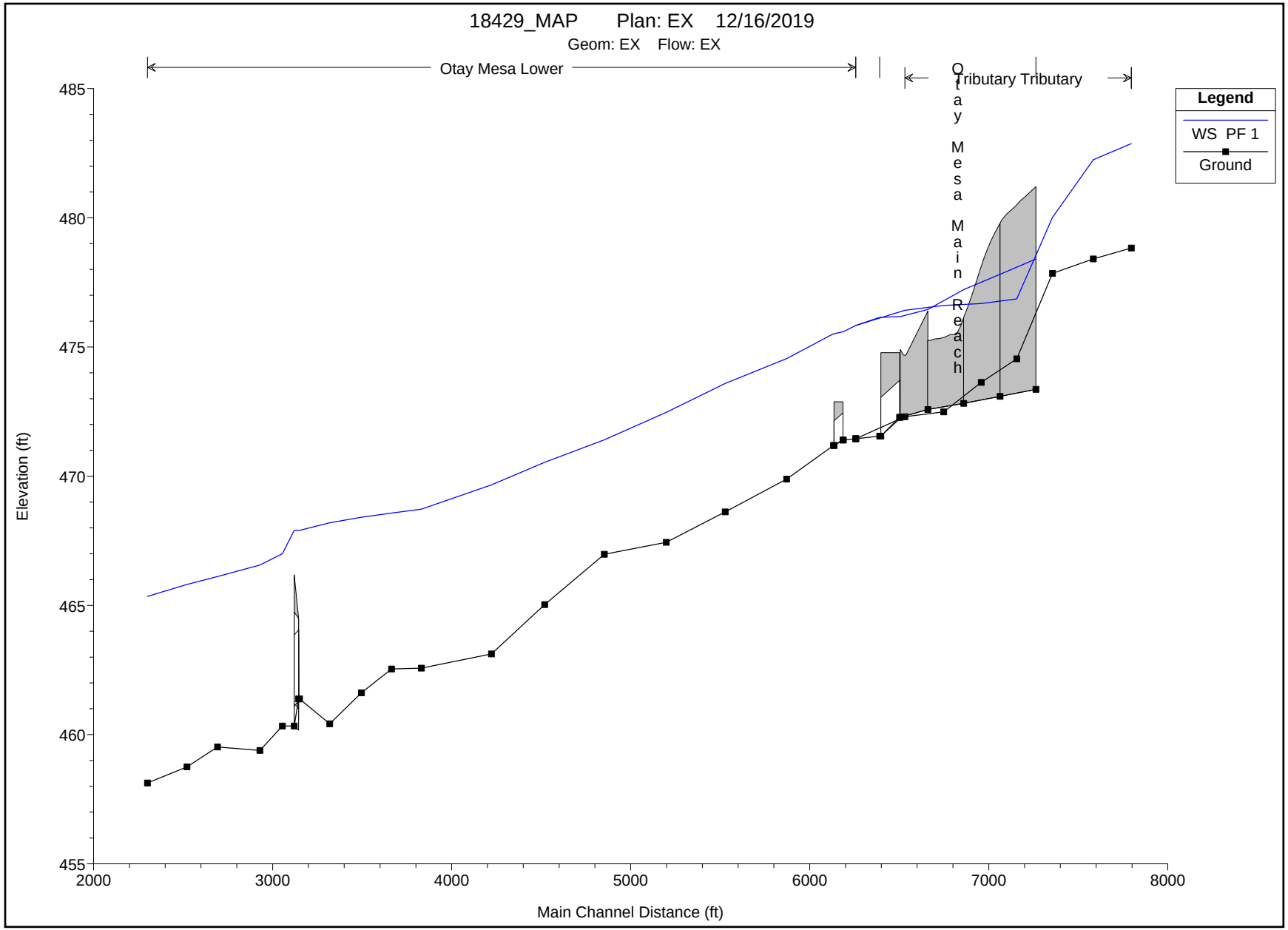
Along the west side of La Media Road, the WSEL increases are largely due to the increased flow as a result of the realignment of the Caltrans box culvert. In this area, the existing conservation easement is bounded by relatively steep side slopes such that the increased WSEL within the area results in minor increases in inundation limits. Please refer to the inundation mapping in Map Pocket 4. Additionally, just upstream of the conservation easement, the WSELs are reduced in the proposed condition, resulting in no negative impacts to properties upstream.

Appendix C

HEC-RAS Output for the 100-Year Pre-Project Condition

HEC-RAS Plan: EX Profile: PF 1

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Otay Mesa	Lower	2300.996	PF 1	3164.00	458.13	465.35	462.75	465.48	0.002000	3.50	1209.50	385.27	0.26
Otay Mesa	Lower	2521.617	PF 1	3164.00	458.75	465.81		465.92	0.001862	2.91	1289.63	431.58	0.24
Otay Mesa	Lower	2691.943	PF 1	3164.00	459.52	466.12		466.21	0.001497	2.76	1388.07	444.48	0.22
Otay Mesa	Lower	2928.886	PF 1	3164.00	459.39	466.56		466.72	0.002954	3.26	1021.10	317.15	0.30
Otay Mesa	Lower	3111.536	PF 1	3164.00	460.33	467.00		467.31	0.006025	4.46	722.81	235.84	0.42
Otay Mesa	Lower	3130.904		Culvert									
Otay Mesa	Lower	3150.273	PF 1	3164.00	461.38	467.91	465.62	468.01	0.001752	2.97	1422.68	553.25	0.24
Otay Mesa	Lower	3319.173	PF 1	3164.00	460.42	468.20		468.26	0.001334	2.05	1661.58	671.97	0.20
Otay Mesa	Lower	3496.063	PF 1	3164.00	461.62	468.41		468.46	0.000929	2.03	2087.97	799.68	0.17
Otay Mesa	Lower	3634.315	PF 1	2620.00	462.54	468.57		468.60	0.000763	1.94	2070.60	860.08	0.16
Otay Mesa	Lower	3830.658	PF 1	2620.00	462.57	468.72		468.79	0.001943	3.07	1476.07	832.93	0.25
Otay Mesa	Lower	4222.345	PF 1	2620.00	463.12	469.66		469.79	0.003092	3.03	1034.63	557.68	0.30
Otay Mesa	Lower	4519.806	PF 1	2620.00	465.03	470.54		470.65	0.002764	2.87	1055.90	519.30	0.28
Otay Mesa	Lower	4852.983	PF 1	2620.00	466.98	471.41		471.50	0.002412	2.64	1142.31	529.33	0.26
Otay Mesa	Lower	5198.392	PF 1	2620.00	467.44	472.47		472.60	0.004090	3.76	1024.46	680.42	0.35
Otay Mesa	Lower	5327.565	PF 1	2620.00	468.62	473.59		473.69	0.003060	3.50	1134.39	562.51	0.30
Otay Mesa	Lower	5671.065	PF 1	2620.00	469.89	474.55		474.65	0.002650	2.73	1078.33	452.58	0.27
Otay Mesa	Lower	5932.84	PF 1	2031.80	471.19	475.51		475.69	0.006577	5.02	678.10	405.82	0.44
Otay Mesa	Lower	5957.35		Culvert									
Otay Mesa	Lower	5987.15	PF 1	2031.80	471.40	475.59	474.67	475.69	0.003369	3.51	920.11	536.62	0.31
Otay Mesa	Lower	6057.21	PF 1	2031.80	471.45	475.84		475.94	0.002510	2.79	826.41	357.86	0.27
Otay Mesa	Main Reach	6190.78	PF 1	655.18	471.55	476.14		476.16	0.000428	1.26	768.30	396.02	0.11
Otay Mesa	Main Reach	6255.99		Culvert									
Otay Mesa	Main Reach	6305.78	PF 1	655.18	472.28	476.18	474.18	476.20	0.000717	1.48	645.90	402.11	0.14
Otay Mesa	Main Reach	6350.00		Lat Struct									
Otay Mesa	Main Reach	6459.63	PF 1	1073.54	472.58	476.45		476.59	0.005711	3.37	415.73	313.15	0.38
Otay Mesa	Main Reach	6500.00		Lat Struct									
Otay Mesa	Main Reach	6660.16	PF 1	1792.62	472.82	477.22		477.32	0.002854	3.37	838.65	460.75	0.29
Otay Mesa	Main Reach	6700.00		Lat Struct									
Otay Mesa	Main Reach	6863.01	PF 1	1872.00	473.09	477.81		477.92	0.003085	3.54	864.01	507.92	0.30
Otay Mesa	Main Reach	6900.00		Lat Struct									
Otay Mesa	Main Reach	7063.61	PF 1	1872.00	473.36	478.40		478.50	0.002745	3.42	977.35	709.19	0.29
Tributary	Tributary	6330.88	PF 1	1396.62	472.30	476.42		476.47	0.001321	1.85	832.11	349.10	0.19
Tributary	Tributary	6547.49	PF 1	681.55	472.49	476.61		476.62	0.000288	0.76	949.89	452.94	0.09
Tributary	Tributary	6757.03	PF 1	601.00	473.63	476.68		476.69	0.000516	0.83	732.53	421.24	0.11
Tributary	Tributary	6955.21	PF 1	601.00	474.54	476.86		476.90	0.002718	1.60	387.68	473.09	0.24
Tributary	Tributary	7155.16	PF 1	601.00	477.85	480.02	480.02	480.65	0.029022	6.80	103.18	752.11	0.84
Tributary	Tributary	7383.07	PF 1	601.00	478.41	482.25		482.38	0.003306	3.03	213.64	804.74	0.30
Tributary	Tributary	7595.58	PF 1	601.00	478.83	482.87		482.98	0.002405	2.75	236.75	299.06	0.26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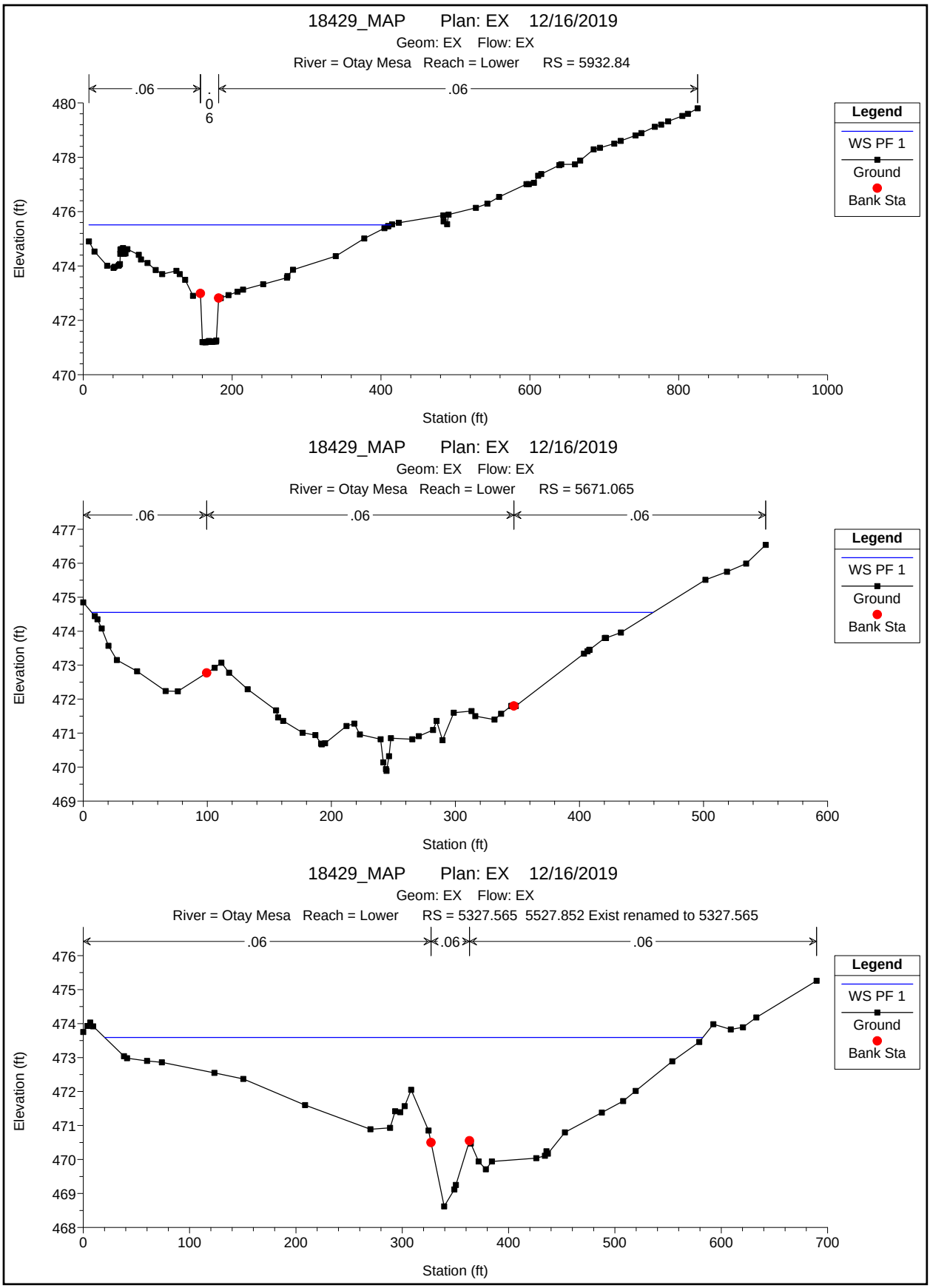
Geom: EX Flow: EX
Otay Mesa Lower
Otay Mesa Main Reach
Tributary Tributary
Legend
WS PF 1
Ground
Elevation (ft)
485
480
475
470
465
460
455
2000
3000
4000
5000
6000
7000
8000
Main Channel Distance (ft)

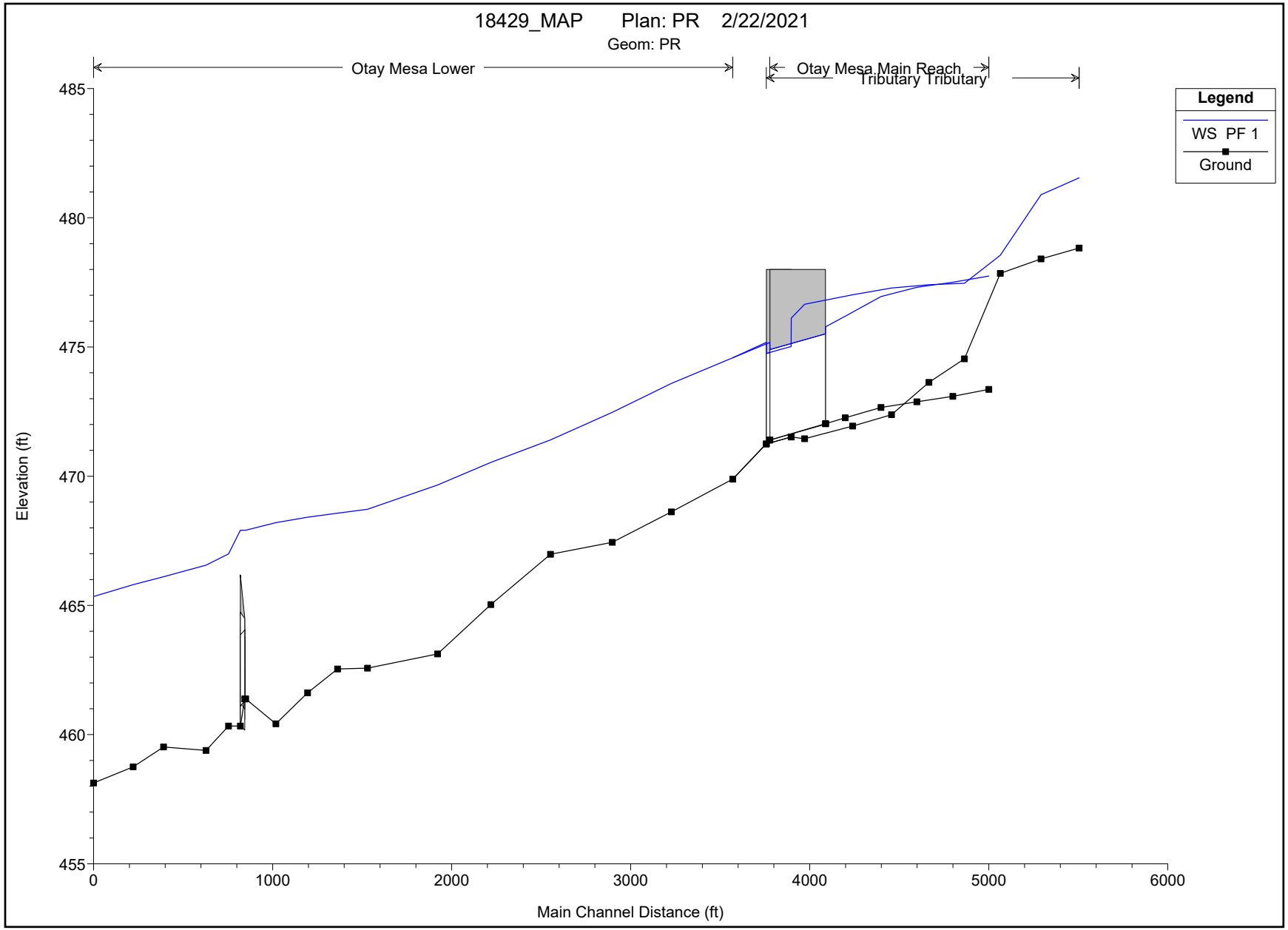

18429_MAP Plan: EX 12/16/2019
Geom: EX Flow: EX
River = Otay Mesa Reach = Lower RS = 5932.84
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
18429_MAP Plan: EX 12/16/2019
Geom: EX Flow: EX
River = Otay Mesa Reach = Lower RS = 5671.065
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
18429_MAP Plan: EX 12/16/2019
Geom: EX Flow: EX
River = Otay Mesa Reach = Lower RS = 5327.565 5527.852 Exist renamed to 5327.565
.06
.06
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

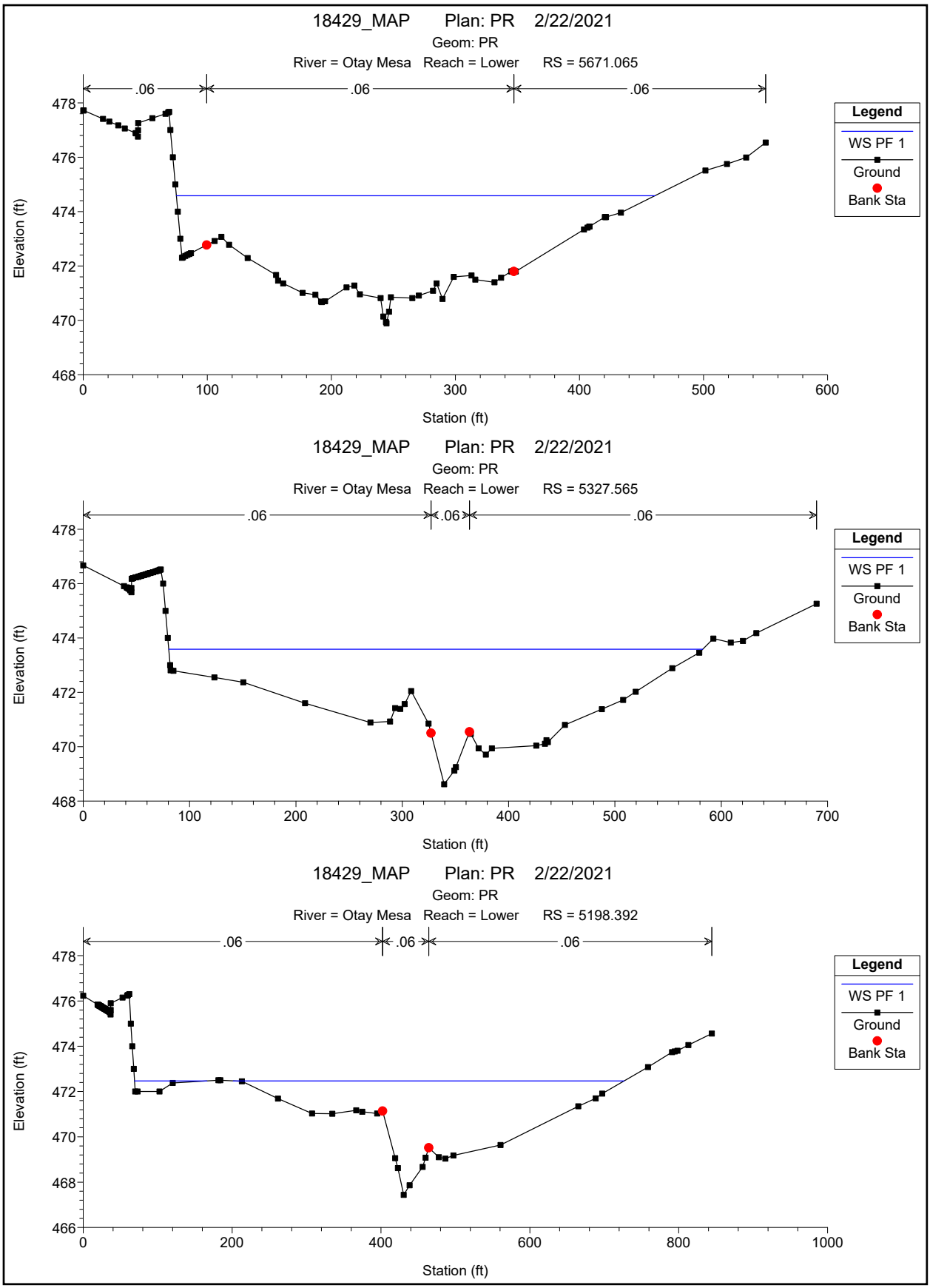
Appendix D

HEC-RAS Output for the 100-Year Post-Project Condition

HEC-RAS Plan: PR Profile: PF 1

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Otay Mesa	Lower	2300.996	PF 1	3155.00	458.13	465.34	462.76	465.47	0.002002	3.50	1206.55	384.92	0.26
Otay Mesa	Lower	2521.617	PF 1	3155.00	458.75	465.80		465.91	0.001864	2.91	1286.52	431.19	0.24
Otay Mesa	Lower	2691.943	PF 1	3155.00	459.52	466.11		466.20	0.001497	2.75	1384.98	443.97	0.22
Otay Mesa	Lower	2928.886	PF 1	3155.00	459.39	466.56		466.71	0.002956	3.26	1018.99	316.93	0.30
Otay Mesa	Lower	3111.536	PF 1	3155.00	460.33	466.99		467.30	0.006026	4.46	721.33	235.58	0.42
Otay Mesa	Lower	3130.904		Culvert									
Otay Mesa	Lower	3150.273	PF 1	3155.00	461.38	467.91	465.62	468.01	0.001737	2.95	1424.22	553.57	0.24
Otay Mesa	Lower	3319.173	PF 1	3155.00	460.42	468.20		468.26	0.001325	2.04	1661.95	672.03	0.19
Otay Mesa	Lower	3496.063	PF 1	3155.00	461.62	468.41		468.45	0.000925	2.02	2087.46	799.62	0.17
Otay Mesa	Lower	3634.315	PF 1	2610.00	462.54	468.57		468.60	0.000758	1.93	2069.36	859.89	0.16
Otay Mesa	Lower	3830.658	PF 1	2610.00	462.57	468.72		468.79	0.001935	3.07	1474.14	832.30	0.25
Otay Mesa	Lower	4222.345	PF 1	2610.00	463.12	469.66		469.78	0.003088	3.02	1031.82	556.79	0.29
Otay Mesa	Lower	4519.806	PF 1	2610.00	465.03	470.53		470.65	0.002763	2.87	1052.94	518.49	0.28
Otay Mesa	Lower	4852.983	PF 1	2610.00	466.98	471.40		471.50	0.002411	2.63	1139.13	528.65	0.26
Otay Mesa	Lower	5198.392	PF 1	2610.00	467.44	472.47		472.60	0.004136	3.78	997.74	622.43	0.35
Otay Mesa	Lower	5327.565	PF 1	2610.00	468.62	473.59		473.69	0.003015	3.47	1097.78	502.12	0.30
Otay Mesa	Lower	5671.065	PF 1	2610.00	469.89	474.58		474.70	0.002957	2.90	979.92	385.79	0.29
Otay Mesa	Main Reach	6190.78	PF 1	871.00	471.40	475.17		475.34	0.003016	3.30	264.19	76.62	0.30
Otay Mesa	Main Reach	6255.99		Culvert									
Otay Mesa	Main Reach	6305.78	PF 1	871.00	472.03	475.78	473.72	475.96	0.003113	3.34	261.03	69.55	0.30
Otay Mesa	Main Reach	6350.00	PF 1	871.00	472.26	476.19		476.39	0.004889	3.68	255.47	129.58	0.37
Otay Mesa	Main Reach	6459.63	PF 1	871.00	472.66	476.95		477.06	0.002341	2.99	425.61	279.60	0.26
Otay Mesa	Main Reach	6660.16	PF 1	871.00	472.88	477.31		477.34	0.000924	1.95	704.02	380.58	0.17
Otay Mesa	Main Reach	6863.01	PF 1	871.00	473.09	477.51		477.54	0.001072	2.00	710.23	453.73	0.18
Otay Mesa	Main Reach	7063.61	PF 1	871.00	473.36	477.75		477.80	0.001492	2.26	552.93	309.90	0.21
Tributary	Tributary	5932.84	PF 1	1684.00	471.25	475.18		475.66	0.008150	5.57	302.52	83.96	0.50
Tributary	Tributary	5957.35		Culvert									
Tributary	Tributary	5987.15	PF 1	1684.00	471.52	476.12	473.98	476.47	0.004824	4.76	354.07	86.01	0.39
Tributary	Tributary	6057.21	PF 1	1684.00	471.45	476.65		476.73	0.001315	2.30	794.50	244.83	0.20
Tributary	Tributary	6330.88	PF 1	1684.00	471.94	477.02		477.09	0.001486	2.23	812.07	266.74	0.21
Tributary	Tributary	6547.49	PF 1	1684.00	472.38	477.28		477.32	0.000853	1.54	1126.43	387.47	0.15
Tributary	Tributary	6757.03	PF 1	601.00	473.63	477.41		477.42	0.000163	0.58	1041.52	427.58	0.06
Tributary	Tributary	6955.21	PF 1	601.00	474.54	477.46		477.48	0.000758	1.07	583.50	522.87	0.13
Tributary	Tributary	7155.16	PF 1	601.00	477.85	478.55	478.55	478.77	0.058151	4.18	162.15	421.09	0.96
Tributary	Tributary	7383.07	PF 1	601.00	478.41	480.89	479.98	480.96	0.003693	2.18	288.03	298.69	0.29
Tributary	Tributary	7595.58	PF 1	601.00	478.83	481.55		481.64	0.002989	2.21	243.67	105.57	0.27


18429_MAP Plan: PR 2/22/2021
Geom: PR
Otay Mesa Lower
Otay Mesa Main Reach
Tributary Tributary
Legend
WS PF 1
Ground
Elevation (ft)
485
480
475
470
465
460
455
0
1000
2000
3000
4000
5000
6000
Main Channel Distance (ft)


18429_MAP Plan: PR 2/22/2021
Geom: PR
River = Otay Mesa Reach = Lower RS = 5671.065
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
18429_MAP Plan: PR 2/22/2021
Geom: PR
River = Otay Mesa Reach = Lower RS = 5327.565
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta
18429_MAP Plan: PR 2/22/2021
Geom: PR
River = Otay Mesa Reach = Lower RS = 5198.392
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
WS PF 1
Ground
Bank Sta

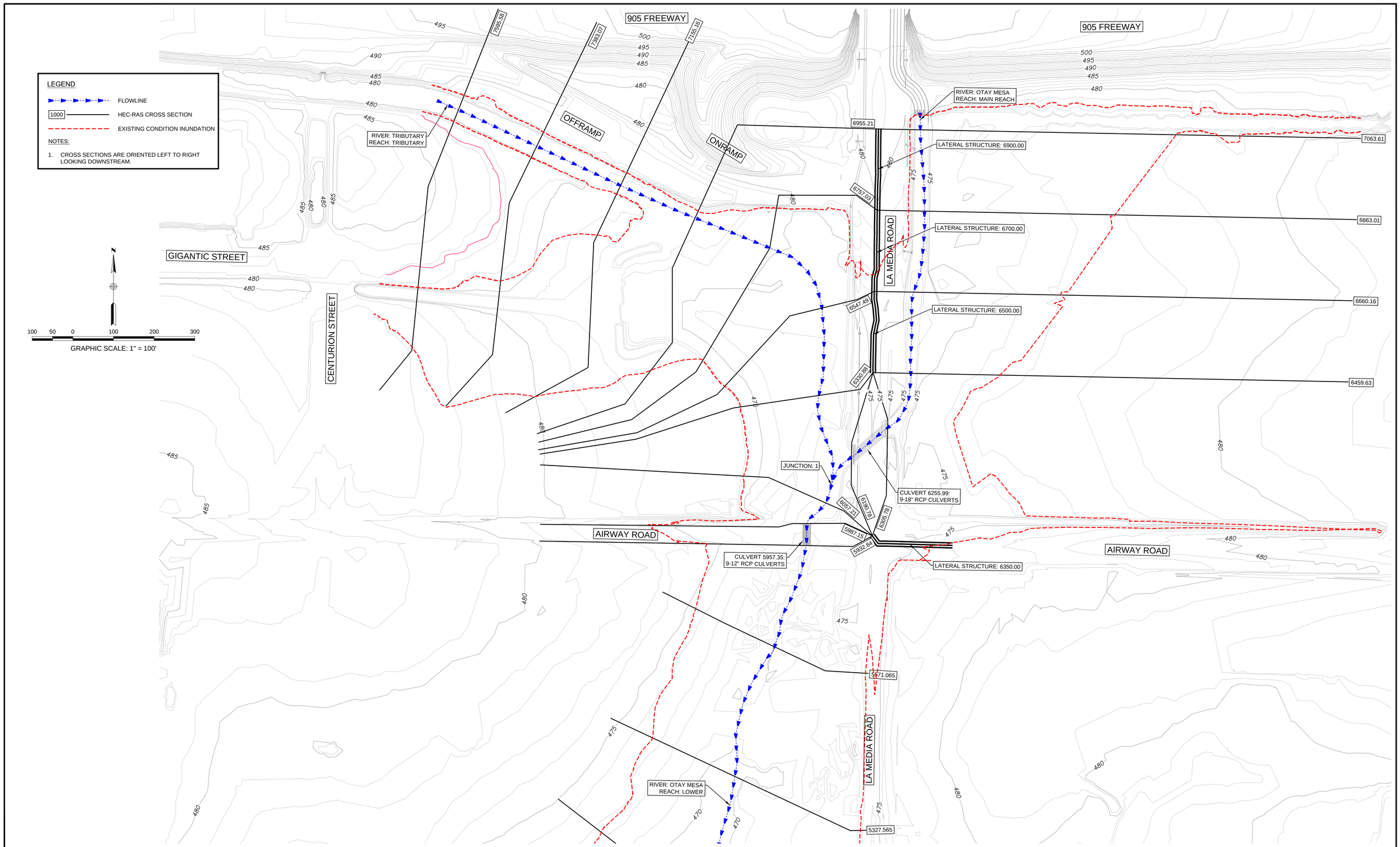
Appendix E

HEC-RAS Pre- and Post- Project Condition Results Summary

Existing Condition					Proposed Condition						
River - Reach	Cross Section	Flow Rate (cfs)	W.S. Elevation (ft) [1]	Channel Velocity (ft/s) [2]	River - Reach	Cross Section	Flow Rate (cfs)	W.S. Elevation (ft) [3]	Channel Velocity (ft/s) [4]	PR - EX WSEL [3] - [1]	PR - EX Velocity [4] - [2]
Otay Mesa - Lower	2300.996	3164	465.4	3.5	Otay Mesa - Lower	2300.996	3155	465.3	3.5	0.0	0.0
Otay Mesa - Lower	2521.617	3164	465.8	2.9	Otay Mesa - Lower	2521.617	3155	465.8	2.9	0.0	0.0
Otay Mesa - Lower	2691.943	3164	466.1	2.8	Otay Mesa - Lower	2691.943	3155	466.1	2.8	0.0	0.0
Otay Mesa - Lower	2928.886	3164	466.6	3.3	Otay Mesa - Lower	2928.886	3155	466.6	3.3	0.0	0.0
Otay Mesa - Lower	3111.536	3164	467.0	4.5	Otay Mesa - Lower	3111.536	3155	467.0	4.5	0.0	0.0
Otay Mesa - Lower	3130.904	Culvert			Otay Mesa - Lower	3130.904	Culvert			--	--
Otay Mesa - Lower	3150.273	3164	467.9	3.0	Otay Mesa - Lower	3150.273	3155	467.9	3.0	0.0	0.0
Otay Mesa - Lower	3319.173	3164	468.2	2.1	Otay Mesa - Lower	3319.173	3155	468.2	2.0	0.0	0.0
Otay Mesa - Lower	3496.063	3164	468.4	2.0	Otay Mesa - Lower	3496.063	3155	468.4	2.0	0.0	0.0
Otay Mesa - Lower	3634.315	2620	468.6	1.9	Otay Mesa - Lower	3634.315	2610	468.6	1.9	0.0	0.0
Otay Mesa - Lower	3830.658	2620	468.7	3.1	Otay Mesa - Lower	3830.658	2610	468.7	3.1	0.0	0.0
Otay Mesa - Lower	4222.345	2620	469.7	3.0	Otay Mesa - Lower	4222.345	2610	469.7	3.0	0.0	0.0
Otay Mesa - Lower	4519.806	2620	470.5	2.9	Otay Mesa - Lower	4519.806	2610	470.5	2.9	0.0	0.0
Otay Mesa - Lower	4852.983	2620	471.4	2.6	Otay Mesa - Lower	4852.983	2610	471.4	2.6	0.0	0.0
Otay Mesa - Lower	5198.392	2620	472.5	3.8	Otay Mesa - Lower	5198.392	2610	472.5	3.8	0.0	0.0
Otay Mesa - Lower	5327.565	2620	473.6	3.5	Otay Mesa - Lower	5327.565	2610	473.6	3.5	0.0	0.0
Otay Mesa - Lower	5671.065	2620	474.6	2.7	Otay Mesa - Lower	5671.065	2610	474.6	2.9	0.0	0.2
Otay Mesa - Lower	5932.84	2032	475.5	5.0	Tributary - Tributary	5932.84	1684	475.2	5.6	-0.3	0.6
Otay Mesa - Lower	5957.35	Culvert			Tributary - Tributary	5957.35	Culvert			--	--
Otay Mesa - Lower	5987.15	2032	475.6	3.5	Tributary - Tributary	5987.15	1684	476.1	4.8	0.5	1.3
Otay Mesa - Lower	6057.21	2032	475.8	2.8	Tributary - Tributary	6057.21	1684	476.7	2.3	0.8	-0.5
Otay Mesa - Main Reach	6190.78	655	476.1	1.3	Otay Mesa - Main Reach	6190.78	871	475.2	3.3	-1.0	2.0
Otay Mesa - Main Reach	6255.99	Culvert			Otay Mesa - Main Reach	6255.99	Culvert			--	--
Otay Mesa - Main Reach	6305.78	655	476.2	1.5	Otay Mesa - Main Reach	6305.78	871	475.8	3.3	-0.4	1.9
Otay Mesa - Main Reach	6350	Lateral Structure			Otay Mesa - Main Reach	6350	871	476.2	3.7	--	--
Otay Mesa - Main Reach	6459.63	1074	476.5	3.4	Otay Mesa - Main Reach	6459.63	871	477.0	3.0	0.5	-0.4
Otay Mesa - Main Reach	6500	Lateral Structure			--					--	--
Otay Mesa - Main Reach	6660.16	1793	477.2	3.4	Otay Mesa - Main Reach	6660.16	871	477.3	2.0	0.1	-1.4
Otay Mesa - Main Reach	6700	Lateral Structure			--					--	--
Otay Mesa - Main Reach	6863.01	1872	477.8	3.5	Otay Mesa - Main Reach	6863.01	871	477.5	2.0	-0.3	-1.5
Otay Mesa - Main Reach	6900	Lateral Structure			--					--	--
Otay Mesa - Main Reach	7063.61	1872	478.4	3.4	Otay Mesa - Main Reach	7063.61	871	477.8	2.3	-0.6	-1.2
Tributary - Tributary	6330.88	1397	476.4	1.9	Tributary - Tributary	6330.88	1684	477.0	2.2	0.6	0.4
Tributary - Tributary	6547.49	682	476.6	0.8	Tributary - Tributary	6547.49	1684	477.3	1.5	0.7	0.8
Tributary - Tributary	6757.03	601	476.7	0.8	Tributary - Tributary	6757.03	601	477.4	0.6	0.7	-0.3
Tributary - Tributary	6955.21	601	476.9	1.6	Tributary - Tributary	6955.21	601	477.5	1.1	0.6	-0.5
Tributary - Tributary	7155.16	601	480.0	6.8	Tributary - Tributary	7155.16	601	478.6	4.2	-1.5	-2.6
Tributary - Tributary	7383.07	601	482.3	3.0	Tributary - Tributary	7383.07	601	480.9	2.2	-1.4	-0.9
Tributary - Tributary	7595.58	601	482.9	2.8	Tributary - Tributary	7595.58	601	481.6	2.2	-1.3	-0.5

MAP POCKET 3

HEC-RAS Pre-Project Conditions Map



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EXISTING CONDITION HEC-RAS WORKMAP FOR METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 1 OF 3

J-15818-B
DATE: DECEMBER 16, 2019

LEGEND

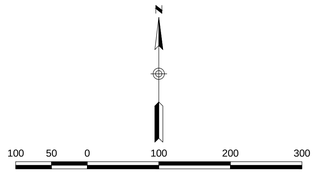
FLOWLINE

1000 HEC-RAS CROSS SECTION

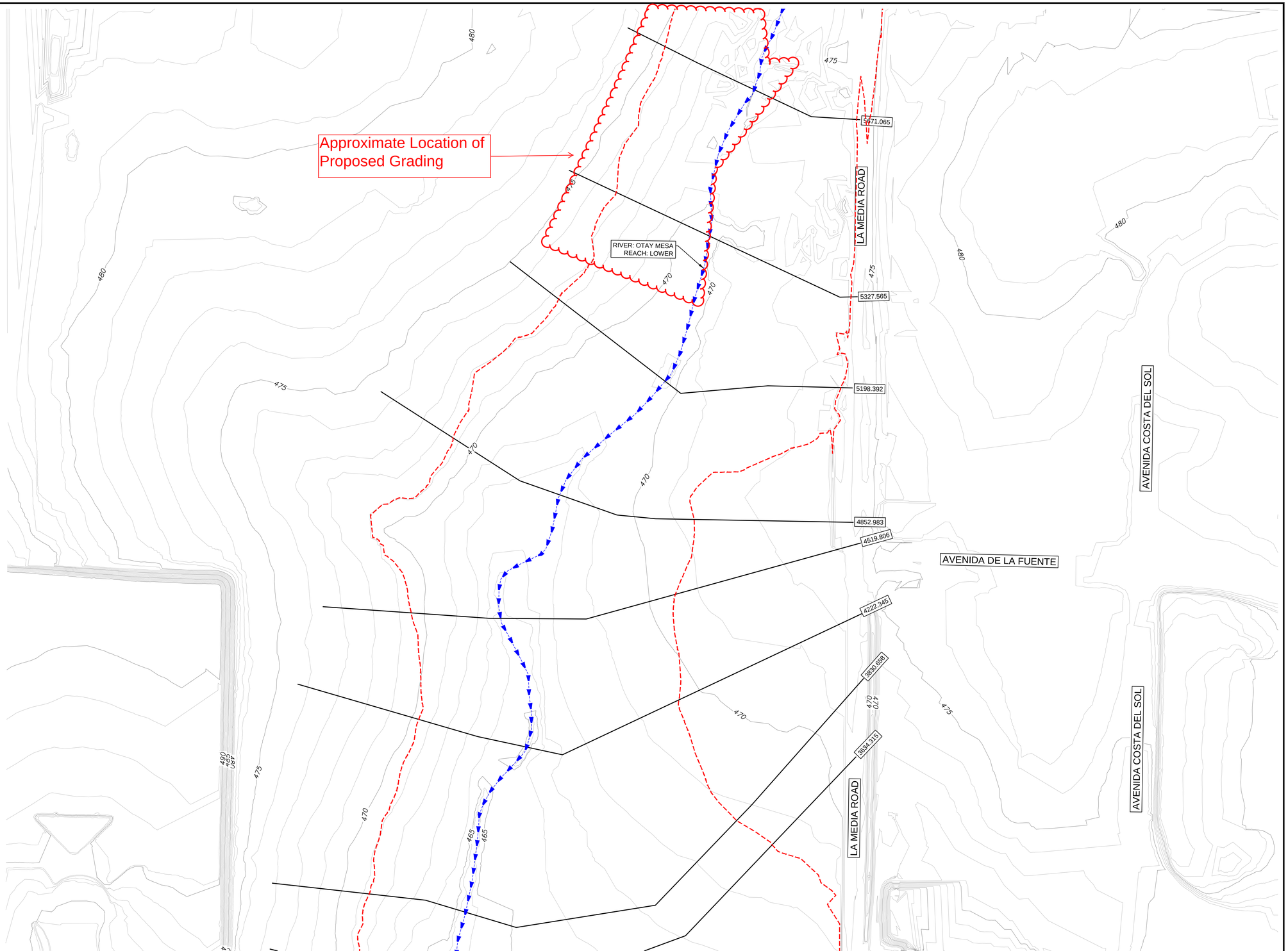
EXISTING CONDITION INUNDATION

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.



GRAPHIC SCALE: 1" = 100'



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EXISTING CONDITION HEC-RAS WORKMAP FOR METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 2 OF 3

J-15818-B
DATE: DECEMBER 16, 2019

LEGEND

FLOWLINE

1000 HEC-RAS CROSS SECTION

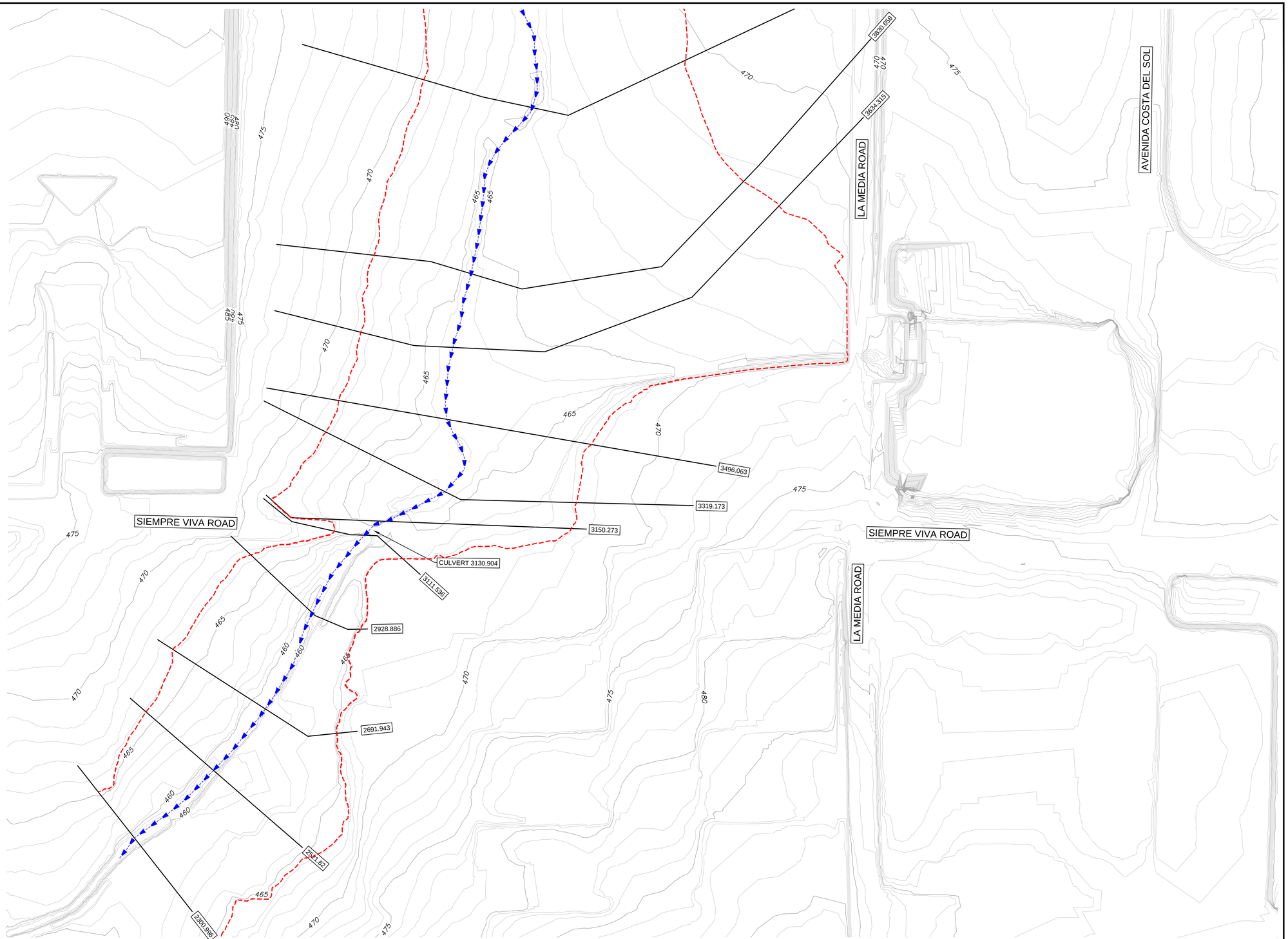
EXISTING CONDITION INUNDATION

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'



EXISTING CONDITION HEC-RAS WORKMAP FOR METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 3 OF 3

J-15818-B
DATE: DECEMBER 16, 2019

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MAP POCKET 4

HEC-RAS Post-Project Conditions Map

LEGEND

- FLOWLINE
- 1000 — HEC-RAS CROSS SECTION
- PROPOSED CONDITION INUNDATION

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'

905 FREEWAY

905 FREEWAY

OFFRAMP

ONRAMP

RIVER: TRIBUTARY
REACH: TRIBUTARY

RIVER: OTAY MESA
REACH: MAIN REACH

RIVER: OTAY MESA
REACH: LOWER

LA MEDIA ROAD

LA MEDIA ROAD

CENTURION STREET

AIRWAY ROAD

AIRWAY ROAD

JUNCTION: 1

7595.58
7383.07
7155.16
6955.21
7063.61
6757.03
6863.01
6547.49
6660.16
6530.88
6459.63
6350.00
6057.21
5987.15
6308.78
5932.84
6290.78
5671.065
5327.585

PROPOSED CONDITION HEC-RAS WORKMAP
FOR
METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 1 OF 3

J-18429
DATE: FEBRUARY 22, 2021

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LEGEND

FLOWLINE

1000 HEC-RAS CROSS SECTION

PROPOSED CONDITION INUNDATION

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'

Approximate Location of Proposed Grading

JUNCTION: 1

6180.76

5671.065

5327.565

5198.392

4852.993

4519.840

4222.845

3830.858

3634.459

RIVER: OTAY MESA
REACH: LOWER

LA MEDIA ROAD

AVENIDA DE LA FUENTE

AVENIDA COSTA DEL SOL

480 475 470 465 460

PROPOSED CONDITION HEC-RAS WORKMAP
FOR
METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 2 OF 3

J-18429
DATE: FEBRUARY 22, 2021

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LEGEND

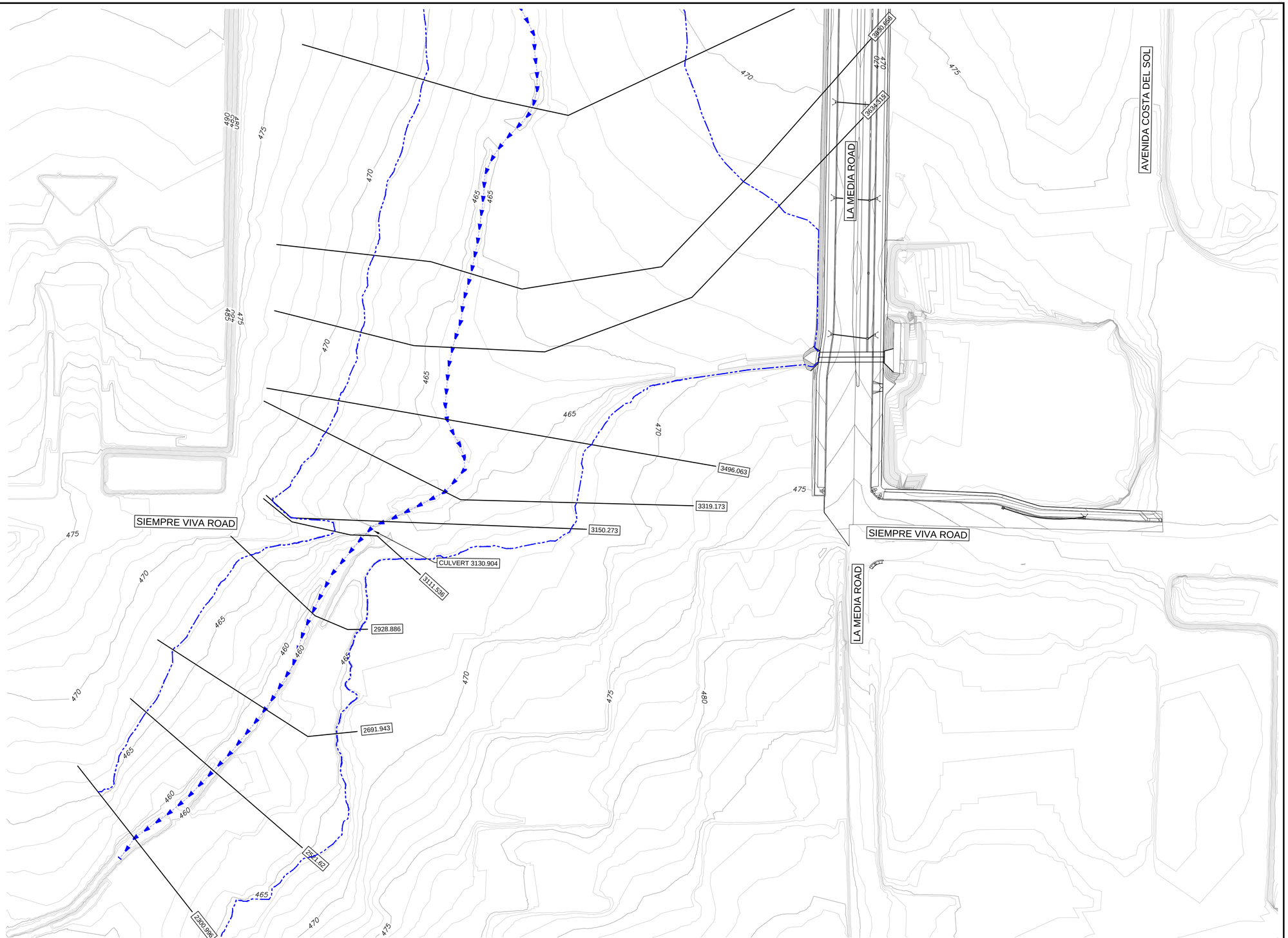
- FLOWLINE
- 1000 — HEC-RAS CROSS SECTION
- PROPOSED CONDITION INUNDATION

NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'



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PROPOSED CONDITION HEC-RAS WORKMAP FOR METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 3 OF 3

J-18429
DATE: FEBRUARY 22, 2021

Attachment 2

Proposed Condition HEC-RAS Analysis Results

PROJECT PROPOSED CONDITION

HEC-RAS Plan: PR1X River: Otay Mesa Reach: Lower

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lower	5671.065	Q100	2610.00	469.89	474.36		474.48	0.003295	2.86	943.92	378.74	0.30
Lower	5671.065	0.5 Q2	522.00	469.89	472.38		472.43	0.004494	1.80	289.74	258.86	0.30
Lower	5521.065	Q100	2610.00	470.00	474.06		474.13	0.001428	2.14	1271.84	440.78	0.20
Lower	5521.065	0.5 Q2	522.00	470.00	472.13		472.14	0.000936	1.00	522.65	348.33	0.14
Lower	5327.565	Q100	2610.00	468.62	473.56		473.66	0.002775	2.83	1084.57	490.19	0.28
Lower	5327.565	0.5 Q2	522.00	468.62	471.73		471.77	0.002914	1.73	328.41	293.64	0.25
Lower	5198.392	Q100	2610.00	467.44	472.47		472.60	0.004136	3.78	997.74	622.43	0.35
Lower	5198.392	0.5 Q2	522.00	467.44	470.68		470.74	0.003621	2.37	279.55	217.91	0.29
Lower	4852.983	Q100	2610.00	466.98	471.40		471.50	0.002411	2.63	1139.13	528.65	0.26
Lower	4852.983	0.5 Q2	522.00	466.98	469.38		469.42	0.003855	1.69	310.48	293.47	0.28
Lower	4519.806	Q100	2610.00	465.03	470.53		470.65	0.002763	2.87	1052.94	518.49	0.28
Lower	4519.806	0.5 Q2	522.00	465.03	468.45		468.49	0.002129	1.65	316.74	182.50	0.22
Lower	4222.345	Q100	2610.00	463.12	469.66		469.78	0.003088	3.02	1031.82	556.79	0.29
Lower	4222.345	0.5 Q2	522.00	463.12	467.70		467.75	0.002974	1.73	301.66	207.29	0.25
Lower	3830.658	Q100	2610.00	462.57	468.72		468.79	0.001935	3.07	1474.14	832.30	0.25
Lower	3830.658	0.5 Q2	522.00	462.57	466.62		466.68	0.002423	2.33	327.31	294.22	0.25
Lower	3634.315	Q100	2610.00	462.54	468.57		468.60	0.000758	1.93	2069.36	859.89	0.16
Lower	3634.315	0.5 Q2	522.00	462.54	466.46		466.48	0.000710	1.27	633.15	493.25	0.14
Lower	3496.063	Q100	3155.00	461.62	468.41		468.45	0.000925	2.02	2087.46	799.62	0.17
Lower	3496.063	0.5 Q2	631.00	461.62	466.33		466.35	0.000833	1.25	656.26	528.63	0.14
Lower	3319.173	Q100	3155.00	460.42	468.20		468.26	0.001325	2.04	1661.95	672.03	0.19
Lower	3319.173	0.5 Q2	631.00	460.42	466.22		466.24	0.000479	0.93	678.84	301.11	0.11
Lower	3150.273	Q100	3155.00	461.38	467.91	465.62	468.01	0.001737	2.95	1424.22	553.57	0.24
Lower	3150.273	0.5 Q2	631.00	461.38	466.13	463.53	466.15	0.000506	1.18	642.67	346.82	0.12
Lower	3130.904		Culvert									
Lower	3111.536	Q100	3155.00	460.33	466.99		467.30	0.006026	4.46	721.33	235.58	0.42
Lower	3111.536	0.5 Q2	631.00	460.33	464.15		464.26	0.004477	2.75	229.84	106.74	0.33
Lower	2928.886	Q100	3155.00	459.39	466.56		466.71	0.002956	3.26	1018.99	316.93	0.30
Lower	2928.886	0.5 Q2	631.00	459.39	463.78		463.85	0.002286	1.99	321.63	170.17	0.24
Lower	2691.943	Q100	3155.00	459.52	466.11		466.20	0.001497	2.75	1384.98	443.97	0.22
Lower	2691.943	0.5 Q2	631.00	459.52	463.15		463.22	0.003119	2.13	302.93	214.66	0.27
Lower	2521.617	Q100	3155.00	458.75	465.80		465.91	0.001864	2.91	1286.52	431.19	0.24
Lower	2521.617	0.5 Q2	631.00	458.75	462.81		462.86	0.001434	1.75	393.76	193.99	0.19
Lower	2300.996	Q100	3155.00	458.13	465.34	462.76	465.47	0.002002	3.50	1206.55	384.92	0.26
Lower	2300.996	0.5 Q2	631.00	458.13	462.42	460.71	462.48	0.002002	2.21	348.92	190.05	0.23

Plan: PR1X Otay Mesa Lower RS: 5671.065 Profile: Q100

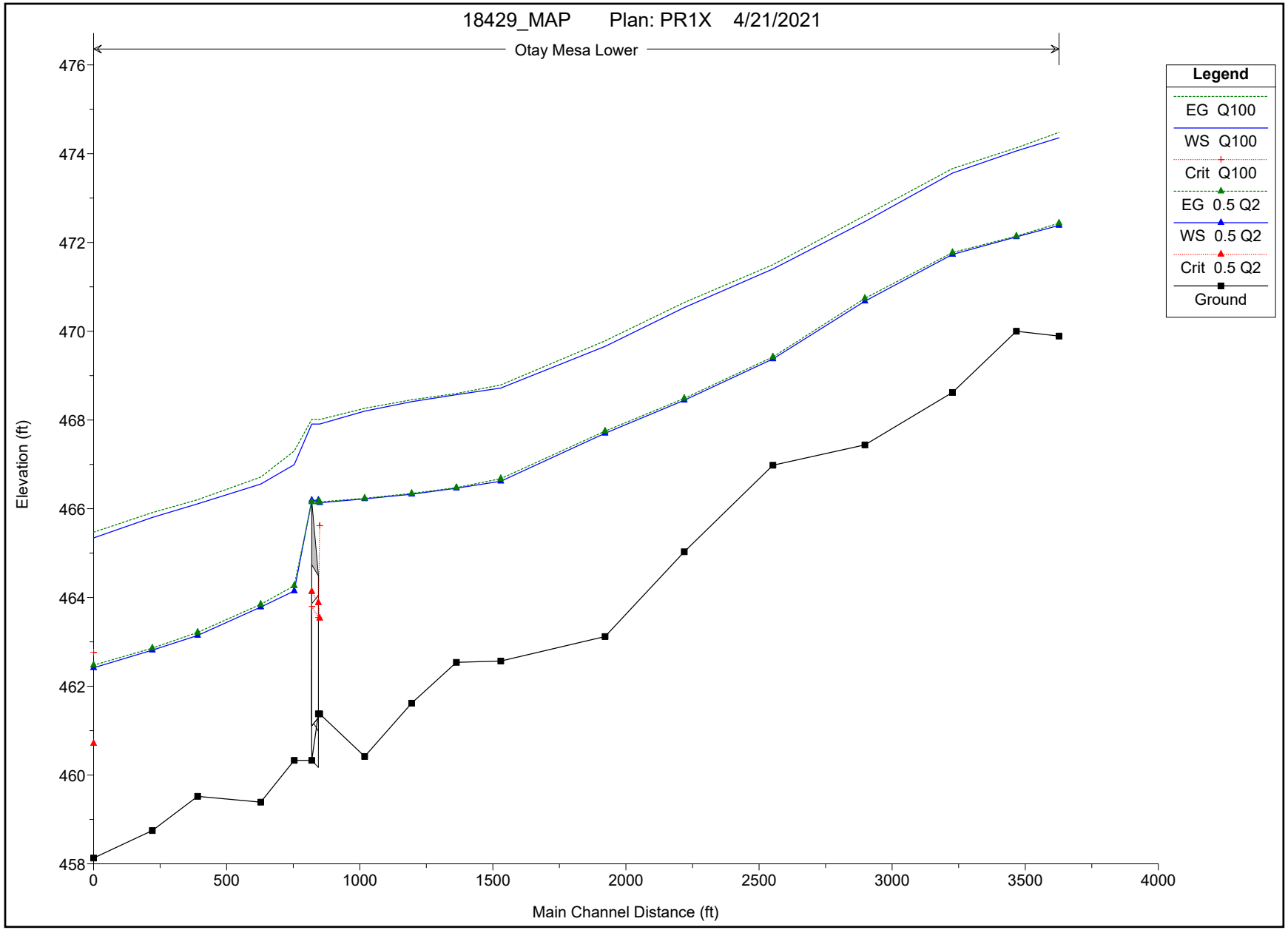
E.G. Elev (ft)	474.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	474.36	Reach Len. (ft)	198.93	160.00	158.83
Crit W.S. (ft)		Flow Area (sq ft)	40.52	872.86	30.54
E.G. Slope (ft/ft)	0.003295	Area (sq ft)	40.52	872.86	30.54
Q Total (cfs)	2610.00	Flow (cfs)	80.43	2498.20	31.37
Top Width (ft)	378.74	Top Width (ft)	24.06	304.95	49.73
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)	1.99	2.86	1.03
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)	1.68	2.86	0.61
Conv. Total (cfs)	45468.3	Conv. (cfs)	1401.2	43520.6	546.5
Length Wtd. (ft)	160.61	Wetted Per. (ft)	24.55	305.55	49.74
Min Ch El (ft)	469.89	Shear (lb/sq ft)	0.34	0.59	0.13
Alpha	1.04	Stream Power (lb/ft s)	0.67	1.68	0.13
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	33.71	56.80	12.38
C & E Loss (ft)	0.02	Cum SA (acres)	21.44	15.93	8.24

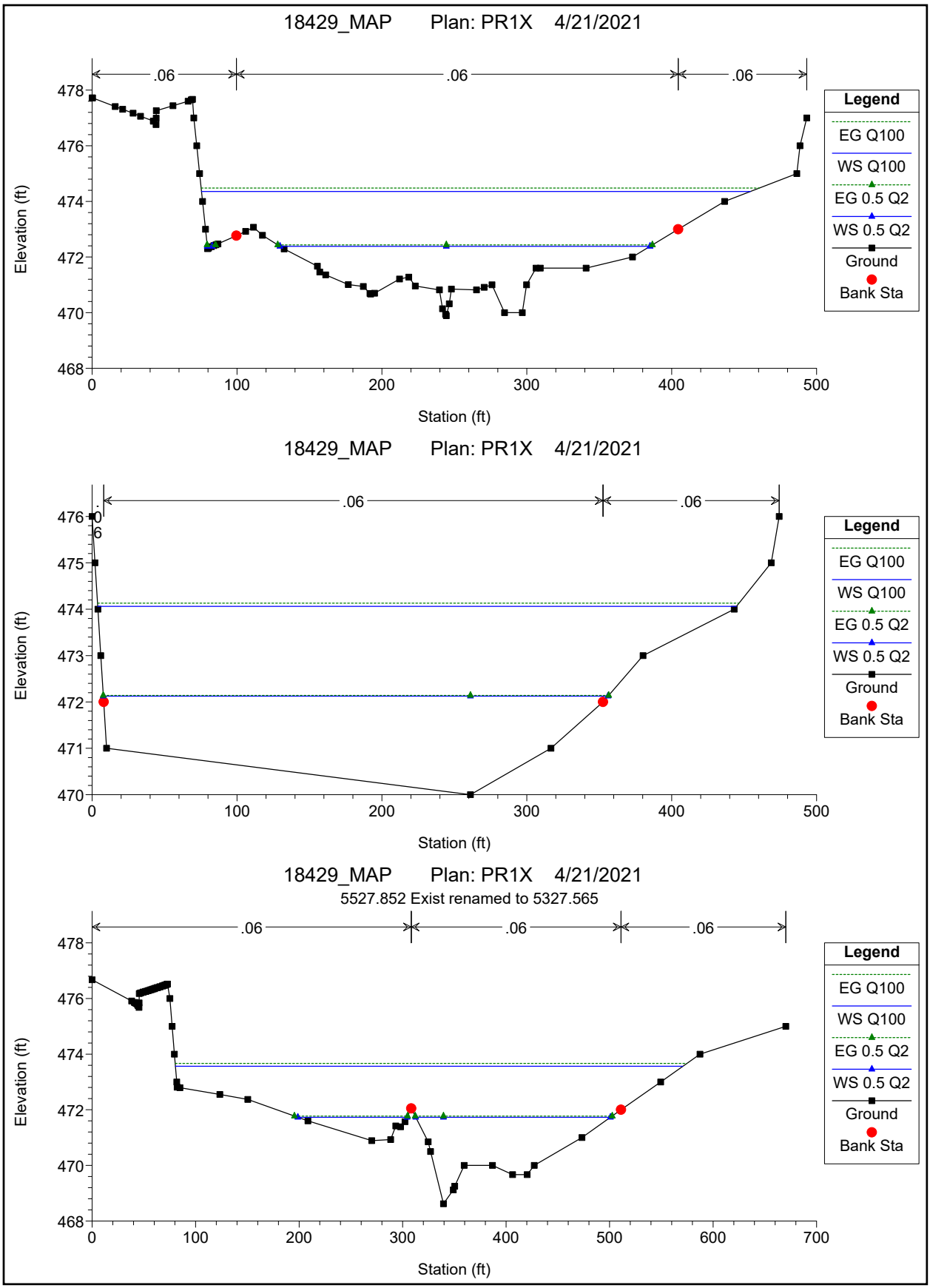
Plan: PR1X Otay Mesa Lower RS: 5521.065 Profile: Q100

E.G. Elev (ft)	474.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	474.06	Reach Len. (ft)	236.18	240.00	208.29
Crit W.S. (ft)		Flow Area (sq ft)	4.25	1189.18	78.41
E.G. Slope (ft/ft)	0.001428	Area (sq ft)	4.25	1189.18	78.41
Q Total (cfs)	2610.00	Flow (cfs)	3.76	2540.31	65.92
Top Width (ft)	440.78	Top Width (ft)	4.12	344.60	92.06
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.89	2.14	0.84
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	1.03	3.45	0.85
Conv. Total (cfs)	69063.3	Conv. (cfs)	99.6	67219.3	1744.4
Length Wtd. (ft)	238.75	Wetted Per. (ft)	4.61	344.86	92.09
Min Ch El (ft)	470.00	Shear (lb/sq ft)	0.08	0.31	0.08
Alpha	1.06	Stream Power (lb/ft s)	0.07	0.66	0.06
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	33.61	53.02	12.18
C & E Loss (ft)	0.00	Cum SA (acres)	21.38	14.74	7.99

Plan: PR1X Otay Mesa Lower RS: 5327.565 Profile: Q100

E.G. Elev (ft)	473.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	473.56	Reach Len. (ft)	303.71	329.46	297.63
Crit W.S. (ft)		Flow Area (sq ft)	391.07	646.84	46.66
E.G. Slope (ft/ft)	0.002775	Area (sq ft)	391.07	646.84	46.66
Q Total (cfs)	2610.00	Flow (cfs)	730.88	1827.42	51.70
Top Width (ft)	490.19	Top Width (ft)	227.88	202.71	59.60
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.87	2.83	1.11
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)	1.72	3.19	0.78
Conv. Total (cfs)	49541.9	Conv. (cfs)	13873.2	34687.2	981.4
Length Wtd. (ft)	315.26	Wetted Per. (ft)	228.10	203.01	59.62
Min Ch El (ft)	468.62	Shear (lb/sq ft)	0.30	0.55	0.14
Alpha	1.14	Stream Power (lb/ft s)	0.56	1.56	0.15
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	32.54	47.96	11.88
C & E Loss (ft)	0.00	Cum SA (acres)	20.75	13.23	7.62


18429_MAP Plan: PR1X 4/21/2021
Otay Mesa Lower
Legend
EG Q100
WS Q100
Crit Q100
EG 0.5 Q2
WS 0.5 Q2
Crit 0.5 Q2
Ground
Elevation (ft)
476
474
472
470
468
466
464
462
460
458
0
500
1000
1500
2000
2500
3000
3500
4000
Main Channel Distance (ft)


18429_MAP Plan: PR1X 4/21/2021
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG Q100
WS Q100
EG 0.5 Q2
WS 0.5 Q2
Ground
Bank Sta
18429_MAP Plan: PR1X 4/21/2021
.06
.06
Elevation (ft)
Station (ft)
Legend
EG Q100
WS Q100
EG 0.5 Q2
WS 0.5 Q2
Ground
Bank Sta
18429_MAP Plan: PR1X 4/21/2021
5527.852 Exist renamed to 5327.565
.06
.06
.06
Elevation (ft)
Station (ft)
Legend
EG Q100
WS Q100
EG 0.5 Q2
WS 0.5 Q2
Ground
Bank Sta

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: 18429_MAP
Project File : 18429_MAP.prj
Run Date and Time: 4/21/2021 9:57:00 PM

Project in English units

Project Description:
Metropolitan Air Park-La Media Off-site Improvements
15818-B

PLAN DATA

Plan Title: PR1X
Plan File :
C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\Hydraulics\HecRas\
18429_MAP.p06

Geometry Title: PR1X
Geometry File :
C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\Hydraulics\HecRas\
18429_MAP.g06

Flow Title : PR
Flow File :
C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\Hydraulics\HecRas\
18429_MAP.f02

Plan Summary Information:
Number of: Cross Sections = 34 Multiple Openings = 0
Culverts = 3 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 40
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: PR
Flow File :
C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\Hydraulics\HecRas\
18429_MAP.f02

Flow Data (cfs)

River	Reach	RS	Q100	0.5 Q2
Otay Mesa	Main Reach	7063.61	871	174
Otay Mesa	Lower	5671.065	2610	522
Otay Mesa	Lower	3496.063	3155	631
Tributary	Tributary	7595.58	601	120
Tributary	Tributary	6547.49	1684	337

Boundary Conditions

River	Reach	Profile	Upstream
Downstream			
Otay Mesa	Lower	Q100	
Normal S = 0.002			

GEOMETRY DATA

Geometry Title: PR1X
Geometry File :
C:\RICK\Projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\Hydraulics\HecRas\
18429_MAP.g06

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Otay Mesa	Main Reach		1
Otay Mesa	Lower	1	
Tributary	Tributary		1

JUNCTION INFORMATION

Name: 1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length
Angle				
Tributary	Tributary	to Otay Mesa	Lower	186.69
Otay Mesa	Main Reach	to Otay Mesa	Lower	206.46

CROSS SECTION

RIVER: Otay Mesa
REACH: Main Reach RS: 7063.61

INPUT
Description:
Station Elevation Data num= 481

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.76	.52	480.74	1.33	480.69	2.6	480.64	3.52	480.59
6.02	480.56	6.67	480.53	7.17	480.53	7.62	480.51	7.83	480.51
8.36	480.49	8.82	480.49	9.58	480.46	10.8	480.47	11.67	480.45
13.65	480.45	14.54	480.44	15.34	480.43	18.09	480.44	18.79	480.42
21.16	480.43	22.02	480.43	23.11	480.4	23.23	480.4	23.34	480.4
23.6	480.4	25.92	480.43	26.5	480.43	27.07	480.43	27.37	480.43
29.32	480.36	29.62	480.37	31.08	480.31	33	480.37	33.39	480.38
41.39	480.45	42.05	480.42	43.52	480.42	45.58	480.41	45.64	480.41
56.42	480.31	59.73	480.24	63.92	480.22	67.46	480.22	71.78	480.2
75.65	480.17	79.63	480.14	85.12	479.93	86.91	479.93	87.34	479.92
114.01	479.92	115.34	479.89	142.43	479.88	142.45	479.88	148.74	479.8
149.11	479.8	149.52	479.8	171.42	479.8	192.22	479.8	192.25	479.8
193.31	479.8	195.18	479.8	195.48	479.8	200.74	479.8	206.32	479.8
209.48	479.8	219.79	479.8	220.01	479.8	220.08	479.8	220.89	479.8
220.9	479.8	220.91	479.8	220.95	479.8	221.62	479.8	222.12	479.8
222.19	479.8	224.32	479.8	224.41	479.8	224.44	479.8	224.58	479.8
230.6	479.8	230.65	479.8	237.42	479.8	237.46	479.8	242.23	479.8
242.24	479.8	244.53	479.8	245.27	479.79	245.28	479.79	246.7	479.77
246.72	479.77	247.62	479.76	249.12	479.78	249.15	479.78	250.39	479.8
250.6	479.8	250.61	479.8	251.36	479.8	251.82	479.8	252.44	479.8
252.9	479.8	254.05	479.77	254.07	479.77	254.1	479.77	257.4	479.64
257.52	479.64	257.6	479.64	257.65	479.64	257.71	479.64	260.73	479.53
260.82	479.53	260.9	479.53	260.97	479.53	261.04	479.53	262.13	479.5
262.4	479.5	262.47	479.49	262.53	479.49	262.97	479.49	263.02	479.49
263.44	479.49	263.49	479.49	263.67	479.49	263.77	479.49	263.83	479.49
265.2	479.48	265.39	479.48	267.57	479.51	267.8	479.51	268.09	479.51
270.21	479.53	270.55	479.53	271.22	479.48	271.67	479.48	272.07	479.48
272.29	479.49	272.42	479.5	272.54	479.51	272.67	479.52	272.97	479.45
273.3	479.37	275.25	479.36	276.33	479.23	276.62	479.23	278.28	479.04
279.44	478.91	280.35	478.91	282.37	478.89	283.54	478.88	283.96	478.84
286.93	478.8	290.03	478.77	304.95	478	307.22	478	308.4	477.98
332.81	477.98	333.43	477.96	338.79	477.96	339.87	477.96	376.38	479.44
377.35	479.52	378.4	479.62	379.27	479.69	380.54	479.69	380.93	479.78
380.94	479.78	380.95	479.78	381.01	479.79	381.02	479.79	381.11	479.8
381.34	479.8	381.58	479.8	382.27	479.8	382.65	479.8	382.91	479.8
383.14	479.8	383.37	479.8	383.54	479.8	384.1	479.8	384.33	479.8
384.68	479.8	385.36	479.8	386.27	479.8	386.88	479.8	387.35	479.8
387.76	479.8	389.15	479.8	390.48	479.8	390.64	479.8	390.72	479.8
392	479.8	392.05	479.8	394.14	479.8	394.21	479.8	394.63	479.8
395.05	479.8	395.95	479.8	396.39	479.8	398.02	479.8	401.85	479.8
403.14	479.8	404.48	479.8	404.52	479.8	404.59	479.8	404.91	479.8
405.07	479.8	405.32	479.8	405.45	479.8	405.95	479.8	406.52	479.8
406.76	479.8	406.96	479.8	407.25	479.8	408.94	479.8	409.08	479.8
409.36	479.8	411.36	479.8	411.5	479.8	412.83	479.8	414.9	479.8
414.93	479.8	415.24	479.8	415.25	479.8	415.26	479.8	417.21	479.6
417.32	479.6	421.71	479.51	422.5	479.49	471.06	477.8	471.47	477.8
471.79	477.8	485.17	477.8	485.48	477.8	514.45	477.8	514.73	477.8
515.65	477.8	515.84	477.8	522.16	477.8	553.11	477.8	553.24	477.8
553.31	477.8	553.39	477.8	553.49	477.8	554.03	477.8	555.5	477.8
557.2	477.8	558.4	477.8	558.61	477.8	559.38	477.8	565.83	477.8
571.4	477.8	571.77	477.8	575.94	477.8	580.15	477.8	586.69	477.8
589.82	477.8	590.51	477.8	591.88	477.8	593.61	477.8	595.38	477.8
596.73	477.8	597.21	477.8	597.31	477.8	617.12	477.8	626.63	477.8
628.91	477.8	631.24	477.8	631.93	477.8	639.23	477.8	641.59	477.8
656.33	477.8	656.59	477.8	668.36	477.8	668.85	477.8	671.31	477.8
672.19	477.8	673.14	477.8	674.25	477.8	674.65	477.8	676.03	477.8
676.45	477.8	676.88	477.8	677.54	477.8	678.23	477.8	678.85	477.8

679.62	477.8	679.87	477.8	680.89	477.8	681.49	477.8	682.32	477.8
683.11	477.8	683.47	477.8	683.91	477.8	684.19	477.8	684.52	477.8
684.83	477.8	686.55	477.8	690.34	477.8	690.77	477.8	690.93	477.8
691.56	477.8	692.39	477.8	693.93	477.8	696.41	477.8	701.2	477.8
704	477.8	711.34	477.8	712.96	477.8	713.42	477.8	715.14	477.8
716.74	477.8	717.46	477.8	719.3	477.8	719.61	477.8	719.96	477.8
720.27	477.8	720.43	477.8	720.94	477.8	721.31	477.8	725.84	477.8
727.81	477.8	730.49	477.8	732.96	477.8	734.83	477.8	735.55	477.8
737.18	477.8	760.22	477.8	760.23	477.8	760.28	477.8	760.38	477.8
760.45	477.8	760.46	477.8	760.47	477.8	839.78	475.84	849.93	475.84
851.49	475.84	852.08	475.84	855.26	475.84	858.89	475.84	866.66	475.84
866.85	475.84	867.01	475.84	867.47	475.84	868.58	475.84	869.9	475.84
870.97	475.84	872.15	475.84	873.77	475.84	875.42	475.84	876.68	475.84
887.46	475.84	889.08	475.84	895.21	475.84	896.61	475.84	901.28	475.84
903.78	475.84	904.76	475.84	904.97	475.84	905.2	475.84	941.11	477.8
941.18	477.8	941.19	477.8	941.23	477.8	941.27	477.8	941.31	477.8
941.34	477.8	941.43	477.8	941.6	477.8	941.62	477.8	941.99	477.8
942.41	477.8	942.8	477.8	943.06	477.8	943.13	477.8	943.9	477.8
943.93	477.8	943.96	477.8	944.28	477.8	946.29	477.8	946.4	477.8
947.35	477.8	947.65	477.8	948.47	477.8	948.61	477.8	948.9	477.8
952.37	477.8	952.92	477.8	952.99	477.8	953.15	477.8	953.82	477.8
955.31	477.8	955.46	477.8	956.22	477.8	956.3	477.8	956.71	477.8
959.29	477.8	959.59	477.8	959.86	477.8	960.38	477.8	960.7	477.8
961.1	477.8	961.46	477.8	961.65	477.8	962.06	477.8	965.33	477.8
966.03	477.8	967.96	477.8	970.4	477.8	970.59	477.8	971.66	477.8
972.21	477.8	972.27	477.8	972.35	477.8	973.99	477.8	974.11	477.8
974.2	477.8	984.87	476.83	997.22	475.8	997.72	475.8	999.15	475.8
1000.56	475.8	1029.67	475.8	1030.17	475.8	1030.92	475.8	1031.85	475.8
1032.9	475.8	1032.99	475.8	1033.04	475.8	1033.19	475.8	1033.55	475.8
1034.13	475.8	1035.31	475.8	1035.43	475.8	1035.56	475.8	1036.12	475.8
1036.13	475.8	1036.37	475.8	1036.38	475.8	1036.39	475.8	1037.03	475.8
1043.23	475.8	1043.89	475.8	1044	475.8	1044.11	475.8	1044.45	475.8
1045.24	475.8	1046.27	475.8	1046.28	475.799	1048.95	475.45	1050.5	475.39
1051.03	475.37	1066.38	473.68	1067.22	473.74	1067.95	473.65	1075.24	473.4
1082.32	473.36	1083.47	473.37	1088.49	473.37	1092.73	473.4	1099.82	475.78
1103.68	476.67	1104.74	476.99	1105.46	477.2	1113.56	479.71	1115.8	480.4
1116.59	480.39	1121.07	480.31	1121.42	479.87	1121.46	479.79	1121.75	479.81
1123.32	479.9	1124.02	479.92	1127.53	480.02	1129.94	480.06	1141.82	480.26
1151.01	480.45	1153.09	480.48	1163.46	480.72	1165.57	480.77	1169.39	480.86
1186.62	481.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1046.27	.06	1099.82	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1046.27	1099.82	200.08	200.6	200.03	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.79	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.05	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	477.73	Reach Len. (ft)	200.08	200.60
200.03				
Crit W.S. (ft)		Flow Area (sq ft)	346.17	195.23
7.70				
E.G. Slope (ft/ft)	0.001520	Area (sq ft)	346.17	195.23
7.70				
Q Total (cfs)	871.00	Flow (cfs)	419.91	443.61
7.49				
Top Width (ft)	309.00	Top Width (ft)	248.09	53.55
7.36				
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	1.21	2.27
0.97				
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)	1.40	3.65
1.05				
Conv. Total (cfs)	22343.8	Conv. (cfs)	10771.9	11379.9
192.1				
Length Wtd. (ft)	200.32	Wetted Per. (ft)	248.25	54.07
7.62				
Min Ch El (ft)	473.36	Shear (lb/sq ft)	0.13	0.34
0.10				
Alpha	1.33	Stream Power (lb/ft s)	0.16	0.78
0.09				
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	6.76	6.90
0.17				
C & E Loss (ft)	0.01	Cum SA (acres)	5.15	1.59
0.09				

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	476.05	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	476.01	Reach Len. (ft)	200.08	200.60
200.03				
Crit W.S. (ft)		Flow Area (sq ft)	22.70	102.99
0.12				
E.G. Slope (ft/ft)	0.001801	Area (sq ft)	22.70	102.99
0.12				
Q Total (cfs)	174.00	Flow (cfs)	7.63	166.34

0.03					
Top Width (ft)	181.62	Top Width (ft)	127.07	53.55	
1.00					
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	0.34	1.62	
0.25					
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)	0.18	1.92	
0.12					
Conv. Total (cfs)	4100.0	Conv. (cfs)	179.9	3919.5	
0.7					
Length Wtd. (ft)	200.59	Wetted Per. (ft)	127.09	54.07	
1.03					
Min Ch El (ft)	473.36	Shear (lb/sq ft)	0.02	0.21	
0.01					
Alpha	1.31	Stream Power (lb/ft s)	0.01	0.35	
0.00					
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.29	2.86	
0.01					
C & E Loss (ft)	0.00	Cum SA (acres)	1.12	1.51	
0.01					

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Otay Mesa
REACH: Main Reach RS: 6863.01

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.44	40.3	481.15	41.34	481.15	45.66	481.12	48.42	481.1
54.14	481.07	101.69	480.69	114.47	480.57	118.68	480.54	131.37	480.42
136.35	480.38	139.46	480.35	154.43	480.24	156.9	480.22	197.35	479.86
204.32	479.8	204.41	479.8	214.06	479.74	215	479.74	223.96	479.68
310.8	479.18	323.76	479.12	390.92	478.86	396.6	478.83	409.96	478.77
414.97	478.75	419.85	478.73	457.06	478.55	465.59	478.5	529.5	478.28
530.41	478.28	586.52	477.87	586.59	477.87	586.67	477.87	586.72	477.87
594.51	477.81	594.57	477.81	594.94	477.8	596.2	477.8	596.28	477.8
596.54	477.8	596.96	477.8	597.12	477.8	605.27	477.8	607.21	477.8
823.61	476.06	832.67	475.99	936.29	475.82	938.72	475.81	940.67	475.79
957.6	475.55	995.08	475.41	1004.53	475.59	1011.1	475.59	1022.51	475.57
1048.26	475.52	1050.15	475.01	1056.26	473.5	1056.79	473.22	1057.22	473.18
1057.65	473.13	1058.47	473.1	1059.27	473.09	1059.97	473.1	1063.14	473.12
1087.74	473.3	1091.32	474.5	1093.35	475.515	1100.84	479.26	1100.96	479.28
1101.11	479.3	1101.12	479.3	1101.26	479.32	1101.27	479.32	1101.42	479.34
1101.43	479.34	1101.57	479.36	1101.59	479.36	1101.73	479.38	1101.75	479.38
1101.89	479.4	1101.91	479.4	1102.05	479.42	1102.08	479.43	1102.21	479.44
1102.24	479.45	1102.37	479.46	1102.41	479.47	1102.53	479.48	1102.57	479.49
1102.69	479.51	1102.74	479.51	1102.76	479.52	1102.85	479.53	1102.91	479.53
1103.02	479.55	1103.08	479.56	1103.18	479.57	1103.25	479.58	1103.34	479.59
1103.43	479.6	1103.51	479.61	1103.6	479.63	1103.68	479.64	1103.78	479.65
1103.85	479.66	1103.96	479.67	1103.98	479.68	1104.02	479.68	1104.13	479.7
1104.19	479.7	1104.32	479.72	1104.36	479.73	1104.5	479.74	1104.54	479.75
1104.68	479.77	1104.72	479.77	1104.87	479.79	1104.9	479.8	1105.05	479.82
1105.08	479.82	1105.24	479.84	1105.25	479.84	1105.26	479.84	1105.43	479.87
1105.44	479.87	1105.62	479.89	1105.63	479.89	1105.81	479.92	1105.87	479.92
1107.58	479.9	1107.87	479.89	1108.61	479.88	1114.37	479.8	1114.52	479.33
1114.53	479.3	1114.65	479.3	1116.37	479.42	1157.61	479.83	1166.46	479.92
1170.16	479.96	1172.19	479.98	1179.17	480.05	1179.25	480.05	1179.27	480.05
1179.31	480.05	1179.37	480.05						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1048.26	.06	1093.35	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1048.26	1093.35	200.06	201.01	200.21	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.52	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060	
0.060					
W.S. Elev (ft)	477.49	Reach Len. (ft)	200.06	201.01	
200.21					
Crit W.S. (ft)		Flow Area (sq ft)	520.71	177.04	
3.89					
E.G. Slope (ft/ft)	0.001106	Area (sq ft)	520.71	177.04	
3.89					
Q Total (cfs)	871.00	Flow (cfs)	509.24	358.80	
2.95					
Top Width (ft)	451.34	Top Width (ft)	402.30	45.09	
3.95					
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)	0.98	2.03	
0.76					
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)	1.29	3.93	
0.99					
Conv. Total (cfs)	26195.1	Conv. (cfs)	15315.4	10791.0	
88.7					
Length Wtd. (ft)	200.43	Wetted Per. (ft)	402.31	45.85	
4.41					
Min Ch El (ft)	473.09	Shear (lb/sq ft)	0.09	0.27	
0.06					
Alpha	1.46	Stream Power (lb/ft s)	0.09	0.54	

0.05				
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	4.77	6.04
0.14				
C & E Loss (ft)	0.00	Cum SA (acres)	3.66	1.36
0.06				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	475.64	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	475.58	Reach Len. (ft)	200.06	201.01
200.21				
Crit W.S. (ft)		Flow Area (sq ft)	5.66	91.10
0.00				
E.G. Slope (ft/ft)	0.002347	Area (sq ft)	5.66	91.10
0.00				
Q Total (cfs)	174.00	Flow (cfs)	1.28	172.72
0.00				
Top Width (ft)	126.82	Top Width (ft)	81.60	45.09
0.13				
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.23	1.90
0.12				
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	0.07	2.02
0.03				
Conv. Total (cfs)	3591.9	Conv. (cfs)	26.5	3565.4
0.0				
Length Wtd. (ft)	200.93	Wetted Per. (ft)	81.60	45.85
0.15				
Min Ch El (ft)	473.09	Shear (lb/sq ft)	0.01	0.29
0.00				
Alpha	1.10	Stream Power (lb/ft s)	0.00	0.55
0.00				
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.23	2.41
0.01				
C & E Loss (ft)	0.00	Cum SA (acres)	0.64	1.28
0.01				

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Otay Mesa

REACH: Main Reach RS: 6660.16

INPUT
Description:
Station Elevation Data num= 190

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	480.63	22.3	480.34	30.46	480.26	37.03	480.14	54.32	479.8
55.56	479.8	56.29	479.8	57.38	479.8	58.15	479.8	60.22	479.8
62.13	479.8	67.56	479.8	69.26	479.8	69.65	479.8	73.23	479.8
73.47	479.8	73.59	479.8	89.59	479.8	90.15	479.8	90.37	479.8
91.71	479.8	92.94	479.8	94.42	479.8	96.51	479.8	99.73	479.8
101.3	479.8	105.38	479.8	107.7	479.8	111.44	479.8	117.24	479.8
132.47	479.8	133.01	479.8	138.38	479.8	138.73	479.8	138.93	479.8
139.19	479.8	143.69	479.8	143.78	479.8	162.77	479.8	163.63	479.8
165.33	479.8	166.29	479.8	191.6	479.8	192.66	479.8	195.34	479.8
195.77	479.8	199.68	479.8	200.22	479.8	201.38	479.8	205.26	479.8
206.42	479.8	208.96	479.8	402.51	478.09	407.46	478.04	428.85	477.86
429.01	477.86	429.42	477.85	429.85	477.85	430.14	477.85	430.33	477.84
430.45	477.84	431.03	477.84	431.45	477.83	432.26	477.83	434.47	477.82
441.12	477.82	448.31	477.8	448.34	477.8	452	477.8	453.52	477.8
454.01	477.8	456.2	477.8	456.3	477.8	458.38	477.8	459.81	477.8
461.77	477.8	461.87	477.8	465.56	477.8	465.69	477.8	470.3	477.8
470.64	477.8	475.46	477.8	480.72	477.8	482.18	477.8	488.86	477.8
494.33	477.8	496.18	477.8	498.72	477.8	499.87	477.8	501.29	477.8
503.18	477.8	503.95	477.8	506.55	477.8	509.08	477.8	509.21	477.8
510.98	477.8	513.59	477.8	514.06	477.8	514.12	477.8	519.18	477.8
524.63	477.8	524.99	477.8	528.94	477.8	537.24	477.8	541.89	477.8
543.49	477.8	544.83	477.8	548.17	477.8	548.9	477.8	549.46	477.8
550.16	477.8	551.11	477.8	554.08	477.8	557.28	477.8	558.59	477.8
561.64	477.8	573.91	477.8	574.21	477.8	578.82	477.8	580.63	477.8
584.78	477.8	586.29	477.8	587.41	477.8	590.19	477.8	593.76	477.8
595.2	477.8	596.31	477.8	611.37	477.8	613.06	477.8	615.53	477.8
616.13	477.8	618.77	477.8	620.93	477.8	622.7	477.8	624.16	477.8
630.59	477.8	632.33	477.8	635.28	477.8	636.07	477.8	637.43	477.8
637.64	477.8	682.12	477.42	697.28	477.39	711.69	477.27	791.69	476.34
963.02	475.04	988.76	474.47	1010.58	474.36	1013.33	474.35	1024.13	475.07
1032.09	474.76	1043.51	474.54	1046.72	472.93	1050.54	472.92	1057.9	472.9
1058.01	472.9	1058.1	472.9	1061.14	472.89	1062.74	472.88	1074.42	472.92
1076.39	472.93	1076.42	472.93	1077.13	472.93	1077.5	472.93	1078.7	472.93
1082.02	474.583	1083.58	475.36	1089.5	478.29	1093.1	480.08	1093.5	480.07
1095.11	480.05	1096.97	480.02	1101.89	479.95	1107.39	479.4	1107.4	479.37
1107.52	479.38	1109.23	479.49	1150.32	479.9	1159.23	479.99	1162.95	480.02
1165	480.04	1172.03	480.11	1172.12	480.11	1172.14	480.11	1172.17	480.11
1172.23	480.11	1172.39	480.11	1172.9	480.11	1176.34	480.05	1176.46	480.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1043.51	.06	1082.02	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

1043.51 1082.02 200.07 200.11 200.11 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.32	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.03	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	477.28	Reach Len. (ft)	200.07	200.11
200.11				
Crit W.S. (ft)		Flow Area (sq ft)	523.92	163.06
7.35				
E.G. Slope (ft/ft)	0.000956	Area (sq ft)	523.92	163.06
7.35				
Q Total (cfs)	871.00	Flow (cfs)	542.11	322.50
6.38				
Top Width (ft)	377.46	Top Width (ft)	333.50	38.51
5.45				
Vel Total (ft/s)	1.25	Avg. Vel. (ft/s)	1.03	1.98
0.87				
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)	1.57	4.23
1.35				
Conv. Total (cfs)	28169.0	Conv. (cfs)	17532.5	10430.1
206.4				
Length Wtd. (ft)	200.09	Wetted Per. (ft)	333.55	39.28
6.08				
Min Ch El (ft)	472.88	Shear (lb/sq ft)	0.09	0.25
0.07				
Alpha	1.35	Stream Power (lb/ft s)	0.10	0.49
0.06				
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	2.37	5.26
0.12				
C & E Loss (ft)	0.01	Cum SA (acres)	1.97	1.17
0.04				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	475.20	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	475.15	Reach Len. (ft)	200.07	200.11
200.11				
Crit W.S. (ft)		Flow Area (sq ft)	41.65	80.93
0.32				
E.G. Slope (ft/ft)	0.002050	Area (sq ft)	41.65	80.93
0.32				
Q Total (cfs)	174.00	Flow (cfs)	26.92	146.94
0.15				
Top Width (ft)	134.81	Top Width (ft)	95.16	38.51
1.14				
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)	0.65	1.82
0.45				
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.44	2.10
0.28				
Conv. Total (cfs)	3842.6	Conv. (cfs)	594.4	3245.0
3.2				
Length Wtd. (ft)	200.11	Wetted Per. (ft)	95.20	39.28
1.27				
Min Ch El (ft)	472.88	Shear (lb/sq ft)	0.06	0.26
0.03				
Alpha	1.42	Stream Power (lb/ft s)	0.04	0.48
0.01				
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.12	2.01
0.01				
C & E Loss (ft)	0.00	Cum SA (acres)	0.24	1.09
0.01				

CROSS SECTION

RIVER: Otay Mesa
REACH: Main Reach RS: 6459.63

INPUT
Description:
Station Elevation Data num= 119

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.78	5.72	481.72	102.33	481.04	144.39	480.81	153.5	480.75
188.97	480.61	193.27	480.6	194.44	480.59	195.36	480.59	262.44	479.99
279.39	479.8	279.41	479.8	279.89	479.8	279.95	479.8	280.05	479.8
280.26	479.8	281.02	479.8	282.07	479.8	283.71	479.8	287.27	479.8
288.69	479.8	292.36	479.8	293.85	479.8	322.97	479.59	323.2	479.59
323.91	479.59	324.68	479.59	335.54	479.52	336.05	479.52	341.15	479.49
341.46	479.49	422.59	479.17	477.21	478.96	509.45	478.69	513.11	478.68
514.79	478.67	517.4	478.66	529.32	478.6	530.5	478.59	535.4	478.56
538.6	478.55	541.87	478.53	543.52	478.52	544.05	478.52	603.55	478.2
660.37	477.8	664.36	477.8	665.29	477.8	666.23	477.8	667.23	477.8
667.85	477.8	674.41	477.8	681.17	477.8	682.87	477.8	692.77	477.8
704.78	477.8	749.44	477.33	761.67	477.28	766.09	477.25	869.01	476.34

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  880.26  476.25   946.8  475.74  948.59  475.74   950.4  475.73  951.08  475.73
  958.31  475.68   976.2   475.4 1001.42  475.16 1007.99  475.13 1018.75  475.07
 1025.12  475.02 1029.54  472.81 1029.88  472.81 1029.95   472.8 1029.97   472.8
  1030.6  472.79 1030.82  472.78 1030.83  472.78 1031.32  472.77  1031.7  472.76
 1032.05  472.75 1032.58  472.74 1032.78  472.73 1033.46  472.72 1033.52  472.72
 1033.82  472.71 1045.95  472.67 1049.82  472.66 1050.68  472.66 1071.05  472.72
 1075.88 475.133 1081.16  477.77 1083.23  478.81 1085.97  480.18 1086.21  480.18
 1087.97  480.15 1090.63  480.11 1102.48  479.93 1102.63  479.48 1102.64  479.43
 1104.24  479.54 1104.48  479.56 1127.34  479.88 1143.14   480.1 1152.86  480.23
 1159.18  480.32 1161.15  480.34 1162.11  480.36 1162.68  480.36 1164.89  480.39
 1165.05   480.4 1165.09   480.4 1165.14   480.4 1165.23   480.4 1165.37  480.41
 1165.68  480.42 1166.83  480.45 1167.67  480.47 1169.36  480.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 1025.12     .06 1075.88     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1025.12 1075.88           200.14  200.02     200             .1       .3

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            477.02    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                0.060      0.060
   0.060
  W.S. Elev (ft)            476.91    Reach Len. (ft)          200.14     200.02
 200.00
  Crit W.S. (ft)                      Flow Area (sq ft)        207.76     202.47
    3.15
  E.G. Slope (ft/ft)      0.002491    Area (sq ft)             207.76     202.47
    3.15
  Q Total (cfs)              871.00   Flow (cfs)               247.04     620.63
    3.34
  Top Width (ft)             274.52   Top Width (ft)           220.20      50.76
    3.55
  Vel Total (ft/s)             2.11   Avg. Vel. (ft/s)           1.19       3.07
    1.06
  Max Chl Dpth (ft)            4.25   Hydr. Depth (ft)           0.94       3.99
    0.89
  Conv. Total (cfs)         17449.9   Conv. (cfs)              4949.2    12433.8
    66.9
  Length Wtd. (ft)           200.04   Wetted Per. (ft)         220.21      51.85
    3.97
  Min Ch El (ft)             472.66   Shear (lb/sq ft)           0.15       0.61
    0.12
  Alpha                        1.60   Stream Power (lb/ft s)     0.17       1.86
    0.13
  Frctn Loss (ft)              0.73   Cum Volume (acre-ft)       0.69       4.42
    0.09
  C & E Loss (ft)              0.01   Cum SA (acres)             0.70       0.96
    0.02


Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #0.5 Q2


  E.G. Elev (ft)            474.71    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                          0.060

  W.S. Elev (ft)            474.65    Reach Len. (ft)          200.14     200.02
 200.00
  Crit W.S. (ft)                      Flow Area (sq ft)                   88.14

  E.G. Slope (ft/ft)      0.002979    Area (sq ft)                        88.14

  Q Total (cfs)              174.00   Flow (cfs)                         174.00

  Top Width (ft)              49.04   Top Width (ft)                      49.04

  Vel Total (ft/s)             1.97   Avg. Vel. (ft/s)                     1.97

  Max Chl Dpth (ft)            1.99   Hydr. Depth (ft)                     1.80

  Conv. Total (cfs)          3188.0   Conv. (cfs)                        3188.0

  Length Wtd. (ft)           200.02   Wetted Per. (ft)                    49.93

  Min Ch El (ft)             472.66   Shear (lb/sq ft)                     0.33

  Alpha                        1.00   Stream Power (lb/ft s)               0.65

  Frctn Loss (ft)              0.79   Cum Volume (acre-ft)       0.02      1.63
    0.01
  C & E Loss (ft)              0.00   Cum SA (acres)             0.02      0.89
    0.01


CROSS SECTION

RIVER: Otay Mesa
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REACH: Main Reach RS: 6350.00

INPUT
Description:
Station Elevation Data num= 153

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.8	7.86	481.8	8.99	481.8	58.97	481.37	105.06	481.23
149.14	481.04	151.24	481.02	158.69	480.96	159.78	480.95	160.32	480.95
160.6	480.94	180.58	480.81	190.45	480.76	257.25	480.43	274.74	480.33
328.97	479.8	355.81	479.8	356.66	479.8	357.59	479.8	358.83	479.8
362.15	479.8	363.65	479.8	371.03	479.8	372.54	479.8	375.22	479.8
375.28	479.8	375.37	479.8	375.49	479.8	375.61	479.8	375.8	479.8
376.13	479.8	376.52	479.8	380.99	479.8	381.4	479.8	381.75	479.8
383.17	479.8	383.48	479.8	383.7	479.8	383.84	479.8	384.03	479.8
384.39	479.8	385.16	479.8	385.42	479.8	387.11	479.8	390.5	479.8
454.23	479.33	456.06	479.32	459.39	479.3	463.42	479.27	490.66	479.14
517.99	478.84	610.05	477.91	684.5	477.8	690.94	477.8	699.95	477.8
705.29	477.8	705.4	477.8	710.75	477.8	744.64	477.8	744.66	477.8
750.14	477.8	750.26	477.8	750.96	477.79	756.8	477.73	759.41	477.72
766.45	477.66	777.54	477.56	784.09	477.5	793.34	477.41	810.05	477.29
815.12	477.26	836.65	477.03	843.33	476.99	849.98	476.96	855.82	476.93
860.07	476.9	864.54	476.87	870.8	476.84	873.97	476.81	896.17	477.01
981.02	475.77	995.39	475.46	1006.82	475.06	1023.7	474.47	1027.75	472.44
1027.93	472.43	1027.96	472.43	1028.23	472.42	1028.24	472.42	1028.25	472.42
1028.26	472.42	1028.27	472.42	1028.28	472.42	1028.29	472.42	1028.3	472.42
1028.31	472.42	1028.32	472.42	1028.33	472.42	1028.34	472.42	1028.35	472.42
1028.36	472.42	1028.37	472.42	1028.38	472.42	1028.39	472.42	1029.27	472.38
1029.31	472.38	1029.81	472.36	1029.82	472.36	1029.83	472.36	1029.84	472.36
1029.85	472.36	1029.86	472.36	1029.87	472.36	1029.87	472.35	1029.88	472.35
1029.89	472.35	1029.9	472.35	1029.91	472.35	1030.29	472.34	1030.57	472.33
1030.75	472.32	1030.85	472.31	1030.99	472.31	1037.06	472.29	1040.07	472.28
1047.66	472.26	1048.77	472.26	1057.77	472.29	1074.16	472.34	1079.7	475.11
1082.12	476.32	1083.89	477.21	1086.6	478.56	1086.99	478.55	1088.6	478.53
1102.13	478.33	1103.09	478.31	1103.1	478.31	1103.26	477.81	1103.28	477.81
1105.09	477.94	1106.51	477.96	1143.76	478.72	1145.38	478.91	1148.43	479.28
1155.07	479.21	1159.88	479.16	1161.35	479.15	1162.06	479.14	1162.47	479.13
1164.1	479.12	1167.51	479.05	1169.36	479.01				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1006.82	.06	1079.7	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1006.82	1079.7	139.13	109.24	84.86	.3	.5

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	476.27	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.23	Wt. n-Val.		0.060	0.060
0.060					
W.S. Elev (ft)	476.04	Reach Len. (ft)		139.13	109.24
84.86					
Crit W.S. (ft)		Flow Area (sq ft)		17.65	218.66
0.87					
E.G. Slope (ft/ft)	0.005842	Area (sq ft)		17.65	218.66
0.87					
Q Total (cfs)	871.00	Flow (cfs)		18.04	852.04
0.92					
Top Width (ft)	119.23	Top Width (ft)		44.49	72.88
1.87					
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)		1.02	3.90
1.06					
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		0.40	3.00
0.47					
Conv. Total (cfs)	11395.5	Conv. (cfs)		236.1	11147.4
12.0					
Length Wtd. (ft)	109.54	Wetted Per. (ft)		44.50	74.04
2.09					
Min Ch El (ft)	472.26	Shear (lb/sq ft)		0.14	1.08
0.15					
Alpha	1.10	Stream Power (lb/ft s)		0.15	4.20
0.16					
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		0.17	3.45
0.09					
C & E Loss (ft)	0.02	Cum SA (acres)		0.09	0.68
0.01					

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	473.91	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.08	Wt. n-Val.			0.060
W.S. Elev (ft)	473.83	Reach Len. (ft)		139.13	109.24
84.86					
Crit W.S. (ft)		Flow Area (sq ft)			75.10
E.G. Slope (ft/ft)	0.005477	Area (sq ft)			75.10
Q Total (cfs)	174.00	Flow (cfs)			174.00
Top Width (ft)	52.16	Top Width (ft)			52.16
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)			2.32

Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)			1.44
Conv. Total (cfs)	2351.1	Conv. (cfs)			2351.1
Length Wtd. (ft)	109.24	Wetted Per. (ft)			52.85
Min Ch El (ft)	472.26	Shear (lb/sq ft)			0.49
Alpha	1.00	Stream Power (lb/ft s)			1.13
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.02		1.25
0.01					
C & E Loss (ft)	0.01	Cum SA (acres)	0.02		0.65
0.01					

CROSS SECTION

RIVER: Otay Mesa
REACH: Main Reach RS: 6305.78

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.75	.82	478.75	.83	472.03	70.37	472.03	70.38	478.46
71.74	478.46								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	.83	.06	70.37	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
.83	70.37	312.25	312.25	.3	.5

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	475.74	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.20	Wt. n-Val.		0.000	0.060
0.000					
W.S. Elev (ft)	475.54	Reach Len. (ft)		312.25	312.25
312.25					
Crit W.S. (ft)	473.72	Flow Area (sq ft)		0.01	244.37
0.01					
E.G. Slope (ft/ft)	0.003877	Area (sq ft)		0.01	244.37
0.01					
Q Total (cfs)	871.00	Flow (cfs)		0.00	871.00
0.00					
Top Width (ft)	69.55	Top Width (ft)			69.54
Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)		0.03	3.56
0.03					
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		1.76	3.51
1.76					
Conv. Total (cfs)	13988.2	Conv. (cfs)		0.0	13988.2
0.0					
Length Wtd. (ft)	312.25	Wetted Per. (ft)		3.51	69.54
3.51					
Min Ch El (ft)	472.03	Shear (lb/sq ft)			0.85
Alpha	1.00	Stream Power (lb/ft s)			3.03
Frctn Loss (ft)		Cum Volume (acre-ft)		0.14	2.87
0.08					
C & E Loss (ft)		Cum SA (acres)		0.02	0.50
0.01					

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	473.31	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.07	Wt. n-Val.		0.000	0.060
0.000					
W.S. Elev (ft)	473.24	Reach Len. (ft)		312.25	312.25
312.25					
Crit W.S. (ft)	472.61	Flow Area (sq ft)		0.00	84.04
0.00					
E.G. Slope (ft/ft)	0.005429	Area (sq ft)		0.00	84.04
0.00					
Q Total (cfs)	174.00	Flow (cfs)		0.00	174.00
0.00					
Top Width (ft)	69.54	Top Width (ft)			69.54
Vel Total (ft/s)	2.07	Avg. Vel. (ft/s)		0.02	2.07
0.02					
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		0.60	1.21
0.60					
Conv. Total (cfs)	2361.5	Conv. (cfs)		0.0	2361.5
0.0					
Length Wtd. (ft)	312.25	Wetted Per. (ft)		1.21	69.54
1.21					
Min Ch El (ft)	472.03	Shear (lb/sq ft)			0.41

```
  Alpha                          1.00    Stream Power (lb/ft s)                0.85

  Frctn Loss (ft)                        Cum Volume (acre-ft)        0.02      1.05
    0.01
  C & E Loss (ft)                        Cum SA (acres)              0.02      0.50
    0.01



CULVERT


RIVER: Otay Mesa
REACH: Main Reach         RS: 6255.99

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =  310.25
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0     478       0     200     478       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  478.75     .82  478.75     .83  472.03   70.37  472.03   70.38  478.46
   71.74  478.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06     .83     .06   70.37     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
           .83   70.37             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0     478       0     200     478       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     478      .9     478     .91   471.4    6.09   471.4   76.09   471.4
   77.52   471.4   77.53     478   78.99     478

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6.09     .06   76.09     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          6.09   76.09             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    6.09               F
   76.09   78.99               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box     3.5       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  1  310.25     .014     .014        0                   .2
       1
Number of Barrels =  7
Upstream   Elevation =  472.01
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
    4.83      15   25.17   35.33    45.5   55.67   65.83
Downstream Elevation =  471.4
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
   10.59   20.76   30.93   41.09   51.26   61.43   71.59

CROSS SECTION


RIVER: Otay Mesa
REACH: Main Reach         RS: 6190.78

INPUT
Description:
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     478      .9     478     .91   471.4    6.09   471.4   76.09   471.4
```

```
   77.52   471.4   77.53     478   78.99     478

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    6.09     .06   76.09     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          6.09   76.09            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    6.09               F
   76.09   78.99               F

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            475.20    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                           0.060

  W.S. Elev (ft)            475.02    Reach Len. (ft)          206.46     206.46
  206.46
  Crit W.S. (ft)                      Flow Area (sq ft)                    253.08

  E.G. Slope (ft/ft)      0.003480    Area (sq ft)              18.74     253.08
    5.18
  Q Total (cfs)             871.00    Flow (cfs)                           871.00

  Top Width (ft)             76.62    Top Width (ft)             5.19      70.00
    1.44
  Vel Total (ft/s)            3.44    Avg. Vel. (ft/s)                     3.44

  Max Chl Dpth (ft)           3.62    Hydr. Depth (ft)                     3.62

  Conv. Total (cfs)        14764.5    Conv. (cfs)                       14764.5

  Length Wtd. (ft)          206.46    Wetted Per. (ft)                    70.00

  Min Ch El (ft)            471.40    Shear (lb/sq ft)                     0.79

  Alpha                       1.00    Stream Power (lb/ft s)               2.70

  Frctn Loss (ft)             0.69    Cum Volume (acre-ft)       0.14      2.67
    0.08
  C & E Loss (ft)             0.03    Cum SA (acres)



CROSS SECTION OUTPUT  Profile #0.5 Q2
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```
  E.G. Elev (ft)            473.13    Element                  Left OB    Channel
Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                           0.060

  W.S. Elev (ft)            473.10    Reach Len. (ft)          206.46     206.46
  206.46
  Crit W.S. (ft)                      Flow Area (sq ft)                    119.12

  E.G. Slope (ft/ft)      0.001712    Area (sq ft)               8.82     119.12
    2.44
  Q Total (cfs)             174.00    Flow (cfs)                           174.00

  Top Width (ft)             76.62    Top Width (ft)             5.18      70.00
    1.43
  Vel Total (ft/s)            1.46    Avg. Vel. (ft/s)                     1.46

  Max Chl Dpth (ft)           1.70    Hydr. Depth (ft)                     1.70

  Conv. Total (cfs)         4204.9    Conv. (cfs)                        4204.9

  Length Wtd. (ft)          206.46    Wetted Per. (ft)                    70.00

  Min Ch El (ft)            471.40    Shear (lb/sq ft)                     0.18

  Alpha                       1.00    Stream Power (lb/ft s)               0.27

  Frctn Loss (ft)             0.70    Cum Volume (acre-ft)       0.02      0.97
    0.01
  C & E Loss (ft)             0.01    Cum SA (acres)



CROSS SECTION

RIVER: Otay Mesa
REACH: Lower              RS: 5671.065

INPUT
Description:
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  477.72     .35  477.72   15.94  477.41   21.04  477.31   28.23  477.17
   33.45  477.06   42.26  476.89   42.32  476.88   44.09  476.76   44.17  476.99
   44.26  477.26   55.77  477.44   66.28   477.6   68.47  477.65   69.29  477.67
   70.22     477   72.22     476   74.22     475   76.22     474   78.23     473
   79.62   472.3   80.43  472.32   82.26  472.37   83.97  472.41   85.49  472.44
```

86.84	472.47	99.57	472.77	105.95	472.92	111.37	473.07	117.56	472.78
132.5	472.29	155.47	471.67	157.07	471.46	161.21	471.36	176.82	471.01
187.15	470.94	191.74	470.69	192.26	470.67	194.96	470.7	212.19	471.21
218.51	471.28	223.02	470.96	239.74	470.82	241.87	470.14	243.98	469.94
244.46	469.89	246.48	470.32	247.97	470.85	265.3	470.82	270.56	470.91
276	471	284.6	470	296.9	470	299.8	471	306.4	471.6
309.3	471.6	340.92	471.6	372.92	472	404.52	473	436.52	474
486.32	475	488.53	476	493.2	477				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	99.57	.06	404.52	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.57	404.52	198.93	160	158.83	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	474.48	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.12	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	474.36	Reach Len. (ft)	198.93	160.00
158.83				
Crit W.S. (ft)		Flow Area (sq ft)	40.52	872.86
30.54				
E.G. Slope (ft/ft)	0.003295	Area (sq ft)	40.52	872.86
30.54				
Q Total (cfs)	2610.00	Flow (cfs)	80.43	2498.20
31.37				
Top Width (ft)	378.74	Top Width (ft)	24.06	304.95
49.73				
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)	1.99	2.86
1.03				
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)	1.68	2.86
0.61				
Conv. Total (cfs)	45468.3	Conv. (cfs)	1401.2	43520.6
546.5				
Length Wtd. (ft)	160.61	Wetted Per. (ft)	24.55	305.55
49.74				
Min Ch El (ft)	469.89	Shear (lb/sq ft)	0.34	0.59
0.13				
Alpha	1.04	Stream Power (lb/ft s)	0.67	1.68
0.13				
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	33.71	56.80
12.38				
C & E Loss (ft)	0.02	Cum SA (acres)	21.44	15.93
8.24				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	472.43	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.05	Wt. n-Val.	0.060	0.060
W.S. Elev (ft)	472.38	Reach Len. (ft)	198.93	160.00
158.83				
Crit W.S. (ft)		Flow Area (sq ft)	0.14	289.59
E.G. Slope (ft/ft)	0.004494	Area (sq ft)	0.14	289.59
Q Total (cfs)	522.00	Flow (cfs)	0.03	521.97
Top Width (ft)	258.86	Top Width (ft)	3.42	255.44
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)	0.20	1.80
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	0.04	1.13
Conv. Total (cfs)	7786.4	Conv. (cfs)	0.4	7786.0
Length Wtd. (ft)	160.00	Wetted Per. (ft)	3.44	256.02
Min Ch El (ft)	469.89	Shear (lb/sq ft)	0.01	0.32
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.57
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	5.02	24.06
2.14				
C & E Loss (ft)	0.01	Cum SA (acres)	6.02	13.79
2.51				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 5521.065

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	476	2	475	4	474	6	473	8	472
10	471	261.1	470	316.7	471	352.6	472	380.2	473
443.1	474	468.7	475	474.2	476				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	8	.06	352.6	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
8	352.6	236.18	240 208.29	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	474.13	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.07	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	474.06	Reach Len. (ft)	236.18	240.00
208.29				
Crit W.S. (ft)		Flow Area (sq ft)	4.25	1189.18
78.41				
E.G. Slope (ft/ft)	0.001428	Area (sq ft)	4.25	1189.18
78.41				
Q Total (cfs)	2610.00	Flow (cfs)	3.76	2540.31
65.92				
Top Width (ft)	440.78	Top Width (ft)	4.12	344.60
92.06				
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)	0.89	2.14
0.84				
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	1.03	3.45
0.85				
Conv. Total (cfs)	69063.3	Conv. (cfs)	99.6	67219.3
1744.4				
Length Wtd. (ft)	238.75	Wetted Per. (ft)	4.61	344.86
92.09				
Min Ch El (ft)	470.00	Shear (lb/sq ft)	0.08	0.31
0.08				
Alpha	1.06	Stream Power (lb/ft s)	0.07	0.66
0.06				
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	33.61	53.02
12.18				
C & E Loss (ft)	0.00	Cum SA (acres)	21.38	14.74
7.99				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	472.14	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	472.13	Reach Len. (ft)	236.18	240.00
208.29				
Crit W.S. (ft)		Flow Area (sq ft)	0.02	522.41
0.22				
E.G. Slope (ft/ft)	0.000936	Area (sq ft)	0.02	522.41
0.22				
Q Total (cfs)	522.00	Flow (cfs)	0.00	521.97
0.03				
Top Width (ft)	348.33	Top Width (ft)	0.25	344.60
3.48				
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)	0.11	1.00
0.12				
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)	0.06	1.52
0.06				
Conv. Total (cfs)	17065.8	Conv. (cfs)	0.1	17064.9
0.9				
Length Wtd. (ft)	239.85	Wetted Per. (ft)	0.28	344.86
3.48				
Min Ch El (ft)	470.00	Shear (lb/sq ft)	0.00	0.09
0.00				
Alpha	1.00	Stream Power (lb/ft s)	0.00	0.09
0.00				
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	5.02	22.57
2.14				
C & E Loss (ft)	0.00	Cum SA (acres)	6.01	12.69
2.51				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 5327.565

INPUT
Description: 5527.852 Exist renamed to 5327.565
Station Elevation Data num= 67

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	476.67	38.24	475.91	40.88	475.86	41.36	475.85	41.9	475.84
42.4	475.83	42.97	475.82	43.29	475.81	43.66	475.79	44.25	475.75
45.3	475.68	45.36	475.84	45.49	476.18	46.73	476.2	46.87	476.2
49.11	476.23	49.5	476.23	51.49	476.25	52.14	476.26	53.86	476.28
54.78	476.29	56.24	476.31	57.42	476.32	58.62	476.34	60.06	476.35
61	476.37	62.69	476.39	63.38	476.39	65.33	476.42	65.75	476.42
67.97	476.45	68.13	476.45	69.61	476.47	70.32	476.48	71.24	476.49
72.18	476.51	72.9	476.52	75.14	476	77.34	475	79.54	474
81.75	473	82.17	472.81	84.84	472.792	123.4	472.55	150.46	472.37
208.57	471.6	270.11	470.89	288.51	470.93	293.33	471.42	298.08	471.39
302.28	471.57	308.39	472.05	324.72	470.85	327.05	470.5	339.45	468.62
349.02	469.12	350.4	469.25	359.5	470	386.8	470	406.3	469.67
420.3	469.67	427.2	470	473.3	471	511.1	472	549.4	473
587.3	474	670.3	475						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	308.39	.06	511.1	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
308.39	511.1	303.71	329.46	297.63	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	473.66	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	473.56	Reach Len. (ft)	303.71	329.46
297.63				
Crit W.S. (ft)		Flow Area (sq ft)	391.07	646.84
46.66				
E.G. Slope (ft/ft)	0.002775	Area (sq ft)	391.07	646.84
46.66				
Q Total (cfs)	2610.00	Flow (cfs)	730.88	1827.42
51.70				
Top Width (ft)	490.19	Top Width (ft)	227.88	202.71
59.60				
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.87	2.83
1.11				
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)	1.72	3.19
0.78				
Conv. Total (cfs)	49541.9	Conv. (cfs)	13873.2	34687.2
981.4				
Length Wtd. (ft)	315.26	Wetted Per. (ft)	228.10	203.01
59.62				
Min Ch El (ft)	468.62	Shear (lb/sq ft)	0.30	0.55
0.14				
Alpha	1.14	Stream Power (lb/ft s)	0.56	1.56
0.15				
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	32.54	47.96
11.88				
C & E Loss (ft)	0.00	Cum SA (acres)	20.75	13.23
7.62				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	471.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
W.S. Elev (ft)	471.73	Reach Len. (ft)	303.71	329.46
297.63				
Crit W.S. (ft)		Flow Area (sq ft)	50.95	277.45
E.G. Slope (ft/ft)	0.002914	Area (sq ft)	50.95	277.45
Q Total (cfs)	522.00	Flow (cfs)	41.91	480.09
Top Width (ft)	293.64	Top Width (ft)	105.52	188.12
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	0.82	1.73
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)	0.48	1.47
Conv. Total (cfs)	9670.6	Conv. (cfs)	776.5	8894.1
Length Wtd. (ft)	320.96	Wetted Per. (ft)	105.56	188.41
Min Ch El (ft)	468.62	Shear (lb/sq ft)	0.09	0.27
Alpha	1.11	Stream Power (lb/ft s)	0.07	0.46
Frctn Loss (ft)	1.04	Cum Volume (acre-ft)	4.88	20.37
2.14				
C & E Loss (ft)	0.00	Cum SA (acres)	5.72	11.22
2.50				

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 5198.392

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	476.23	19.22	475.84	19.54	475.84	19.91	475.83	20.25	475.82
20.64	475.81	20.99	475.81	21.4	475.8	21.77	475.79	22.2	475.78
22.58	475.78	23.03	475.77	23.44	475.76	23.91	475.75	24.34	475.74
24.83	475.73	25.28	475.72	25.8	475.71	26.27	475.7	26.82	475.69
27.32	475.68	27.9	475.67	28.43	475.66	29.04	475.65	29.6	475.64
30.25	475.62	30.84	475.61	31.53	475.6	32.16	475.58	32.89	475.57
33.56	475.56	34.34	475.54	34.93	475.53	35.4	475.5	36.76	475.4
36.82	475.6	36.93	475.9	52.82	476.15	58.93	476.24	59.93	476.26
61.93	476.3	63.86	475	65.86	474	67.86	473	69.86	472
72.99	472	102.4	472	120.18	472.38	181.62	472.5	184.21	472.5
213.05	472.45	261.66	471.69	307.34	471.03	334.68	471.02	366.7	471.17
374.8	471.11	394.82	471.03	402.24	471.14	419.13	469.06	422.73	468.62
430.44	467.44	438.46	467.86	455.89	468.67	459.85	469.08	464.26	469.52
477.67	469.1	486.53	469.04	497.37	469.18	560.52	469.64	665.08	471.35
688.46	471.7	697.22	471.91	758.7	473.08	791.1	473.74	794.74	473.77
798.29	473.8	813.02	474.05	844.45	474.56				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	402.24	.06	464.26	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
402.24	464.26	335.79	345.41	375.66	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	472.60	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.13	Wt. n-Val.		0.060	0.060
0.060					
W.S. Elev (ft)	472.47	Reach Len. (ft)		335.79	345.41
375.66					
Crit W.S. (ft)		Flow Area (sq ft)		225.43	227.49
544.82					
E.G. Slope (ft/ft)	0.004136	Area (sq ft)		225.43	227.49
544.82					
Q Total (cfs)	2610.00	Flow (cfs)		338.97	858.85
1412.18					
Top Width (ft)	622.43	Top Width (ft)		298.03	62.02
262.39					
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)		1.50	3.78
2.59					
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		0.76	3.67
2.08					
Conv. Total (cfs)	40583.5	Conv. (cfs)		5270.7	13354.5
21958.3					
Length Wtd. (ft)	353.03	Wetted Per. (ft)		298.16	62.34
262.42					
Min Ch El (ft)	467.44	Shear (lb/sq ft)		0.20	0.94
0.54					
Alpha	1.26	Stream Power (lb/ft s)		0.29	3.56
1.39					
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)		30.39	44.65
9.86					
C & E Loss (ft)	0.01	Cum SA (acres)		18.91	12.23
6.52					

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	470.74	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.06	Wt. n-Val.			0.060
0.060					
W.S. Elev (ft)	470.68	Reach Len. (ft)		335.79	345.41
375.66					
Crit W.S. (ft)		Flow Area (sq ft)			117.15
162.40					
E.G. Slope (ft/ft)	0.003621	Area (sq ft)			117.15
162.40					
Q Total (cfs)	522.00	Flow (cfs)			277.22
244.78					
Top Width (ft)	217.91	Top Width (ft)			58.26
159.65					
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)			2.37

1.51					
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)			2.01
1.02					
Conv. Total (cfs)	8674.7	Conv. (cfs)			4606.9
4067.8					
Length Wtd. (ft)	352.51	Wetted Per. (ft)			58.55
159.67					
Min Ch El (ft)	467.44	Shear (lb/sq ft)			0.45
0.23					
Alpha	1.16	Stream Power (lb/ft s)			1.07
0.35					
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)	4.70		18.87
1.58					
C & E Loss (ft)	0.01	Cum SA (acres)	5.35		10.29
1.95					

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 4852.983

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	474.89	18.64	474.52	41.47	474.06	42.08	474.02	43.31	473.94
43.46	474.38	43.47	474.44	45.59	474.47	65.47	474.77	67.36	474.81
69.48	474	71.48	473	72.55	472.49	78.87	472.42	82.36	472.41
202.38	472.59	242.03	472.4	295.66	471.96	350.03	471.52	352.25	471.5
356.3	471.46	408.65	470.86	424.3	470.91	430.47	470.81	460.23	470.3
506.53	469.69	515.54	469.6	558.7	469.18	596.95	468.82	641.09	466.98
641.63	467	662.36	467.84	683.49	467.88	693.5	467.9	699.78	467.87
709.35	467.81	735.27	468	739.61	468.05	794.1	468.64	824.53	469.11
887.81	471.32	891.45	471.46	947.48	472.27	975.36	472.68	1045.89	473.95
1073.45	474.4	1099.63	474.54						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	558.7	.06	824.53	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
558.7	824.53	299.71	333.18	343.44	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	471.50	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	471.40	Reach Len. (ft)	299.71	333.18
343.44				
Crit W.S. (ft)		Flow Area (sq ft)	217.39	846.49
75.24				
E.G. Slope (ft/ft)	0.002411	Area (sq ft)	217.39	846.49
75.24				
Q Total (cfs)	2610.00	Flow (cfs)	281.92	2227.69
100.39				
Top Width (ft)	528.65	Top Width (ft)	197.39	265.83
65.43				
Vel Total (ft/s)	2.29	Avg. Vel. (ft/s)	1.30	2.63
1.33				
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)	1.10	3.18
1.15				
Conv. Total (cfs)	53152.9	Conv. (cfs)	5741.3	45367.1
2044.5				
Length Wtd. (ft)	329.73	Wetted Per. (ft)	197.41	265.90
65.47				
Min Ch El (ft)	466.98	Shear (lb/sq ft)	0.17	0.48
0.17				
Alpha	1.17	Stream Power (lb/ft s)	0.21	1.26
0.23				
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	28.68	40.40
7.19				
C & E Loss (ft)	0.00	Cum SA (acres)	17.00	10.93
5.11				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	469.42	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	469.38	Reach Len. (ft)	299.71	333.18
343.44				
Crit W.S. (ft)		Flow Area (sq ft)	1.96	307.51
1.01				
E.G. Slope (ft/ft)	0.003855	Area (sq ft)	1.96	307.51
1.01				
Q Total (cfs)	522.00	Flow (cfs)	0.64	520.96

0.40					
Top Width (ft)	293.47	Top Width (ft)	20.05	265.83	
7.59					
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)	0.33	1.69	
0.40					
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)	0.10	1.16	
0.13					
Conv. Total (cfs)	8407.7	Conv. (cfs)	10.3	8391.0	
6.5					
Length Wtd. (ft)	333.16	Wetted Per. (ft)	20.05	265.90	
7.60					
Min Ch El (ft)	466.98	Shear (lb/sq ft)	0.02	0.28	
0.03					
Alpha	1.01	Stream Power (lb/ft s)	0.01	0.47	
0.01					
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	4.69	17.19	
0.88					
C & E Loss (ft)	0.00	Cum SA (acres)	5.28	9.00	
1.23					

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 4519.806

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	474.55	11.6	474.76	60.59	473.75	61.45	473.69	62.01	473.66
62.5	473.62	62.57	473.82	62.67	474.12	63.78	474.14	63.96	474.14
66.95	474.18	67.64	474.19	70.13	474.22	71.33	474.24	73.31	474.26
75.02	474.29	76.48	474.31	78.7	474.33	79.66	474.35	82.39	474.38
82.83	474.39	85.6	474.42	85.88	474.43	86.46	474.44	88.01	474.47
89.05	474	91.13	473	91.61	472.77	97.21	472.72	108.19	472.71
181.03	472.41	231.92	472.04	311.9	471.52	317.23	471.48	322.15	471.46
399.38	470.78	431.56	470.61	491.5	470.01	523.17	469.66	594.02	469.02
620.45	469.04	640.38	469.08	665.72	469.04	673.33	469.01	690.49	468.7
691.93	468.67	692.8	468.59	702.67	467.56	710.27	467.19	713.31	467.14
715.9	467.1	728.08	467.25	729.5	467.06	737.38	465.1	757.36	465.06
759.63	465.22	762.29	465.03	766.69	465.16	790.41	465.82	796.17	466.02
807.65	466.99	809.49	467.02	827	467.3	832.24	467.38	838.86	467.49
863.97	468.09	909.05	469.35	974.35	470.93	986.53	471.12	995.22	471.24
1066	471.99	1126.91	472.99	1164.8	473.59	1194.95	474.16		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	665.72	.06	909.05	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

Left	Right	Left	Channel	Right	Coeff Contr.	Expan.
665.72	909.05	286.25	297.46	249.21	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	470.65	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.12	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	470.53	Reach Len. (ft)	286.25	297.46
249.21				
Crit W.S. (ft)		Flow Area (sq ft)	226.38	797.71
28.85				
E.G. Slope (ft/ft)	0.002763	Area (sq ft)	226.38	797.71
28.85				
Q Total (cfs)	2610.00	Flow (cfs)	294.72	2288.85
26.44				
Top Width (ft)	518.49	Top Width (ft)	226.33	243.33
48.83				
Vel Total (ft/s)	2.48	Avg. Vel. (ft/s)	1.30	2.87
0.92				
Max Chl Dpth (ft)	5.50	Hydr. Depth (ft)	1.00	3.28
0.59				
Conv. Total (cfs)	49656.5	Conv. (cfs)	5607.1	43546.4
503.0				
Length Wtd. (ft)	295.37	Wetted Per. (ft)	226.34	243.75
48.85				
Min Ch El (ft)	465.03	Shear (lb/sq ft)	0.17	0.56
0.10				
Alpha	1.21	Stream Power (lb/ft s)	0.22	1.62
0.09				
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	27.15	34.11
6.78				
C & E Loss (ft)	0.00	Cum SA (acres)	15.55	8.98
4.66				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	468.49	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.		0.060
W.S. Elev (ft)	468.45	Reach Len. (ft)	286.25	297.46
249.21				

Crit W.S. (ft)		Flow Area (sq ft)			316.74
E.G. Slope (ft/ft)	0.002129	Area (sq ft)			316.74
Q Total (cfs)	522.00	Flow (cfs)			522.00
Top Width (ft)	182.50	Top Width (ft)			182.50
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)			1.65
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)			1.74
Conv. Total (cfs)	11312.7	Conv. (cfs)			11312.7
Length Wtd. (ft)	297.46	Wetted Per. (ft)			182.89
Min Ch El (ft)	465.03	Shear (lb/sq ft)			0.23
Alpha	1.00	Stream Power (lb/ft s)			0.38
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	4.69	14.80	0.88
C & E Loss (ft)	0.00	Cum SA (acres)	5.21	7.29	1.20

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 4222.345

INPUT
Description:
Station Elevation Data num= 104

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	473.9	18.25	474.27	70.6	473.44	71.06	473.41	71.66	473.38
72.64	473.32	72.81	473.76	72.83	473.82	74.83	473.85	75.02	473.86
76.95	473.89	77.35	473.89	79.08	473.92	79.67	473.93	81.2	473.95
81.99	473.96	83.32	473.99	84.31	474	85.44	474.02	86.64	474.04
87.56	474.05	88.96	474.07	89.68	474.08	91.28	474.11	91.81	474.12
93.61	474.14	93.93	474.15	95.93	474.18	96.05	474.18	97.33	474.2
97.97	474.21	98.58	474.22	99.6	474.24	100.67	474.27	100.88	474
103.11	473	105.35	472	105.72	471.84	138.6	471.63	147.39	471.46
165.47	471.21	175.88	471.06	191.04	471.42	194.83	471.5	207.49	471.78
209.64	471.75	217.4	471.6	253.5	470.99	256.67	470.93	269.74	470.74
318.14	470.58	351.42	470.36	384.56	470.07	435.42	469.94	445.4	469.92
466.99	469.78	508.33	469.47	533.97	469.47	563.9	469.2	617.09	468.34
636.31	468.12	641.19	468.13	652.53	468.15	672.87	468.26	682.79	468.24
703.28	468.52	713.27	468.6	721.67	468.44	729.46	468.3	736.53	468.32
745.87	468.27	752.91	467.1	757.64	466.32	783.9	467.29	784.43	467.31
785.64	467.35	787.45	467.36	799.79	467.27	822.26	463.27	823.04	463.12
823.85	463.22	838.81	465.2	845.76	465.19	851.41	465.18	852.61	465.17
854.54	465.13	863.33	465.91	865.65	466.09	866.31	466.15	873.77	466.19
900.62	466.36	910.47	466.58	925.98	466.94	949.21	467.48	959.92	467.8
972.66	468.12	1061.13	470.14	1075.14	470.56	1116.78	471.21	1138.36	471.43
1160.43	471.72	1230.06	472.69	1281.31	473.45	1318.82	474.28		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	745.87	.06	972.66	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
745.87	972.66	437.78	391.69	378.47	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	469.78	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.13	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	469.66	Reach Len. (ft)	437.78	391.69
378.47				
Crit W.S. (ft)		Flow Area (sq ft)	238.79	741.22
51.81				
E.G. Slope (ft/ft)	0.003088	Area (sq ft)	238.79	741.22
51.81				
Q Total (cfs)	2610.00	Flow (cfs)	308.44	2241.72
59.85				
Top Width (ft)	556.79	Top Width (ft)	262.63	226.79
67.37				
Vel Total (ft/s)	2.53	Avg. Vel. (ft/s)	1.29	3.02
1.16				
Max Chl Dpth (ft)	6.54	Hydr. Depth (ft)	0.91	3.27
0.77				
Conv. Total (cfs)	46965.1	Conv. (cfs)	5550.1	40338.1
1076.9				
Length Wtd. (ft)	405.98	Wetted Per. (ft)	262.65	227.54
67.38				
Min Ch El (ft)	463.12	Shear (lb/sq ft)	0.18	0.63
0.15				
Alpha	1.26	Stream Power (lb/ft s)	0.23	1.90
0.17				
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	25.62	28.85
6.55				
C & E Loss (ft)	0.02	Cum SA (acres)	13.94	7.37
4.33				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	467.75	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.05	Wt. n-Val.		0.060
W.S. Elev (ft)	467.70	Reach Len. (ft)	437.78	391.69
378.47				
Crit W.S. (ft)		Flow Area (sq ft)		301.66
E.G. Slope (ft/ft)	0.002974	Area (sq ft)		301.66
Q Total (cfs)	522.00	Flow (cfs)		522.00
Top Width (ft)	207.29	Top Width (ft)		207.29
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)		1.46
Conv. Total (cfs)	9572.3	Conv. (cfs)		9572.3
Length Wtd. (ft)	399.62	Wetted Per. (ft)		207.99
Min Ch El (ft)	463.12	Shear (lb/sq ft)		0.27
Alpha	1.00	Stream Power (lb/ft s)		0.47
Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	4.69	12.69
0.88				
C & E Loss (ft)	0.00	Cum SA (acres)	5.21	5.96
1.20				

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 3830.658

INPUT
Description:

Station Elevation Data num= 137

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	473.87	34.21	474.19	106.43	472.98	106.44	472.98	106.97	472.95
107.34	472.93	107.84	472.91	108.11	472.9	109.24	472.84	109.25	472.84
109.25	472.85	109.5	473.34	110.05	473.34	110.07	473.34	111.33	473.35
111.4	473.35	112.61	473.36	112.73	473.36	113.89	473.37	114.06	473.37
115.17	473.37	115.39	473.38	116.45	473.38	116.72	473.38	117.72	473.39
118.05	473.39	119	473.4	119.38	473.4	120.28	473.41	120.71	473.41
121.56	473.41	122.04	473.42	122.84	473.42	123.37	473.42	124.12	473.43
124.7	473.43	125.4	473.44	126.03	473.44	126.68	473.45	127.36	473.45
127.96	473.45	128.69	473.46	129.24	473.46	130.02	473.47	130.52	473.47
131.35	473.47	131.8	473.48	132.68	473.48	133.08	473.48	134	473.49
134.36	473.49	135.33	473.5	135.64	473.5	136.66	473.51	136.92	473.51
137.99	473.51	138.2	473.52	139.32	473.52	139.47	473.52	140.65	473.53
140.75	473.53	141.98	473.54	142.03	473.54	143.31	473.55	144.44	473.56
144.81	473.56	145.57	473.57	146.3	473.57	146.7	473.58	147.8	473.59
147.83	473.59	147.92	473.59	149.69	473	152.74	472	155.79	471
157.18	470.54	163.06	470.5	169.34	470.37	187.01	470.3	226.89	470.04
232.06	470.09	241.07	470.24	248.54	470.2	278.5	469.84	330.13	469.53
363.78	469.47	366.2	469.45	381.94	469.3	457.77	468.55	485.05	468.84
496.51	468.8	524.85	468.06	528.75	468.01	548.2	468.53	550.66	468.6
553.07	468.68	568.24	468.63	597.44	468.45	644.45	468.13	671.24	467.88
686.27	467.82	749.47	467.45	786.21	467.04	803.23	467.08	886.05	466.71
895.98	466.56	900.69	466.18	943.51	466.04	978.44	465.68	1026.56	465.3
1067	465.55	1078.36	465.64	1079.73	465.66	1090.59	463.61	1095.37	462.69
1097.81	462.57	1101.62	462.71	1118.97	464.31	1121.67	464.55	1131.16	465.72
1134.48	465.72	1139.87	465.85	1184.97	466.6	1204.23	466.87	1215.36	467.05
1225.06	467.22	1236.86	467.45	1266.71	467.86	1305.43	468.9	1360.22	470.39
1378.13	470.85	1381.95	470.94	1389.4	471.12	1440.51	472.42	1465.91	473.03
1484.33	473.14	1520.9	473.65						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	1079.73	.06	1131.16	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
1079.73	1131.16	145.2	166.69	183.22	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	468.79	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.07	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	468.72	Reach Len. (ft)	145.20	166.69
183.22				
Crit W.S. (ft)		Flow Area (sq ft)	955.75	245.00
273.38				
E.G. Slope (ft/ft)	0.001935	Area (sq ft)	955.75	245.00

273.38				
Q Total (cfs)	2610.00	Flow (cfs)	1445.84	751.44
412.72				
Top Width (ft)	832.30	Top Width (ft)	613.31	51.43
167.56				
Vel Total (ft/s)	1.77	Avg. Vel. (ft/s)	1.51	3.07
1.51				
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)	1.56	4.76
1.63				
Conv. Total (cfs)	59328.6	Conv. (cfs)	32865.8	17081.1
9381.7				
Length Wtd. (ft)	155.02	Wetted Per. (ft)	613.36	51.87
167.59				
Min Ch El (ft)	462.57	Shear (lb/sq ft)	0.19	0.57
0.20				
Alpha	1.38	Stream Power (lb/ft s)	0.28	1.75
0.30				
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	19.62	24.42
5.14				
C & E Loss (ft)	0.01	Cum SA (acres)	9.54	6.12
3.31				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	466.68	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	466.62	Reach Len. (ft)	145.20	166.69
183.22				
Crit W.S. (ft)		Flow Area (sq ft)	165.12	136.94
25.25				
E.G. Slope (ft/ft)	0.002423	Area (sq ft)	165.12	136.94
25.25				
Q Total (cfs)	522.00	Flow (cfs)	184.83	318.89
18.28				
Top Width (ft)	294.22	Top Width (ft)	187.64	51.43
55.15				
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)	1.12	2.33
0.72				
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)	0.88	2.66
0.46				
Conv. Total (cfs)	10604.6	Conv. (cfs)	3754.9	6478.3
371.4				
Length Wtd. (ft)	156.46	Wetted Per. (ft)	187.66	51.87
55.15				
Min Ch El (ft)	462.57	Shear (lb/sq ft)	0.13	0.40
0.07				
Alpha	1.48	Stream Power (lb/ft s)	0.15	0.93
0.05				
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	3.86	10.72
0.77				
C & E Loss (ft)	0.01	Cum SA (acres)	4.27	4.79
0.96				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 3634.315

INPUT
Description: 3663.966 exist x-sect renamed to 3634.315 proposed
Station Elevation Data num= 124

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	473.63	12.21	473.84	81.49	473.12	81.88	473.1	82.18	473.09
82.75	473.06	83.04	473.05	84.19	473	84.2	473.01	84.44	473.5
85.03	473.51	85.06	473.51	86.35	473.52	86.44	473.52	87.67	473.53
87.81	473.53	88.99	473.55	89.19	473.55	90.31	473.56	90.56	473.56
91.63	473.57	91.94	473.58	92.95	473.59	93.31	473.59	94.27	473.6
94.69	473.6	95.59	473.61	96.06	473.62	96.91	473.63	97.44	473.63
98.23	473.64	98.81	473.64	99.55	473.65	100.19	473.66	100.87	473.66
101.56	473.67	102.19	473.67	102.94	473.68	103.5	473.69	104.31	473.69
104.82	473.7	105.69	473.7	106.14	473.71	107.06	473.72	107.46	473.72
108.44	473.73	108.78	473.73	109.81	473.74	110.1	473.74	111.19	473.75
111.42	473.75	112.56	473.76	112.74	473.76	113.94	473.77	114.06	473.77
115.32	473.78	115.38	473.78	116.69	473.79	116.7	473.79	116.86	473.79
117.87	473.8	118.23	473.81	119.03	473.81	119.79	473.82	120.18	473.83
121.29	473.84	121.34	473.82	123.71	473	126.63	472	129.47	471
132.45	470	133.14	469.76	153.77	469.61	155.32	469.6	156.66	469.6
158.29	469.59	274.35	468.92	278.61	468.88	307.09	468.88	323.56	468.73
328.95	468.85	335.66	468.89	346.97	468.97	371.93	468.69	377.99	468.71
398.28	468.7	467.94	467.92	481.51	467.83	501.73	467.64	538.68	467.45
605.65	467.09	613.16	467.07	617.81	466.83	631.98	466.95	674.43	466.46
745.14	465.97	771.9	465.81	832.93	465.05	846.08	464.9	879.25	464.9
887.94	464.91	915.07	464.87	967.35	464.68	1038.36	464.85	1054.31	464.91

```
 1061.96  464.94  1068.1  464.87  1080.2   462.8 1081.18   462.6 1081.77  462.59
 1088.25  462.54  1098.9  464.68 1099.98  464.88  1100.4  464.88 1101.77  464.91
 1127.25  465.34 1158.29  466.24  1163.1  466.36  1190.1  467.01 1251.53  468.15
 1354.44  470.51 1387.31  471.25 1429.34  472.04 1474.99  472.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06 1061.96     .06 1101.77     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       1061.96 1101.77           171.63   167.9   148.3             .1       .3

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            468.60    Element                   Left OB    Channel
 Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                 0.060      0.060
   0.060
  W.S. Elev (ft)            468.57    Reach Len. (ft)           171.63     167.90
  148.30
  Crit W.S. (ft)                      Flow Area (sq ft)        1577.42     191.47
  300.47
  E.G. Slope (ft/ft)      0.000758    Area (sq ft)             1577.42     191.47
  300.47
  Q Total (cfs)             2610.00    Flow (cfs)               1938.74     369.44
  301.83
  Top Width (ft)             859.89    Top Width (ft)            652.03      39.81
  168.05
  Vel Total (ft/s)             1.26    Avg. Vel. (ft/s)            1.23       1.93
    1.00
  Max Chl Dpth (ft)            6.03    Hydr. Depth (ft)            2.42       4.81
    1.79
  Conv. Total (cfs)         94774.3    Conv. (cfs)              70399.5    13415.0
 10959.9
  Length Wtd. (ft)           166.87    Wetted Per. (ft)          652.05      40.24
  168.10
  Min Ch El (ft)             462.54    Shear (lb/sq ft)            0.11       0.23
    0.08
  Alpha                        1.11    Stream Power (lb/ft s)      0.14       0.43
    0.09
  Frctn Loss (ft)              0.14    Cum Volume (acre-ft)       15.40      23.58
    3.93
  C & E Loss (ft)              0.00    Cum SA (acres)              7.43       5.95
    2.60



CROSS SECTION OUTPUT  Profile #0.5 Q2
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  E.G. Elev (ft)            466.48    Element                   Left OB    Channel
 Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                 0.060      0.060
   0.060
  W.S. Elev (ft)            466.46    Reach Len. (ft)           171.63     167.90
  148.30
  Crit W.S. (ft)                      Flow Area (sq ft)        469.51     107.62
   56.01
  E.G. Slope (ft/ft)      0.000710    Area (sq ft)             469.51     107.62
   56.01
  Q Total (cfs)               522.00    Flow (cfs)               351.92     136.84
   33.25
  Top Width (ft)              493.25    Top Width (ft)           387.82      39.81
   65.62
  Vel Total (ft/s)              0.82    Avg. Vel. (ft/s)            0.75       1.27
    0.59
  Max Chl Dpth (ft)             3.92    Hydr. Depth (ft)            1.21       2.70
    0.85
  Conv. Total (cfs)         19591.3    Conv. (cfs)              13207.9    5135.6
  1247.8
  Length Wtd. (ft)            167.53    Wetted Per. (ft)         387.83      40.24
   65.64
  Min Ch El (ft)              462.54    Shear (lb/sq ft)            0.05       0.12
    0.04
  Alpha                         1.21    Stream Power (lb/ft s)      0.04       0.15
    0.02
  Frctn Loss (ft)               0.13    Cum Volume (acre-ft)        2.80      10.25
    0.60
  C & E Loss (ft)               0.00    Cum SA (acres)              3.31       4.62
    0.71



CROSS SECTION


RIVER: Otay Mesa
REACH: Lower              RS: 3496.063

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  469.24   115.9   467.1  128.93  466.92  156.26  466.72  233.48  466.19
  292.27  465.69  340.86  465.33  416.72  465.29  417.51  465.29  418.48   465.3
  467.65  465.48  494.29  464.31   509.5  463.83   521.6  463.69  524.66  463.61
  540.87  464.11  562.92  461.62  583.22  464.55  604.44  464.65   620.3  464.95
  656.78  464.89     738  466.25  787.82  467.15  824.85  468.01  893.69  469.43
  906.38  469.78  981.25  471.68  988.69  471.79
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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  467.65     .06   620.3     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        467.65   620.3           190.15  176.89  109.02             .1       .3

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            468.45    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            468.41    Reach Len. (ft)          190.15     176.89
  109.02
  Crit W.S. (ft)                      Flow Area (sq ft)        935.76     673.20
  478.50
  E.G. Slope (ft/ft)      0.000925    Area (sq ft)             935.76     673.20
  478.50
  Q Total (cfs)             3155.00   Flow (cfs)              1196.59    1360.96
  597.45
  Top Width (ft)             799.62   Top Width (ft)           422.87     152.65
  224.10
  Vel Total (ft/s)            1.51    Avg. Vel. (ft/s)          1.28       2.02
    1.25
  Max Chl Dpth (ft)           6.79    Hydr. Depth (ft)          2.21       4.41
    2.14
  Conv. Total (cfs)       103756.9    Conv. (cfs)             39351.7    44757.3
 19648.0
  Length Wtd. (ft)           173.13   Wetted Per. (ft)         422.89     153.05
  224.13
  Min Ch El (ft)             461.62   Shear (lb/sq ft)          0.13       0.25
    0.12
  Alpha                       1.17    Stream Power (lb/ft s)    0.16       0.51
    0.15
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)     10.45      21.92
    2.60
  C & E Loss (ft)             0.00    Cum SA (acres)            5.31       5.58
    1.93



CROSS SECTION OUTPUT  Profile #0.5 Q2


  E.G. Elev (ft)            466.35    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.02    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            466.33    Reach Len. (ft)          190.15     176.89
  109.02
  Crit W.S. (ft)                      Flow Area (sq ft)        188.71     354.65
  112.90
  E.G. Slope (ft/ft)      0.000833    Area (sq ft)             188.71     354.65
  112.90
  Q Total (cfs)             631.00    Flow (cfs)               110.60     443.76
   76.64
  Top Width (ft)            528.63    Top Width (ft)           254.05     152.65
  121.93
  Vel Total (ft/s)            0.96    Avg. Vel. (ft/s)          0.59       1.25
    0.68
  Max Chl Dpth (ft)           4.71    Hydr. Depth (ft)          0.74       2.32
    0.93
  Conv. Total (cfs)        21869.3    Conv. (cfs)              3833.2    15379.9
  2656.1
  Length Wtd. (ft)           173.93   Wetted Per. (ft)         254.05     153.05
  121.94
  Min Ch El (ft)             461.62   Shear (lb/sq ft)          0.04       0.12
    0.05
  Alpha                       1.32    Stream Power (lb/ft s)    0.02       0.15
    0.03
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)      1.50       9.36
    0.31
  C & E Loss (ft)             0.00    Cum SA (acres)            2.04       4.25
    0.39



CROSS SECTION


RIVER: Otay Mesa
REACH: Lower              RS: 3319.173

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  472.48   24.01  472.24   25.59  472.18   54.02  471.67   55.34  471.65
   56.64  471.63    72.9   471.2   85.53  470.74  104.32  470.06  115.36  469.78
  123.16  469.68  130.05  469.39  154.88  468.68   198.3   468.1  240.48  467.54
  275.43  467.48   305.8  467.22  323.22  467.17   366.3  466.81  387.69  466.91
   389.1  466.92  390.34   466.9  460.99  466.51  467.84  466.49  492.42  465.87
   493.6  465.84 499.054   465.5  518.07  464.69  531.07  461.62  541.43  460.42
  550.91   460.6  564.33   462.6   592.6   463.2  594.64   461.6  606.15  461.88
  620.04  462.93  636.03  463.78   650.3  464.09  653.49  464.13  706.99  464.77
  760.48  465.77  820.48  467.19  873.73  468.46  921.51  469.92  971.37  471.09
  981.99   471.4
```

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	389.1	.06	820.48	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

389.1	820.48	121.22	168.9	192.71	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	468.26	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	468.20	Reach Len. (ft)	121.22	168.90
192.71				
Crit W.S. (ft)		Flow Area (sq ft)	166.47	1474.08
21.39				
E.G. Slope (ft/ft)	0.001325	Area (sq ft)	166.47	1474.08
21.39				
Q Total (cfs)	3155.00	Flow (cfs)	133.56	3009.21
12.23				
Top Width (ft)	672.03	Top Width (ft)	198.30	431.38
42.36				
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)	0.80	2.04
0.57				
Max Chl Dpth (ft)	7.78	Hydr. Depth (ft)	0.84	3.42
0.51				
Conv. Total (cfs)	86663.5	Conv. (cfs)	3668.8	82658.7
335.9				
Length Wtd. (ft)	164.78	Wetted Per. (ft)	198.31	432.65
42.37				
Min Ch El (ft)	460.42	Shear (lb/sq ft)	0.07	0.28
0.04				
Alpha	1.11	Stream Power (lb/ft s)	0.06	0.58
0.02				
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	8.04	17.56
1.98				
C & E Loss (ft)	0.00	Cum SA (acres)	3.96	4.39
1.60				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	466.24	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.		0.060
W.S. Elev (ft)	466.22	Reach Len. (ft)	121.22	168.90
192.71				
Crit W.S. (ft)		Flow Area (sq ft)		678.84
E.G. Slope (ft/ft)	0.000479	Area (sq ft)		678.84
Q Total (cfs)	631.00	Flow (cfs)		631.00
Top Width (ft)	301.11	Top Width (ft)		301.11
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)		0.93
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		2.25
Conv. Total (cfs)	28824.7	Conv. (cfs)		28824.7
Length Wtd. (ft)	166.64	Wetted Per. (ft)		302.37
Min Ch El (ft)	460.42	Shear (lb/sq ft)		0.07
Alpha	1.00	Stream Power (lb/ft s)		0.06
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	1.09	7.26
0.17				
C & E Loss (ft)	0.00	Cum SA (acres)	1.49	3.33
0.24				

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 3150.273

INPUT
Description: Upstream of Siempre Viva Road
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	470.34	9.74	470.14	13.29	470.06	41.58	469.41	42.24	469.4
91.93	468.75	102.12	468.6	134.72	468.17	151.74	467.92	157.79	467.84
178.09	467.57	193.17	467.46	209.08	467.25	224.9	467.14	241.09	466.95
259.93	466.82	265.06	466.76	281.82	466.5	289.9	466.1	294.04	465.94
309.36	465.5	326.22	465.43	346.8	464.62	360.48	464.51	377.95	464.62
387.34	464.56	403.91	464.65	416.1	464.36	445.54	463.88	449.04	463.92
452.29	463.61	453.84	463.55	455.69	463.48	470.47	462.6	477.23	462.19
489.77	462.13	490.58	462.12	491.81	462.03	497.72	461.52	501.33	461.38
512.98	461.69	521.68	462.16	523.75	462.34	532.47	463.12	541.75	463.67
546.34	464.52	553.85	464.86	574.86	465.1	585.33	464.99	596.76	465.26

```
  607.46  465.49  629.06     466  641.52  466.24  709.65     468  714.01   468.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  403.91     .06  546.34     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        403.91  546.34           176.92   95.56    26.1             .3       .5

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            468.01    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            467.91    Reach Len. (ft)          176.92      95.56
  26.10
  Crit W.S. (ft)            465.62    Flow Area (sq ft)        435.86     690.75
  297.61
  E.G. Slope (ft/ft)      0.001737    Area (sq ft)             435.86     690.75
  297.61
  Q Total (cfs)             3155.00   Flow (cfs)               649.35    2040.68
  464.97
  Top Width (ft)            553.57    Top Width (ft)           251.35     142.43
  159.79
  Vel Total (ft/s)            2.22    Avg. Vel. (ft/s)           1.49       2.95
    1.56
  Max Chl Dpth (ft)           6.53    Hydr. Depth (ft)           1.73       4.85
    1.86
  Conv. Total (cfs)         75690.1   Conv. (cfs)              15578.3    48957.1
 11154.8
  Length Wtd. (ft)            95.56   Wetted Per. (ft)         251.39     142.68
  159.84
  Min Ch El (ft)            461.38    Shear (lb/sq ft)           0.19       0.53
    0.20
  Alpha                       1.32    Stream Power (lb/ft s)     0.28       1.55
    0.32
  Frctn Loss (ft)                     Cum Volume (acre-ft)       7.20      13.36
    1.27
  C & E Loss (ft)                     Cum SA (acres)             3.33       3.28
    1.15



CROSS SECTION OUTPUT  Profile #0.5 Q2


  E.G. Elev (ft)            466.15    Element                  Left OB    Channel
 Right OB
```

```
  Vel Head (ft)               0.02    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            466.13    Reach Len. (ft)          176.92      95.56
  26.10
  Crit W.S. (ft)            463.53    Flow Area (sq ft)        129.67     437.96
  75.04
  E.G. Slope (ft/ft)      0.000506    Area (sq ft)             129.67     437.96
  75.04
  Q Total (cfs)             631.00    Flow (cfs)                78.40     515.48
  37.12
  Top Width (ft)            346.82    Top Width (ft)           114.70     142.43
  89.69
  Vel Total (ft/s)            0.98    Avg. Vel. (ft/s)           0.60       1.18
    0.49
  Max Chl Dpth (ft)           4.75    Hydr. Depth (ft)           1.13       3.07
    0.84
  Conv. Total (cfs)         28042.7   Conv. (cfs)              3484.3    22908.6
 1649.8
  Length Wtd. (ft)            95.56   Wetted Per. (ft)         114.73     142.68
  89.71
  Min Ch El (ft)            461.38    Shear (lb/sq ft)           0.04       0.10
    0.03
  Alpha                       1.24    Stream Power (lb/ft s)     0.02       0.11
    0.01
  Frctn Loss (ft)                     Cum Volume (acre-ft)       0.91       5.10
    0.00
  C & E Loss (ft)                     Cum SA (acres)             1.33       2.47
    0.04



CULVERT


RIVER: Otay Mesa
REACH: Lower              RS: 3130.904

INPUT
Description:
Distance from Upstream XS =       5
Deck/Roadway Width        =   24.64
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
  382.13     465          425.19  465.99          468.13  466.86
   505.5  466.84          714.01  466.84

Upstream Bridge Cross Section Data
Station Elevation Data    num=      55
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  470.34    9.74  470.14   13.29  470.06   41.58  469.41   42.24   469.4
   91.93  468.75  102.12   468.6  134.72  468.17  151.74  467.92  157.79  467.84
  178.09  467.57  193.17  467.46  209.08  467.25   224.9  467.14  241.09  466.95
  259.93  466.82  265.06  466.76  281.82   466.5   289.9   466.1  294.04  465.94
  309.36   465.5  326.22  465.43   346.8  464.62  360.48  464.51  377.95  464.62
  387.34  464.56  403.91  464.65   416.1  464.36  445.54  463.88  449.04  463.92
  452.29  463.61  453.84  463.55  455.69  463.48  470.47   462.6  477.23  462.19
  489.77  462.13  490.58  462.12  491.81  462.03  497.72  461.52  501.33  461.38
  512.98  461.69  521.68  462.16  523.75  462.34  532.47  463.12  541.75  463.67
  546.34  464.52  553.85  464.86  574.86   465.1  585.33  464.99  596.76  465.26
  607.46  465.49  629.06     466  641.52  466.24  709.65     468  714.01   468.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  403.91     .06  546.34     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        403.91  546.34             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   76.37     465          110.19  465.99          141.93  466.86
  182.57  466.84          393.11  466.84

Downstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   470.3   38.64     470  101.58     470  110.71     468  117.78     466
  128.82  460.59  134.46  460.33  140.42  461.24  185.22     462  205.75     462
   221.7     464  311.37     466  388.79     468  393.11  468.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  110.71     .06  311.37     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
        110.71  311.37             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =  466.86
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  10
```

```
Culvert Name     Shape      Rise    Span
Culvert #1      Circular     3.5
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                5   24.64     .013     .013        0                   .2
       1
Upstream   Elevation =  460.58
           Centerline Station =  496.48
Downstream Elevation =  460.59
           Centerline Station =  128.82

Culvert Name     Shape      Rise    Span
Culvert #2      Circular     3.5
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                5   24.64     .013     .013        0                   .2
       1
Upstream   Elevation =  460.17
           Centerline Station =  501.33
Downstream Elevation =  460.33
           Centerline Station =  134.46

Culvert Name     Shape      Rise    Span
Culvert #3      Circular     3.5
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                5   24.64     .013     .013        0                   .2
       1
Upstream   Elevation =  460.99
           Centerline Station =  505.48
Downstream Elevation =  461.24
           Centerline Station =  140.42

Culvert Name     Shape      Rise    Span
Culvert #4      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                5   24.64     .013     .013        0                   .2
```

```
      1
Upstream   Elevation =  461.3
           Centerline Station =  512.48
Downstream Elevation =  461.11
           Centerline Station =  147

Culvert Name     Shape      Rise    Span
Culvert #8      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  462.55
           Centerline Station =  513.82
Downstream Elevation =  462.36
           Centerline Station =  148.33

Culvert Name     Shape      Rise    Span
Culvert #5      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  461.3
           Centerline Station =  515.15
Downstream Elevation =  461.11
           Centerline Station =  149.66

Culvert Name     Shape      Rise    Span
Culvert #9      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  462.55
           Centerline Station =  516.48
Downstream Elevation =  462.36
           Centerline Station =  151

Culvert Name     Shape      Rise    Span
Culvert #6      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  461.3
           Centerline Station =  517.81
Downstream Elevation =  461.11
           Centerline Station =  152.33

Culvert Name     Shape      Rise    Span
Culvert #7      Circular    1.25
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  461.3
           Centerline Station =  520.48
Downstream Elevation =  461.11
           Centerline Station =  154.99

Culvert Name     Shape      Rise    Span
Culvert #11     Circular    2.75
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 3 - Groove end entrance; pipe projecting from fill
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                 5   24.64     .013     .013        0                   .2
      1
Upstream   Elevation =  461.3
           Centerline Station =  540
Downstream Elevation =  461.11
           Centerline Station =  175.5

CROSS SECTION


RIVER: Otay Mesa
REACH: Lower              RS: 3111.536

INPUT
Description: Downstream of Siempre Viva Road
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
      0   470.3   38.64     470  101.58     470  110.71     468  117.78     466
 128.82  460.59  134.46  460.33  140.42  461.24  185.22     462  205.75     462
  221.7     464  311.37     466  388.79     468  393.11  468.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  110.71     .06  311.37     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        110.71  311.37           119.12  125.83  110.91             .3       .5

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            467.30    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.31    Wt. n-Val.                           0.060
   0.060
  W.S. Elev (ft)            466.99    Reach Len. (ft)          119.12     125.83
 110.91
  Crit W.S. (ft)                      Flow Area (sq ft)                    702.21
   19.12
  E.G. Slope (ft/ft)      0.006026    Area (sq ft)                         702.21
   19.12
  Q Total (cfs)             3155.00   Flow (cfs)                          3131.94
   23.06
  Top Width (ft)             235.58   Top Width (ft)                       197.10
   38.47
  Vel Total (ft/s)            4.37    Avg. Vel. (ft/s)                       4.46
    1.21
  Max Chl Dpth (ft)           6.66    Hydr. Depth (ft)                       3.56
    0.50
  Conv. Total (cfs)        40641.8    Conv. (cfs)                         40344.8
   297.0
  Length Wtd. (ft)           125.44   Wetted Per. (ft)                     198.72
   38.49
  Min Ch El (ft)             460.33   Shear (lb/sq ft)                       1.33
    0.19
  Alpha                       1.03    Stream Power (lb/ft s)                 5.93
    0.23
  Frctn Loss (ft)             0.51    Cum Volume (acre-ft)        7.20      12.61
    1.27
  C & E Loss (ft)             0.08    Cum SA (acres)              2.82       2.91
    1.09



CROSS SECTION OUTPUT  Profile #0.5 Q2
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```
  E.G. Elev (ft)            464.26    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.12    Wt. n-Val.                           0.060

  W.S. Elev (ft)            464.15    Reach Len. (ft)          119.12     125.83
 110.91
  Crit W.S. (ft)                      Flow Area (sq ft)                    229.84

  E.G. Slope (ft/ft)      0.004477    Area (sq ft)                         229.84

  Q Total (cfs)               631.00    Flow (cfs)                          631.00

  Top Width (ft)              106.74    Top Width (ft)                       106.74

  Vel Total (ft/s)              2.75    Avg. Vel. (ft/s)                       2.75

  Max Chl Dpth (ft)             3.82    Hydr. Depth (ft)                       2.15

  Conv. Total (cfs)           9430.5    Conv. (cfs)                         9430.5

  Length Wtd. (ft)            125.82    Wetted Per. (ft)                     107.78

  Min Ch El (ft)              460.33    Shear (lb/sq ft)                       0.60

  Alpha                         1.00    Stream Power (lb/ft s)                 1.64

  Frctn Loss (ft)               0.39    Cum Volume (acre-ft)        0.91       4.91
    0.00
  C & E Loss (ft)               0.03    Cum SA (acres)              1.09       2.19
    0.01



CROSS SECTION


RIVER: Otay Mesa
REACH: Lower              RS: 2928.886

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  469.86    7.37  469.84   11.44  468.65   23.29  463.76   43.04  463.37
   84.04  466.18   95.73  460.81  125.36  459.39  142.43  459.96  155.38  461.32
  172.67  462.17  178.15  461.96  179.42  462.14  181.09  462.35  185.05  462.48
  186.76  462.53  236.79  463.87  274.06   464.6  313.77  465.92  351.18  467.13
  371.43  467.49

Manning's n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	84.04	.06	313.77	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
84.04	313.77	246.89	236.94	267.61	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	466.71	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.16	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	466.56	Reach Len. (ft)	246.89	236.94
267.61				
Crit W.S. (ft)		Flow Area (sq ft)	141.59	871.14
6.26				
E.G. Slope (ft/ft)	0.002956	Area (sq ft)	141.59	871.14
6.26				
Q Total (cfs)	3155.00	Flow (cfs)	310.31	2840.76
3.93				
Top Width (ft)	316.93	Top Width (ft)	67.53	229.73
19.67				
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)	2.19	3.26
0.63				
Max Chl Dpth (ft)	7.17	Hydr. Depth (ft)	2.10	3.79
0.32				
Conv. Total (cfs)	58031.2	Conv. (cfs)	5707.7	52251.3
72.2				
Length Wtd. (ft)	239.77	Wetted Per. (ft)	68.18	231.12
19.68				
Min Ch El (ft)	459.39	Shear (lb/sq ft)	0.38	0.70
0.06				
Alpha	1.05	Stream Power (lb/ft s)	0.84	2.27
0.04				
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	7.01	10.34
1.24				
C & E Loss (ft)	0.02	Cum SA (acres)	2.73	2.29
1.02				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	463.85	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.060
W.S. Elev (ft)	463.78	Reach Len. (ft)	246.89	236.94
267.61				
Crit W.S. (ft)		Flow Area (sq ft)	5.58	316.05
E.G. Slope (ft/ft)	0.002286	Area (sq ft)	5.58	316.05
Q Total (cfs)	631.00	Flow (cfs)	2.37	628.63
Top Width (ft)	170.17	Top Width (ft)	25.85	144.32
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)	0.43	1.99
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)	0.22	2.19
Conv. Total (cfs)	13198.3	Conv. (cfs)	49.7	13148.6
Length Wtd. (ft)	236.99	Wetted Per. (ft)	25.87	145.16
Min Ch El (ft)	459.39	Shear (lb/sq ft)	0.03	0.31
Alpha	1.02	Stream Power (lb/ft s)	0.01	0.62
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.90	4.12
0.00				
C & E Loss (ft)	0.00	Cum SA (acres)	1.06	1.83
0.01				

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 2691.943

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	470.92	1.99	470.95	21.45	465.69	29.61	463.42	32.18	463.47
65.27	463.48	74.11	463.03	80.38	463.31	100.86	462.99	107.37	462.98
136.15	463.31	161.39	463.24	188.92	462.69	189.3	462.68	204.3	461.81
228.41	460.99	237.48	460.17	242.51	459.52	259.52	459.76	272.28	459.72
276.89	460.12	288.97	461.17	294.43	461.77	320.68	462.24	323.38	462.27
342.58	463.07	426.79	465.58	475.82	466.28	492.59	467.67	494.7	467.64

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	188.92	.06	342.58	.06

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        188.92  342.58            187.5  170.33  150.06             .1       .3

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            466.20    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                0.060      0.060
   0.060
  W.S. Elev (ft)            466.11    Reach Len. (ft)          187.50     170.33
 150.06
  Crit W.S. (ft)                      Flow Area (sq ft)        475.06     749.85
 160.08
  E.G. Slope (ft/ft)      0.001497    Area (sq ft)             475.06     749.85
 160.08
  Q Total (cfs)             3155.00   Flow (cfs)               905.26    2065.21
 184.53
  Top Width (ft)             443.97   Top Width (ft)           169.02     153.66
 121.29
  Vel Total (ft/s)            2.28    Avg. Vel. (ft/s)           1.91       2.75
    1.15
  Max Chl Dpth (ft)           6.59    Hydr. Depth (ft)           2.81       4.88
    1.32
  Conv. Total (cfs)        81535.3    Conv. (cfs)              23394.8    53371.7
 4768.8
  Length Wtd. (ft)           174.49   Wetted Per. (ft)         169.42     153.90
 121.33
  Min Ch El (ft)             459.52   Shear (lb/sq ft)           0.26       0.46
    0.12
  Alpha                       1.17    Stream Power (lb/ft s)     0.50       1.25
    0.14
  Frctn Loss (ft)             0.29    Cum Volume (acre-ft)       5.26       5.93
    0.73
  C & E Loss (ft)             0.00    Cum SA (acres)             2.06       1.25
    0.59


CROSS SECTION OUTPUT  Profile #0.5 Q2


  E.G. Elev (ft)            463.22    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                0.060      0.060
   0.060
  W.S. Elev (ft)            463.15    Reach Len. (ft)          187.50     170.33
 150.06
  Crit W.S. (ft)                      Flow Area (sq ft)          8.47     294.37
    0.09
  E.G. Slope (ft/ft)      0.003119    Area (sq ft)               8.47     294.37
    0.09
  Q Total (cfs)              631.00   Flow (cfs)                 3.61     627.38
    0.01
  Top Width (ft)             214.66   Top Width (ft)            58.48     153.66
    2.52
  Vel Total (ft/s)             2.08   Avg. Vel. (ft/s)           0.43       2.13
    0.16
  Max Chl Dpth (ft)            3.63   Hydr. Depth (ft)           0.14       1.92
    0.04
  Conv. Total (cfs)         11298.4   Conv. (cfs)                64.6    11233.5
     0.3
  Length Wtd. (ft)           171.38   Wetted Per. (ft)          58.49     153.90
    2.52
  Min Ch El (ft)             459.52   Shear (lb/sq ft)           0.03       0.37
    0.01
  Alpha                        1.04   Stream Power (lb/ft s)     0.01       0.79
    0.00
  Frctn Loss (ft)              0.35   Cum Volume (acre-ft)       0.86       2.46
    0.00
  C & E Loss (ft)              0.01   Cum SA (acres)             0.82       1.02
    0.00


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Otay Mesa
REACH: Lower              RS: 2521.617

INPUT
Description:
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  466.56    6.42   466.3   58.74  464.25   62.55  464.08   64.49  464.07
  110.03  465.15   113.3  465.22  119.35  464.38  149.11  461.06  160.51  461.13
  190.36  462.05  237.93  465.11  239.95  465.21  247.41  465.57  247.74  465.36
  248.47  465.24  252.19  464.27  266.33  460.28  277.97  459.21     281   458.9
  288.55  458.82  303.93  458.75  305.43  458.95  325.37  459.73  340.99  460.34
  342.56  460.34  344.88   460.5  370.53  462.22  392.83  463.33  422.34  464.82
  459.56  466.13  477.51  466.55   491.2  466.78  493.74  466.81

Manning's n Values        num=       3
```

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	247.41	.06	422.34	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
247.41	422.34	242.44	220.62	197.71 .1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	465.91	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.11	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	465.80	Reach Len. (ft)	242.44	220.62
197.71				
Crit W.S. (ft)		Flow Area (sq ft)	484.19	788.60
13.74				
E.G. Slope (ft/ft)	0.001864	Area (sq ft)	484.19	788.60
13.74				
Q Total (cfs)	3155.00	Flow (cfs)	853.49	2292.36
9.15				
Top Width (ft)	431.19	Top Width (ft)	228.32	174.93
27.94				
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)	1.76	2.91
0.67				
Max Chl Dpth (ft)	7.05	Hydr. Depth (ft)	2.12	4.51
0.49				
Conv. Total (cfs)	73078.2	Conv. (cfs)	19769.1	53097.3
211.9				
Length Wtd. (ft)	228.21	Wetted Per. (ft)	228.73	175.91
27.96				
Min Ch El (ft)	458.75	Shear (lb/sq ft)	0.25	0.52
0.06				
Alpha	1.16	Stream Power (lb/ft s)	0.43	1.52
0.04				
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	3.20	2.92
0.43				
C & E Loss (ft)	0.00	Cum SA (acres)	1.20	0.61
0.33				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	462.86	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
W.S. Elev (ft)	462.81	Reach Len. (ft)	242.44	220.62
197.71				
Crit W.S. (ft)		Flow Area (sq ft)	74.49	319.27
E.G. Slope (ft/ft)	0.001434	Area (sq ft)	74.49	319.27
Q Total (cfs)	631.00	Flow (cfs)	73.52	557.48
Top Width (ft)	193.99	Top Width (ft)	68.86	125.12
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)	0.99	1.75
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	1.08	2.55
Conv. Total (cfs)	16663.8	Conv. (cfs)	1941.4	14722.3
Length Wtd. (ft)	226.01	Wetted Per. (ft)	69.00	125.66
Min Ch El (ft)	458.75	Shear (lb/sq ft)	0.10	0.23
Alpha	1.09	Stream Power (lb/ft s)	0.10	0.40
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.68	1.26
C & E Loss (ft)	0.00	Cum SA (acres)	0.55	0.48

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Otay Mesa
REACH: Lower RS: 2300.996

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	465.64	3.65	465.58	8.67	465.2	13.67	465	16.55	464.66
23.28	463.8	27.09	463.4	45.74	461.14	49.94	461.33	85.21	464.66
92.21	464.14	138.2	459.58	180.87	461.18	198.43	461.66	202.02	461.76
210.71	461.85	222.13	459.54	227.85	458.13	235.96	458.17	244.4	458.28
249.12	458.37	266.7	461.34	272.83	462.37	275.08	462.57	330.96	463.74
352.88	464.18	396.32	465.48	402.36	465.64				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	210.71	.06	275.08	.06

Bank Sta: Left Right Coeff Contr. Expan.
210.71 275.08 .1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	465.47	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.13	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	465.34	Reach Len. (ft)		
Crit W.S. (ft)	462.76	Flow Area (sq ft)	665.37	366.10
175.07				
E.G. Slope (ft/ft)	0.002002	Area (sq ft)	665.37	366.10
175.07				
Q Total (cfs)	3155.00	Flow (cfs)	1618.21	1282.55
254.24				
Top Width (ft)	384.92	Top Width (ft)	203.92	64.37
116.63				
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)	2.43	3.50
1.45				
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)	3.26	5.69
1.50				
Conv. Total (cfs)	70519.9	Conv. (cfs)	36169.8	28667.2
5682.8				
Length Wtd. (ft)		Wetted Per. (ft)	204.60	65.12
116.66				
Min Ch El (ft)	458.13	Shear (lb/sq ft)	0.41	0.70
0.19				
Alpha	1.20	Stream Power (lb/ft s)	0.99	2.46
0.27				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	462.48	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.060
W.S. Elev (ft)	462.42	Reach Len. (ft)		
Crit W.S. (ft)	460.71	Flow Area (sq ft)	170.92	178.00
E.G. Slope (ft/ft)	0.002002	Area (sq ft)	170.92	178.00
Q Total (cfs)	631.00	Flow (cfs)	238.45	392.55
Top Width (ft)	190.05	Top Width (ft)	127.40	62.66
Vel Total (ft/s)	1.81	Avg. Vel. (ft/s)	1.40	2.21
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)	1.34	2.84
Conv. Total (cfs)	14102.6	Conv. (cfs)	5329.3	8773.2
Length Wtd. (ft)		Wetted Per. (ft)	127.71	63.40
Min Ch El (ft)	458.13	Shear (lb/sq ft)	0.17	0.35
Alpha	1.15	Stream Power (lb/ft s)	0.23	0.77
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 7595.58

INPUT
Description:
Station Elevation Data num= 176

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	497.65	35.66	497.53	55.93	497.17	58.16	497.14	85.04	496.25
89.47	496.08	96.98	495.8	97.03	495.8	97.13	495.8	97.17	495.8
97.22	495.8	97.3	495.8	97.38	495.8	97.5	495.8	97.59	495.8
97.92	495.73	98.03	495.71	98.25	495.65	100.28	495.16	101.5	494.86
102.22	494.69	103.38	494.43	104.83	494.18	106.5	493.93	106.8	493.87
107.18	493.8	107.25	493.8	107.57	493.8	107.72	493.8	107.86	493.8
108.49	493.66	109.14	493.57	109.6	493.5	109.83	493.45	111.88	492.45
112.45	492.16	113.23	491.8	113.25	491.8	114.89	491.4	121.68	489.8
123.44	489.38	130.03	487.8	130.54	487.8	130.72	487.8	139.82	487.8
144.69	487.8	150.21	487.8	156.24	487.8	170.99	487.8	177.41	487.8
183.69	487.8	197.55	486.42	203.87	485.8	223.01	483.84	223.39	483.8
223.64	483.8	229.83	483.8	229.95	483.8	230.66	483.8	242.24	483.8

244.46	483.8	255.52	483.8	258.52	483.09	263.79	481.8	265.66	481.25
267.25	480.8	267.32	480.78	269.14	480.25	269.54	480.14	270.38	479.92
270.81	479.8	297.32	478.83	323.83	479.8	323.96	479.83	324.04	479.84
324.25	479.88	324.5	479.92	324.75	479.97	325.59	480.18	328.54	480.952
331.78	481.8	334.09	481.9	337.15	482.05	338.62	482.09	342.64	482.27
356.25	482.69	370.6	483.21	371.03	483.23	372.17	483.27	383.09	483.59
383.58	483.61	383.75	483.61	383.78	483.61	383.8	483.61	390.23	483.8
401.47	484	417.84	484.3	428.21	484.48	432.09	484.55	434.39	484.6
438.13	484.67	439.88	484.69	444.45	484.8	483.77	485.23	500.85	485.36
500.92	485.36	503.91	485.36	505.04	485.36	511.91	485.34	513.46	485.34
515.74	485.34	523.76	485.3	526.29	485.3	532.64	485.24	534.68	485.25
549.21	485.2	554.94	485.14	585.36	484.78	588.66	484.74	593.33	484.69
596.81	484.66	600.97	484.6	605.67	484.54	616.01	484.41	651.2	483.8
653.4	483.8	653.65	483.8	654.41	483.8	654.81	483.8	655.59	483.8
745.83	481.86	748.82	481.8	749.31	481.56	750.64	480.915	752.94	479.8
755.57	478.7	757.68	478	769.35	477.95	781.03	478	782.34	478.42
785.15	479.8	787.3	480.84	788.07	481.213	789.28	481.8	789.38	481.8
789.39	481.8	789.49	481.8	792.46	481.84	795.96	481.89	897.56	482.88
900.34	482.88	904.56	482.9	905.52	482.9	905.86	482.9	907.01	482.91
911.24	482.94	914.67	482.97	915.54	482.98	918.74	483.01	921.13	483.03
926.97	483.08	931.22	483.12	937.21	483.17	954.11	483.3	957.28	483.31
959.94	483.34	963.08	483.36	968.91	483.39	971.6	483.41	985.15	483.51
1000.96	483.62	1002.15	483.62	1011.8	483.7	1021.55	483.77	1025.84	483.8
1031.85	483.8								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.06	267.25	.06	328.54	.06	750.64	.06	787.3	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
267.25	328.54	215.16	212.51	200.02	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	481.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	481.55	Reach Len. (ft)	215.16	212.51	200.02
Crit W.S. (ft)		Flow Area (sq ft)	0.98	128.37	114.32
E.G. Slope (ft/ft)	0.002989	Area (sq ft)	0.98	128.37	114.32
Q Total (cfs)	601.00	Flow (cfs)	0.67	283.57	316.76
Top Width (ft)	105.57	Top Width (ft)	2.59	61.29	41.68
Vel Total (ft/s)	2.47	Avg. Vel. (ft/s)	0.69	2.21	2.77
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)	0.38	2.09	2.74
Conv. Total (cfs)	10992.9	Conv. (cfs)	12.3	5186.7	5793.9
Length Wtd. (ft)	205.41	Wetted Per. (ft)	2.70	61.60	43.28
Min Ch El (ft)	478.83	Shear (lb/sq ft)	0.07	0.39	0.49
Alpha	1.04	Stream Power (lb/ft s)	0.05	0.86	1.37
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	1.70	21.78	3.04
C & E Loss (ft)	0.01	Cum SA (acres)	1.67	7.29	3.46

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	480.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.060	0.060
W.S. Elev (ft)	480.09	Reach Len. (ft)	215.16	212.51	200.02
Crit W.S. (ft)		Flow Area (sq ft)		41.55	60.71
E.G. Slope (ft/ft)	0.001550	Area (sq ft)		41.55	60.71
Q Total (cfs)	120.00	Flow (cfs)		33.35	86.65
Top Width (ft)	88.93	Top Width (ft)		55.51	33.41
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		0.80	1.43
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		0.75	1.82
Conv. Total (cfs)	3048.5	Conv. (cfs)		847.2	2201.2
Length Wtd. (ft)	203.39	Wetted Per. (ft)		55.62	34.27
Min Ch El (ft)	478.83	Shear (lb/sq ft)		0.07	0.17
Alpha	1.20	Stream Power (lb/ft s)		0.06	0.24
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.07	6.46	

```
    0.70
  C & E Loss (ft)             0.00    Cum SA (acres)              0.19       6.33
    1.46


Warning: Divided flow computed for this cross-section.

CROSS SECTION


RIVER: Tributary
REACH: Tributary          RS: 7383.07

INPUT
Description:
Station Elevation Data    num=     206
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   499.8   17.03   499.8   18.94   499.8   30.89  499.01   49.55   497.9
    50.1  497.87   50.31  497.85   50.56  497.84   51.24   497.8   60.81  496.05
    62.2   495.8   68.77  494.22   70.56   493.8   74.71  492.81   76.32  492.42
   77.71   492.1      79  491.83   79.14   491.8   80.42  491.54   84.64  490.55
   86.09  490.22   86.67  490.08   87.06  489.99    87.8   489.8   96.52  487.92
   97.06   487.8  102.24  486.37  103.91  485.93  104.42   485.8  104.57   485.8
  104.72   485.8  108.25  484.81  111.87   483.8  115.97  482.83  120.44  481.82
  120.52   481.8  127.44  481.41  133.45  481.05  135.97  480.91  136.99  480.85
   139.3  480.72   141.5  480.59  143.05   480.5  148.59  480.17  150.95  480.04
   154.8   479.8  154.81   479.8  154.82   479.8   156.3   479.8  169.18   479.8
  177.69  481.26  180.89   481.8  183.26  482.24  191.47   483.8  202.73  485.69
  203.38   485.8  203.47   485.8  205.65   485.8  205.67   485.8     210  485.62
  216.38  485.35  238.87   484.4  252.24   483.8  260.54   483.8  273.46   483.8
  273.73   483.8  274.96   483.8   275.2   483.8  275.58   483.8  276.41   483.8
     277   483.8  277.21   483.8  277.29   483.8  277.34   483.8  278.15   483.8
  279.97   483.8  280.23   483.8  281.32   483.8  290.49   483.8  291.83   483.8
  292.14  483.76  292.34  483.73   292.8  483.64  297.19   482.9  302.19   481.8
  306.85  480.17  306.86 480.166  306.97  480.12  307.91   479.8  337.29  478.41
  366.66   479.8  367.88 480.141  371.64  481.19  373.87   481.8  378.31   481.8
  384.01   481.8  384.51   481.8  384.52   481.8  387.77   481.8  393.11   481.8
  396.14   481.8  418.03   481.8  418.15   481.8  420.95   481.8  431.12   481.8
  431.54   481.8  431.62   481.8  447.74   481.8  486.18   481.8  486.64   481.8
  487.07   481.8  488.12   481.8  490.79   481.8  493.21   481.8  493.68   481.8
  495.08   481.8   495.8   481.8   508.2   481.8  520.28   481.8  528.21  481.78
   528.3  481.78  533.94   481.8  538.97   481.8  543.36  481.79  543.41  481.79
   549.3  481.76  549.48  481.76  553.07  481.75  554.97  481.74  558.76  481.73
  564.01  481.72  569.91  481.72  570.29  481.72  574.34  481.72  576.71  481.72
  577.56  481.71  578.07  481.71  579.56  481.71  601.06  481.71  601.76  481.72
  602.21  481.72  602.51  481.71  603.22  481.71  603.42  481.71  603.58  481.71
  603.72  481.71  603.84  481.71  604.05  481.71  621.48  481.58  622.28  481.58
  622.41  481.58  623.28  481.58  623.36  481.58  623.66  481.58  624.06  481.58
  648.75  481.23  651.28  481.18  658.63  481.04  691.41  480.49  701.07  480.27
  701.13  480.27  701.18  480.27  709.95  480.08  717.37  479.91  722.02   479.8
  723.12  479.44  728.07     478  741.17  477.89  754.26     478   754.9  478.02
  758.93 479.449  759.92   479.8  763.29  479.85  765.56  479.89  767.24  479.92
  770.53  479.97  855.68  480.87  856.03  480.87  856.61  480.88  859.12  480.88
  863.29   480.9  867.87   480.9  869.62  480.91  873.25  480.94  876.07  480.96
  882.36     481  891.07  481.05   901.8  481.11  904.17  481.14  951.06  481.47
  952.74  481.49   954.6   481.5  965.05  481.58  975.16  481.65  976.03  481.66
  987.99  481.75  995.05   481.8 1002.81  481.86 1003.33  481.87 1016.88  481.98
 1018.48  481.99 1027.65  482.07 1029.87  482.09 1034.88  482.13 1037.71  482.16
 1040.16  482.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  306.85     .06  367.88     .06  723.12     .06  758.93     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        306.85  367.88           227.55  227.91  231.99             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  203.38               F

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            480.96    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            480.89    Reach Len. (ft)          227.55     227.91
  231.99
  Crit W.S. (ft)            479.98    Flow Area (sq ft)          0.74     106.97
  180.32
  E.G. Slope (ft/ft)      0.003693    Area (sq ft)              29.86     106.97
  180.32
  Q Total (cfs)             601.00    Flow (cfs)                 0.54     233.58
  366.87
  Top Width (ft)            298.69    Top Width (ft)            41.29      61.03
  196.37
  Vel Total (ft/s)            2.09    Avg. Vel. (ft/s)           0.73       2.18
    2.03
  Max Chl Dpth (ft)           3.00    Hydr. Depth (ft)           0.36       1.75
    0.92
  Conv. Total (cfs)         9889.2    Conv. (cfs)                8.9     3843.5
  6036.7
  Length Wtd. (ft)          230.90    Wetted Per. (ft)           2.18      61.21
  197.06
  Min Ch El (ft)            478.41    Shear (lb/sq ft)           0.08       0.40
    0.21
  Alpha                       1.01    Stream Power (lb/ft s)     0.06       0.88
    0.43
```

Frctn Loss (ft)	2.18	Cum Volume (acre-ft)	1.62	21.20
2.36				
C & E Loss (ft)	0.01	Cum SA (acres)	1.56	6.99
2.92				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	479.74	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.03	Wt. n-Val.		0.060
0.060				
W.S. Elev (ft)	479.71	Reach Len. (ft)	227.55	227.91
231.99				
Crit W.S. (ft)		Flow Area (sq ft)		35.51
56.21				
E.G. Slope (ft/ft)	0.002281	Area (sq ft)		35.51
56.21				
Q Total (cfs)	120.00	Flow (cfs)		31.43
88.57				
Top Width (ft)	92.13	Top Width (ft)		54.78
37.35				
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)		0.89
1.58				
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)		0.65
1.50				
Conv. Total (cfs)	2512.6	Conv. (cfs)		658.0
1854.6				
Length Wtd. (ft)	231.10	Wetted Per. (ft)		54.85
37.89				
Min Ch El (ft)	478.41	Shear (lb/sq ft)		0.09
0.21				
Alpha	1.19	Stream Power (lb/ft s)		0.08
0.33				
Frctn Loss (ft)	1.45	Cum Volume (acre-ft)	0.07	6.27
0.43				
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	6.06
1.30				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 7155.16

INPUT
Description:
Station Elevation Data num= 229

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	499.06	3.37	498.3	5.21	497.8	7.49	497.25	13.34	495.8
13.51	495.75	15.06	495.32	21.42	493.8	25.69	492.76	29.64	491.8
30.69	491.58	31.43	491.41	35.59	490.53	38.77	489.8	40.06	489.58
41.09	489.39	41.63	489.29	42.13	489.2	44.35	488.79	49.29	487.9
49.79	487.8	49.82	487.8	63.39	485.82	63.47	485.81	63.51	485.8
63.54	485.8	63.56	485.8	63.57	485.8	63.79	485.8	63.95	485.8
64.11	485.8	64.22	485.8	64.32	485.8	64.37	485.8	64.4	485.8
64.44	485.8	64.6	485.8	64.98	485.8	65.16	485.8	66.98	485.8
68.37	485.63	73.97	485.39	74.12	485.36	74.34	485.35	74.64	485.32
78.94	485.12	79.31	485.09	79.63	485.06	79.88	485.04	80.05	485.03
80.26	485.02	81.61	484.95	82.03	484.92	82.46	484.89	82.71	484.87
83.09	484.85	83.2	484.84	83.26	484.84	84.17	484.75	84.77	484.71
85.61	484.65	89.16	484.3	89.89	484.24	90.41	484.2	90.57	484.19
94.17	483.8	95.31	483.69	95.45	483.67	97.57	483.45	97.81	483.42
97.97	483.39	98.11	483.37	98.77	483.28	98.97	483.25	99.68	483.16
100.04	483.1	101.16	482.94	102.81	482.69	104.21	482.49	108.85	481.8
113.17	481.53	126.68	480.16	129.75	479.88	130.23	479.8	130.3	479.8
130.41	479.8	132.58	479.8	134.58	479.8	135.37	479.8	139.6	479.8
186.74	478.08	196.09	477.81	196.58	477.8	196.63	477.8	196.71	477.8
206.86	477.8	208.29	477.8	208.44	477.8	208.69	477.8	209.06	477.8
209.1	477.8	228.29	479.5	231.56	479.8	231.61	479.8	240.1	480.75
246.16	481.42	249.75	481.8	249.98	481.8	250.6	481.8	250.77	481.8
250.82	481.8	250.93	481.8	251.05	481.8	251.53	481.8	251.73	481.8
251.94	481.8	252.18	481.8	252.26	481.8	252.5	481.8	252.65	481.8
302.62	483.69	305.09	483.77	305.62	483.8	305.64	483.8	319.61	483.8
334.87	483.8	342.64	482.78	349.74	481.8	355.77	479.93	356.19	479.8
356.67	479.8	356.71	479.8	357	479.8	365.42	479.14	366.16	479.1
373.37	478.52	376.47	478.27	382.31	478	396.48	477.85	410.64	478
412.23	478.19	413.35	478.46	414.82	478.8	416.85	479.26	417.79	479.49
419.05	479.8	419.07	479.8	428.21	479.8	432.7	479.8	434.62	479.8
435.18	479.8	436.16	479.8	436.33	479.8	436.49	479.8	436.75	479.8

```
  437.01   479.8  437.11   479.8  437.56   479.8  437.73   479.8  459.84  479.34
  462.88  479.29  463.89  479.27  470.55  479.14   471.4  479.12  473.09  479.09
  487.13  478.85  488.27  478.84  491.19   478.8  493.64  478.79  493.81  478.78
  494.22  478.78  496.93  478.76  545.74   478.4  552.36  478.32  554.54   478.3
  558.14  478.28  559.56  478.27   561.4  478.26  563.57  478.25  567.92  478.24
  570.04  478.23  571.72  478.23  576.33  478.22  578.84  478.22  582.61  478.21
  584.88  478.21  586.67  478.21  587.96  478.21  588.92  478.21  589.64   478.2
  591.05   478.2  593.35   478.2  600.45  478.19  604.29  478.19  604.86  478.19
  607.02  478.19  607.94  478.19  609.07  478.19  609.82  478.18  611.24  478.18
  642.17     478  707.32  477.82  772.46     478  805.09  478.31  806.45  478.32
   823.2  478.39  825.04   478.4  825.51   478.4  825.92   478.4  826.26   478.4
  828.53  478.41  828.78  478.41   835.7  478.44  838.62  478.45  841.55  478.45
   844.7  478.45  845.93  478.46  848.99  478.46  854.07  478.47   897.9  478.94
  938.04  479.38  979.01   479.8  979.22   479.8  993.94  479.94 1021.65  480.19
 1024.75  480.22 1037.84  480.35 1059.65  480.57 1084.91  480.82

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06  376.47     .06  412.23     .06  545.74     .06  805.09     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        376.47  412.23           199.56  199.95  209.72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0  334.87               F

CROSS SECTION OUTPUT  Profile #Q100


  E.G. Elev (ft)            478.77    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.22    Wt. n-Val.                0.060      0.060
  0.060
  W.S. Elev (ft)            478.55    Reach Len. (ft)          199.56     199.95
  209.72
  Crit W.S. (ft)            478.55    Flow Area (sq ft)          0.49      20.92
  140.74
  E.G. Slope (ft/ft)      0.058151    Area (sq ft)              22.19      20.92
  140.74
  Q Total (cfs)             601.00    Flow (cfs)                 0.79      87.35
  512.86
  Top Width (ft)            421.09    Top Width (ft)            47.27      35.76
  338.06
  Vel Total (ft/s)            3.71    Avg. Vel. (ft/s)           1.61       4.18
    3.64
  Max Chl Dpth (ft)           0.75    Hydr. Depth (ft)           0.14       0.58
    0.42
  Conv. Total (cfs)         2492.3    Conv. (cfs)                3.3      362.2
  2126.8
  Length Wtd. (ft)          204.13    Wetted Per. (ft)           3.51      35.78
  338.11
  Min Ch El (ft)            477.85    Shear (lb/sq ft)           0.51       2.12
    1.51
  Alpha                       1.01    Stream Power (lb/ft s)     0.82       8.86
    5.51
  Frctn Loss (ft)             0.54    Cum Volume (acre-ft)       1.49      20.87
    1.51
  C & E Loss (ft)             0.06    Cum SA (acres)             1.33       6.74
    1.50


Warning: The energy equation could not be balanced within the specified number of
iterations.  The program used critical
         depth for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream
conveyance) is less than 0.7 or greater than
         1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section.  This may indicate
         the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was
set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there
is not a valid subcritical answer.  The
         program defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #0.5 Q2


  E.G. Elev (ft)            478.29    Element                  Left OB    Channel
 Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                         0.060
   0.060
  W.S. Elev (ft)            478.22    Reach Len. (ft)          199.56     199.95
  209.72
  Crit W.S. (ft)                      Flow Area (sq ft)                    9.01
   47.21
  E.G. Slope (ft/ft)      0.054220    Area (sq ft)               9.24       9.01
   47.21
  Q Total (cfs)             120.00    Flow (cfs)                          21.16
   98.84
  Top Width (ft)            281.42    Top Width (ft)            30.86      34.64
  215.92
  Vel Total (ft/s)            2.13    Avg. Vel. (ft/s)                     2.35
    2.09
  Max Chl Dpth (ft)           0.42    Hydr. Depth (ft)                     0.26
    0.22
  Conv. Total (cfs)           515.3   Conv. (cfs)                          90.9
```

424.5					
Length Wtd. (ft)	203.97	Wetted Per. (ft)			34.65
215.93					
Min Ch El (ft)	477.85	Shear (lb/sq ft)			0.88
0.74					
Alpha	1.01	Stream Power (lb/ft s)			2.07
1.55					
Frctn Loss (ft)	2.53	Cum Volume (acre-ft)		0.05	6.15
0.15					
C & E Loss (ft)	0.01	Cum SA (acres)		0.11	5.82
0.63					

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 6955.21

INPUT
Description:
Station Elevation Data num= 272

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	481.2	1.12	481.17	6.56	481.03	15.91	480.8	18.45	480.74
20.84	480.71	30.22	480.56	33.25	480.5	44.21	480.31	45.24	480.28
48.69	480.22	49.2	480.2	50.58	480.12	50.65	480.25	50.88	480.65
52.51	480.64	56.64	480.66	66.12	479.78	67.8	479.67	73.6	479.29
86.92	478.61	100.43	478.15	109.65	477.8	109.8	477.8	110.09	477.8
110.53	477.8	128.59	477.34	154.36	476.67	185.54	476.13	192.05	476
192.6	476	192.8	476	193.14	476	193.46	476	193.62	476.01
193.95	476.01	201.05	475.91	201.5	475.91	208.6	475.81	208.63	475.81
209.19	475.8	217.08	475.8	217.41	475.8	217.5	475.8	217.6	475.8
228.06	475.8	228.26	475.8	228.5	475.8	228.72	475.8	228.89	475.8
228.97	475.8	238.25	475.8	238.31	475.8	243.36	475.8	243.45	475.8
243.65	475.8	243.98	475.8	247.24	475.8	247.78	475.8	251.37	475.8
257.13	475.8	259.78	475.8	262.25	475.8	269.78	475.8	270.02	475.8
270.48	475.8	271.26	475.8	283.54	476.06	285.17	476.13	285.25	476.13
285.36	476.14	285.49	476.14	285.66	476.15	287.5	476.23	288.5	476.27
321.17	477.8	321.74	477.8	322.83	477.8	323.38	477.8	323.4	477.8
323.42	477.8	323.46	477.8	323.52	477.8	323.55	477.8	323.63	477.8
323.72	477.8	323.76	477.8	323.9	477.8	323.92	477.8	324.03	477.8

324.36	477.88	324.49	477.93	325.56	478.24	325.67	478.27	326.42	478.52
327.44	478.87	328.27	479.16	330.18	479.8	332	480.2	335.03	480.86
339.21	481.8	343.23	482.55	347.31	483.33	349.85	483.61	350.24	483.66
351.54	483.8	353.13	483.96	353.33	483.98	355.85	484.23	356.16	484.25
358.25	484.46	358.58	484.47	361.69	484.81	363.53	485	365.99	485.37
367.81	485.65	368.67	485.78	368.71	485.79	368.78	485.8	369.13	485.85
369.38	485.89	369.58	485.92	369.82	485.96	370.15	486.01	370.9	486.13
372.25	486.34	374.18	486.44	377.31	486.82	379.48	487	383.69	487.34
385.11	487.49	385.7	487.54	386	487.56	389.03	487.8	390.84	487.98
391.59	488.05	395.48	488.44	399.72	488.87	401.22	489.02	401.76	489.08
402.1	489.12	402.32	489.14	402.46	489.16	402.58	489.17	402.69	489.18
403.06	489.22	409.11	489.8	410.54	489.93	413.74	490.21	414.85	490.3
415.45	490.35	415.78	490.38	415.99	490.4	416.14	490.42	416.29	490.43
425.65	489.8	427.4	489.8	433.27	489.8	437.84	488.35	439.55	487.8
441.41	487.16	445.45	485.8	449.89	484.36	451.62	483.8	452.49	483.52
457.89	481.8	467.44	480.19	469.85	479.8	470.11	479.8	471.96	479.8
473.45	479.8	481.81	480.48	494.88	481.54	498.05	481.8	500.47	481.99
521.44	483.67	523.03	483.8	523.2	483.8	523.57	483.8	524.06	483.8
524.45	483.8	524.84	483.8	528.13	483.8	537.68	483.8	539.36	483.8
540.58	483.8	540.59	483.8	540.8	483.8	548.63	483.18	550.51	482.99
553.16	482.69	553.98	482.6	555.67	482.4	558.05	482.12	558.96	482.02
560.3	481.87	560.86	481.8	560.88	481.8	560.89	481.8	560.91	481.8
561.44	481.61	562.39	481.29	566.32	479.8	566.38	479.8	566.45	479.8
566.49	479.8	566.52	479.8	567.72	479.6	578.53	477.8	598.88	476.58
643.06	476.29	706.88	475.87	714.32	476.08	714.39	476.08	726.48	476.03
734.23	475.84	734.73	475.82	735.3	475.8	846.01	474.54	904.27	475.74
904.7	475.75	906.49	475.8	906.55	475.8	906.68	475.8	909.22	476.21
911.94	476.65	913.15	476.86	914.51	477.08	916.27	477.37	917.8	477.61
917.97	477.63	918.15	477.66	919	477.8	919.02	477.8	919.12	477.8
919.2	477.8	921.49	478.16	924.12	478.53	938.48	478.78	939.19	478.7
941.88	478.41	942.04	478.39	947.46	477.8	947.54	477.8	947.55	477.8
972.73	477.8	991.4	477.8	1013.08	477.8	1013.75	477.8	1035.93	477.8
1036.13	477.8	1036.31	477.8	1047.74	477.8	1047.83	477.8	1047.88	477.8
1048.22	477.8	1049.15	477.8	1050.7	477.8	1053	477.8	1053.27	477.8
1056.2	477.8	1059.33	477.8	1061.79	477.8	1099.17	478.13	1100.89	478.14
1102.12	478.14	1108.56	478.19	1120.05	478.28	1198.15	478.93	1302.06	479.8
1331.53	480.1	1337.04	480.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	643.06	.06	909.22	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
643.06	909.22	187.73	198.18	95.07	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	539.36		F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.43	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	477.41	Reach Len. (ft)	187.73	198.18
95.07				
Crit W.S. (ft)		Flow Area (sq ft)	48.93	513.43
4.40				
E.G. Slope (ft/ft)	0.000830	Area (sq ft)	263.82	513.43
4.40				
Q Total (cfs)	601.00	Flow (cfs)	31.14	567.64
2.22				
Top Width (ft)	518.65	Top Width (ft)	245.17	266.16
7.32				
Vel Total (ft/s)	1.06	Avg. Vel. (ft/s)	0.64	1.11
0.50				
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)	0.84	1.93
0.60				
Conv. Total (cfs)	20858.6	Conv. (cfs)	1080.9	19700.7
77.0				
Length Wtd. (ft)	196.97	Wetted Per. (ft)	58.08	266.22
7.42				
Min Ch El (ft)	474.54	Shear (lb/sq ft)	0.04	0.10
0.03				
Alpha	1.05	Stream Power (lb/ft s)	0.03	0.11
0.02				
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.83	19.64
1.16				
C & E Loss (ft)	0.00	Cum SA (acres)	0.66	6.04
0.66				

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	475.74	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.03	Wt. n-Val.		0.060
W.S. Elev (ft)	475.72	Reach Len. (ft)	187.73	198.18
95.07				
Crit W.S. (ft)		Flow Area (sq ft)		94.31
E.G. Slope (ft/ft)	0.005361	Area (sq ft)		94.31
Q Total (cfs)	120.00	Flow (cfs)		120.00
Top Width (ft)	160.41	Top Width (ft)		160.41
Vel Total (ft/s)	1.27	Avg. Vel. (ft/s)		1.27
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		0.59
Conv. Total (cfs)	1638.9	Conv. (cfs)		1638.9
Length Wtd. (ft)	198.18	Wetted Per. (ft)		160.42
Min Ch El (ft)	474.54	Shear (lb/sq ft)		0.20
Alpha	1.00	Stream Power (lb/ft s)		0.25
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.03	5.91
0.04				
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	5.38
0.11				

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 6757.03

INPUT
Description:
Station Elevation Data num= 208

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	479.79	1.89	479.78	3.83	479.76	3.95	479.76	15.72	479.6
21.88	479.5	25.86	479.48	37.7	479.37	45.56	479.35	57.63	479.27
58.09	479.28	63.33	479.29	69.51	479.28	73.24	479.3	76.18	479.32
97.53	479.31	100.21	479.31	108.4	479.49	111.09	479.52	117.84	479.64
120	479.64	126.98	479.8	127.07	479.8	127.15	479.8	143.72	479.8
143.98	479.8	147	479.8	147.55	479.8	149.4	479.8	154.65	479.8
155.09	479.8	155.61	479.8	164.7	479.8	164.87	479.8	165.2	479.8
171.96	479.8	175.04	479.8	175.09	479.8	175.14	479.8	175.19	479.8
175.21	479.8	175.24	479.8	175.31	479.8	175.49	479.8	181.31	479.8
181.33	479.8	181.35	479.8	184.19	479.8	185.97	479.8	186.01	479.8
186.89	479.8	187.09	479.8	188.46	479.8	188.63	479.8	189.97	479.8

191.63	479.8	191.72	479.8	194.03	479.8	195.64	479.8	198.46	479.8
198.99	479.8	201.91	479.8	205.6	479.8	206.28	479.8	211.56	479.8
213.54	479.8	213.71	479.8	219.16	479.8	219.3	479.8	219.39	479.8
225.57	480.49	226.62	480.53	230.85	480.6	232.36	480.63	236.69	480.71
238.18	480.72	238.59	480.72	244.29	480.77	253.36	480.96	254.02	480.98
255.78	481.09	266.68	481.8	268.32	481.8	268.41	481.8	268.53	481.8
268.54	481.8	268.74	481.8	268.85	481.8	273.85	481.8	274.45	481.8
275.31	481.8	276.16	481.8	277.99	481.06	280.19	480.17	280.69	479.97
280.84	479.91	281.14	479.8	281.4	479.63	282.01	479.26	282.48	478.92
284.07	477.8	284.15	477.77	285.11	477.34	286.04	476.87	286.83	476.5
288.01	475.879	288.16	475.8	288.2	475.8	293.57	475.81	294.41	475.81
294.96	475.81	301.85	475.82	302.82	475.82	303.23	475.82	303.49	475.82
303.69	475.82	319.72	475.59	350.98	475.53	355.2	475.49	359.01	475.48
385.9	475.24	386.57	475.23	415.17	475.08	500.93	475.02	500.95	475.02
500.99	475.02	503.43	474.98	503.73	474.98	504.1	474.97	504.59	474.97
505.24	474.96	600.98	473.86	602.21	473.84	603.76	473.82	605.78	473.78
608.5	473.74	612.38	473.67	614.93	473.63	639.45	474.25	646.12	474.42
668.42	475	677.59	475.23	686.92	475.46	690.27	475.54	692.28	475.59
701.48	475.8	704.82	476.27	704.96	476.29	705.59	476.37	706.67	476.53
708.72	476.84	710.95	477.18	713.55	477.56	714.76	477.77	714.93	477.8
714.94	477.8	714.95	477.8	726.09	477.8	727.74	477.8	728.29	477.8
728.83	477.8	729.98	477.8	730.14	477.8	730.32	477.8	731.54	477.8
733.74	477.8	734.83	477.8	738.62	477.8	738.69	477.8	738.74	477.8
738.96	477.8	741.29	477.8	765.55	477.8	778.33	477.8	785.09	477.8
805.53	477.8	823.1	477.8	823.68	477.8	825.05	477.8	826.44	477.8
833.84	477.8	834.55	477.8	836.52	477.8	876.63	477.8	877.88	477.8
879.38	477.8	880.59	477.8	893.06	477.8	893.17	477.8	893.53	477.8
910.41	477.93	911.85	477.94	919.88	478.01	922.54	478.03	930.11	478.09
933.17	478.11	938.15	478.15	971.72	478.43	1081.77	479.35	1102.85	479.52
1106.66	479.56	1113.97	479.62	1135.93	479.8	1136.63	479.8	1137.49	479.8
1139.07	479.8	1140.29	479.8	1173.3	480.13				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	288.16	.06	692.28	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
288.16	692.28	314.48	209.54	85.08	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.36	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	477.36	Reach Len. (ft)	314.48	209.54
85.08				
Crit W.S. (ft)		Flow Area (sq ft)	2.37	992.00
23.72				
E.G. Slope (ft/ft)	0.000175	Area (sq ft)	2.37	992.00
23.72				
Q Total (cfs)	601.00	Flow (cfs)	0.60	591.68
8.72				
Top Width (ft)	427.08	Top Width (ft)	3.09	404.12
19.87				
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)	0.25	0.60
0.37				
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	0.77	2.45
1.19				
Conv. Total (cfs)	45406.3	Conv. (cfs)	45.6	44702.2
658.5				
Length Wtd. (ft)	202.93	Wetted Per. (ft)	3.46	404.16
19.99				
Min Ch El (ft)	473.63	Shear (lb/sq ft)	0.01	0.03
0.01				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.02
0.00				
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.26	16.22
1.13				
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	4.52
0.63				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	475.44	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.		0.060
W.S. Elev (ft)	475.44	Reach Len. (ft)	314.48	209.54
85.08				
Crit W.S. (ft)		Flow Area (sq ft)		231.05
E.G. Slope (ft/ft)	0.000685	Area (sq ft)		231.05
Q Total (cfs)	120.00	Flow (cfs)		120.00
Top Width (ft)	321.94	Top Width (ft)		321.94
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.52
Max Chl Dpth (ft)	1.81	Hydr. Depth (ft)		0.72
Conv. Total (cfs)	4586.3	Conv. (cfs)		4586.3
Length Wtd. (ft)	209.14	Wetted Per. (ft)		321.97

Min Ch El (ft)	473.63	Shear (lb/sq ft)			0.03
Alpha	1.00	Stream Power (lb/ft s)			0.02
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.03	5.17	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	4.28	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than
1.4. This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 6547.49

INPUT
Description:
Station Elevation Data num= 154

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	479.54	1.21	479.52	1.37	479.52	1.5	479.52	3.37	479.49
3.59	479.49	3.76	479.49	5.54	479.46	5.8	479.46	6.02	479.45
7.7	479.43	8.02	479.42	8.29	479.42	9.86	479.39	10.24	479.39
10.55	479.38	12.03	479.36	12.46	479.35	12.81	479.35	14.19	479.33
14.68	479.32	15.08	479.31	16.36	479.29	16.9	479.28	17.34	479.28
18.52	479.26	19.12	479.25	19.6	479.24	20.68	479.22	21.33	479.21
21.87	479.2	22.85	479.19	23.55	479.18	24.13	479.17	25.01	479.15
25.77	479.14	26.39	479.13	27.17	479.12	27.99	479.1	28.66	479.09
29.34	479.08	30.21	479.07	30.92	479.05	31.5	479.04	32.43	479.03
33.18	479.02	33.67	479.01	34.64	478.99	35.45	478.98	35.83	478.97
36.86	478.95	37.71	478.94	37.99	478.93	39.08	478.91	39.98	478.9
40.16	478.9	41.3	478.88	42.24	478.86	42.32	478.86	43.52	478.84
44.16	478.83	44.49	478.81	45.14	478.77	46.12	478.71	46.21	478.7
46.25	478.82	46.38	479.2	46.99	479.21	47.05	479.21	47.1	479.21
47.26	479.21	50.49	479.26	50.99	479.27	51.4	479.27	53.88	479.31
54.8	479.32	55.55	479.33	57.27	479.36	58.61	479.38	59.69	479.39
60.66	479.41	62.41	479.43	63.84	479.45	64.06	479.46	65.04	479.47
65.59	479	67.67	478	69.75	477	71.83	476	73.92	475
76	474	78.08	473	79.37	472.38	85.11	472.38	90.24	474.9
92.57	474.88	128.16	474.46	136	474.46	160.12	474.48	217.13	474.35
246.65	474.16	252.44	474.15	267.11	474.01	279.57	473.89	281.69	473.87
284.36	473.85	287.85	473.82	292.57	473.78	299.34	473.73	309.86	473.65
328.42	473.5	334.44	473.45	344.47	473.66	346.61	473.7	380.43	474.4
396.99	474.74	413.07	475.07	418.21	475.18	429.85	475.42	435.19	475.53
439.02	475.6	448.53	475.8	456.13	477.19	459.51	477.8	473	477.8
480.48	477.8	485.09	477.8	489.36	477.8	489.93	477.8	523.27	477.8
527.47	477.8	530.18	477.8	537.14	477.8	552.63	477.8	557.57	477.8
565.39	477.8	572.24	477.8	604.15	477.8	607.2	477.8	653.09	477.8
654.01	477.8	654.18	477.8	674.25	477.97	696.79	478.15	699.18	478.17
905.08	479.8	905.35	479.8	907.94	479.8	907.97	479.8	908.04	479.8
908.21	479.8	910.54	479.8	944.33	480.14	944.72	480.14		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	73.92	.06	396.99	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
73.92	396.99	221.15	216.61	70.47	.1 .3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.25	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	477.22	Reach Len. (ft)	221.15	216.61
70.47				
Crit W.S. (ft)		Flow Area (sq ft)	5.13	990.77
105.79				
E.G. Slope (ft/ft)	0.000916	Area (sq ft)	5.13	990.77
105.79				
Q Total (cfs)	1684.00	Flow (cfs)	3.85	1563.69
116.46				
Top Width (ft)	386.98	Top Width (ft)	4.62	323.07
59.29				
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)	0.75	1.58
1.10				
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)	1.11	3.07
1.78				
Conv. Total (cfs)	55639.7	Conv. (cfs)	127.1	51664.7
3847.9				
Length Wtd. (ft)	202.12	Wetted Per. (ft)	5.13	324.27
59.43				
Min Ch El (ft)	472.38	Shear (lb/sq ft)	0.06	0.17
0.10				
Alpha	1.03	Stream Power (lb/ft s)	0.04	0.28
0.11				
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.23	11.45
1.00				
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	2.77
0.56				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	475.17	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	475.15	Reach Len. (ft)	221.15	216.61
70.47				
Crit W.S. (ft)		Flow Area (sq ft)	0.02	323.01
4.09				
E.G. Slope (ft/ft)	0.001768	Area (sq ft)	0.02	323.01
4.09				
Q Total (cfs)	337.00	Flow (cfs)	0.00	335.51
1.49				
Top Width (ft)	343.20	Top Width (ft)	0.31	323.07
19.82				
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)	0.17	1.04
0.36				
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)	0.08	1.00
0.21				
Conv. Total (cfs)	8014.2	Conv. (cfs)	0.1	7978.7
35.4				
Length Wtd. (ft)	215.42	Wetted Per. (ft)	0.35	324.27
19.82				
Min Ch El (ft)	472.38	Shear (lb/sq ft)	0.01	0.11
0.02				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.11
0.01				
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.03	3.84
0.04				
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	2.73
0.09				

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 6330.88

INPUT
Description:
Station Elevation Data num= 234

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.77	.69	478.76	.76	478.76	.83	478.76	1.92	478.74
2	478.74	2.08	478.74	3.15	478.72	3.24	478.72	3.33	478.72
4.38	478.7	4.49	478.7	4.57	478.7	5.61	478.68	5.73	478.68
5.82	478.68	6.84	478.66	6.97	478.66	7.07	478.66	8.07	478.64
8.21	478.64	8.32	478.64	9.3	478.62	9.45	478.62	9.57	478.62
10.53	478.6	10.69	478.6	10.82	478.6	11.76	478.58	11.93	478.58
12.07	478.58	12.99	478.56	13.17	478.56	13.32	478.56	14.22	478.54
14.41	478.54	14.57	478.54	15.45	478.52	15.65	478.52	15.82	478.52
16.68	478.5	16.89	478.5	17.07	478.5	17.91	478.48	18.13	478.48
18.32	478.48	19.14	478.46	19.37	478.46	19.57	478.46	20.37	478.44
20.61	478.44	20.82	478.44	21.6	478.42	21.85	478.42	22.07	478.42
22.83	478.4	23.09	478.4	23.32	478.4	24.06	478.38	24.33	478.38
24.57	478.38	25.29	478.36	25.57	478.36	25.82	478.36	26.52	478.34
26.82	478.34	27.07	478.34	27.75	478.32	28.06	478.32	28.32	478.32
28.98	478.3	29.3	478.3	29.57	478.3	30.21	478.28	30.54	478.28
30.82	478.28	31.44	478.27	31.78	478.26	32.07	478.26	32.67	478.25
33.02	478.24	33.32	478.24	33.9	478.23	34.26	478.22	34.57	478.22
35.13	478.21	35.5	478.2	35.82	478.2	36.36	478.19	36.74	478.18
37.07	478.18	37.59	478.17	37.98	478.16	38.32	478.16	38.82	478.15
39.22	478.14	39.57	478.14	40.05	478.13	40.46	478.12	40.82	478.12
41.28	478.11	41.7	478.1	42.07	478.1	42.51	478.09	42.94	478.08
43.32	478.08	43.74	478.07	44.18	478.06	44.57	478.06	44.97	478.05
45.42	478.04	45.82	478.04	46.2	478.03	46.66	478.02	47.07	478.02
47.43	478.01	47.9	478	48.32	478	48.66	477.99	49.14	477.98
49.57	477.98	49.89	477.97	50.39	477.96	50.82	477.96	51.12	477.95
51.63	477.94	52.07	477.94	52.24	477.93	52.74	477.92	55.2	477.87
57.61	477.82	58.25	477.81	61.07	477.75	63.07	477.71	63.75	477.66
64.48	477.62	64.93	477.58	65.06	477.97	65.1	478.08	68.91	478.14
69.64	478.15	70.3	478.16	73.81	478.21	75.48	478.23	77	478.25
78.02	478.27	78.71	478.27	81.32	478.31	83.37	478.34	84.56	478
86.58	477	88.61	476	90.63	475	92.66	474	94.69	473
96.84	471.94	97.62	471.94	102.13	474.05	123.69	473.74	149.1	473.47
154.67	473.44	159.83	473.42	185.54	473.27	199.14	473.18	199.73	473.18
200.38	473.18	201.07	473.18	201.84	473.18	202.67	473.18	203.58	473.19
204.59	473.19	205.7	473.19	206.95	473.19	208.34	473.19	209.92	473.19
211.71	473.19	213.77	473.19	216.15	473.19	218.96	473.2	222.3	473.2
226.35	473.2	231.35	473.2	237.69	473.21	239.91	473.21	247.84	473.4
274.8	474.066	335.25	475.56	337.81	475.63	342.47	475.74	343.48	475.77
344.81	475.8	346.8	476.09	358.72	477.8	367.76	477.8	374.24	477.8
375.58	477.8	377.18	477.8	380.1	477.8	380.92	477.8	380.96	477.8
380.98	477.8	381.08	477.8	381.17	477.8	382.04	477.8	382.77	477.8
382.87	477.8	383.08	477.8	384.32	477.8	385.26	477.8	388.05	477.8
389.08	477.8	389.26	477.8	389.62	477.8	515.38	477.8	519.56	477.8
530.48	477.8	535.04	477.8	545.45	477.8	545.72	477.8	560.43	477.8
565.28	477.8	566.39	477.8	619.06	478.21	636.59	478.35	820.15	479.8
820.69	479.8	822.6	479.8	823.15	479.8	824.19	479.8	826.24	479.8
826.47	479.8	826.69	479.8	840.2	479.93	857.37	480.1		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	92.66	.06	274.8	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
92.66	274.8	285.17	268.17	173.67	.1	.3

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	477.01	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.08	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	476.93	Reach Len. (ft)	285.17	268.17
173.67				
Crit W.S. (ft)		Flow Area (sq ft)	8.72	635.94
144.61				
E.G. Slope (ft/ft)	0.001624	Area (sq ft)	8.72	635.94
144.61				
Q Total (cfs)	1684.00	Flow (cfs)	10.45	1455.70
217.85				
Top Width (ft)	265.97	Top Width (ft)	5.95	182.14
77.88				
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)	1.20	2.29
1.51				
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)	1.47	3.49
1.86				
Conv. Total (cfs)	41784.5	Conv. (cfs)	259.3	36119.7
5405.5				
Length Wtd. (ft)	258.39	Wetted Per. (ft)	6.63	183.10
77.98				
Min Ch El (ft)	471.94	Shear (lb/sq ft)	0.13	0.35
0.19				
Alpha	1.06	Stream Power (lb/ft s)	0.16	0.81
0.28				
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.20	7.41
0.80				
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	1.51
0.45				

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	474.68	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.04	Wt. n-Val.	0.060	0.060
0.060				
W.S. Elev (ft)	474.64	Reach Len. (ft)	285.17	268.17
173.67				
Crit W.S. (ft)		Flow Area (sq ft)	0.42	218.97
6.77				
E.G. Slope (ft/ft)	0.002966	Area (sq ft)	0.42	218.97
6.77				
Q Total (cfs)	337.00	Flow (cfs)	0.25	332.76
3.99				
Top Width (ft)	206.85	Top Width (ft)	1.31	182.14
23.40				
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	0.59	1.52
0.59				
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	0.32	1.20
0.29				
Conv. Total (cfs)	6187.6	Conv. (cfs)	4.6	6109.7
73.3				
Length Wtd. (ft)	267.62	Wetted Per. (ft)	1.46	183.10
23.41				
Min Ch El (ft)	471.94	Shear (lb/sq ft)	0.05	0.22
0.05				
Alpha	1.03	Stream Power (lb/ft s)	0.03	0.34
0.03				
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)	0.02	2.49
0.03				
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	1.47
0.05				

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 6057.21

INPUT
Description:
Station Elevation Data num= 237

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	479.85	.02	479.85	.27	479.85	.29	479.85	.99	479.84
1.01	479.84	1.68	479.83	1.72	479.83	2.38	479.82	2.44	479.82
3.08	479.82	3.15	479.81	3.78	479.81	3.86	479.81	4.48	479.8
4.57	479.8	5.18	479.79	5.29	479.79	5.88	479.78	6	479.78
6.58	479.77	6.71	479.77	7.29	479.76	7.42	479.76	7.99	479.75
8.13	479.75	8.69	479.74	8.85	479.74	9.4	479.74	9.56	479.73
10.1	479.73	10.27	479.72	10.81	479.72	10.98	479.72	11.51	479.71
11.69	479.71	12.21	479.7	12.4	479.7	12.92	479.69	13.11	479.69
13.63	479.68	13.82	479.68	14.33	479.67	40.57	479.29	41.43	479.28
42.58	479.27	43.68	479.25	44.59	479.25	45.65	479.23	46.66	479.22
47.62	479.21	48.59	479.2	49.52	479.19	50.42	479.18	51.42	479.17
52.27	479.16	53.09	479.15	54.13	479.14	54.91	479.13	55.66	479.12
56.73	479.12	57.44	479.11	58.13	479.1	59.23	479.1	59.88	479.09
60.51	479.08	61.63	479.08	62.22	479.07	62.79	479.07	63.94	479.06
64.48	479.06	65	479.05	66.17	479.05	66.66	479.04	67.13	479.04
67.58	479.03	68.76	479.03	69.18	479.03	69.59	479.02	70.78	479.02
71.16	479.02	71.53	479.02	72.74	479.02	73.08	479.01	73.34	479.02

73.63	479.02	73.95	479.01	74.31	479.01	75.19	479	75.49	478.99
75.85	478.99	76.75	478.98	77.02	478.98	77.39	478.97	78.31	478.96
78.55	478.96	78.93	478.96	79.87	478.94	80.09	478.94	80.47	478.94
81.43	478.93	81.62	478.92	82.01	478.92	82.99	478.91	83.16	478.91
83.55	478.9	84.55	478.89	84.69	478.89	85.1	478.89	86.1	478.87
86.22	478.87	86.64	478.87	87.66	478.86	87.76	478.85	88.18	478.85
89.22	478.84	89.29	478.84	89.72	478.83	90.78	478.82	90.83	478.82
91.26	478.81	92.34	478.8	92.36	478.8	92.78	478.8	92.81	478.8
93.21	478.79	94.16	478.73	95.2	478.67	95.27	478.86	95.39	479.17
96.18	479.18	96.22	479.18	96.29	479.18	98.59	479.22	98.76	479.22
99.05	479.23	101.01	479.26	101.31	479.27	101.81	479.27	103.43	479.3
103.85	479.31	104.57	479.32	105.85	479.34	106.39	479.35	107.33	479.36
108.27	479.38	108.94	479.39	110.08	479.41	110.69	479.42	111.48	479.43
112.84	479.45	113.11	479.46	114.03	479.47	116.28	477	118.53	476
120.79	475	123.04	474	125.3	473	127.55	472	128.42	471.6
128.79	471.45	145.24	471.45	220.26	472.98	220.36	472.98	220.44	472.98
220.52	472.99	220.59	472.99	220.65	472.99	220.96	472.99	220.99	472.99
221.02	473	221.05	473	221.07	473	221.1	473	221.12	473
221.75	473.01	223.11	473.01	225.39	473.01	231.27	472.98	233.19	472.97
251.92	472.91	254.35	472.91	285.72	474.013	296.16	474.38	307.18	474.7
325.23	475.13	353.94	475.8	355.26	475.8	355.92	475.8	357.67	475.8
359.45	476.14	359.74	476.2	360.18	476.29	361.36	476.54	364.87	477.29
367.29	477.8	369.58	477.8	373	477.8	373.58	477.8	374.38	477.8
375.93	477.8	379.61	477.8	381.59	477.8	387.34	477.8	387.47	477.8
442.79	477.8	452.06	477.8	459.36	477.8	479.46	477.8	496.01	477.8
538.58	477.8	539.47	477.8	554.54	477.8	554.85	477.8	555.17	477.8
557.98	477.8	562.74	477.81	570.36	477.83	576.85	477.84	580.52	477.85
583.38	477.86	627.91	478.25	788.09	479.57	797.77	479.65	801.59	479.68
808.9	479.73	817.49	479.8	818.51	479.8	818.68	479.8	818.85	479.8
820.34	479.8	821.1	479.8	822.63	479.8	831	479.85	847.16	479.99
857.73	480.06	858.13	480.07						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	123.04	.06	285.72	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
123.04	285.72	54.66	74.68	154.4	.3	.5

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	476.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.060	0.060	0.060
W.S. Elev (ft)	476.52	Reach Len. (ft)	54.66	74.68	154.40
Crit W.S. (ft)		Flow Area (sq ft)	7.18	646.15	109.64
E.G. Slope (ft/ft)	0.001484	Area (sq ft)	7.18	646.15	109.64
Q Total (cfs)	1684.00	Flow (cfs)	7.53	1542.51	133.96
Top Width (ft)	243.93	Top Width (ft)	5.69	162.68	75.56
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)	1.05	2.39	1.22
Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)	1.26	3.97	1.45
Conv. Total (cfs)	43711.9	Conv. (cfs)	195.4	40039.2	3477.2
Length Wtd. (ft)	77.81	Wetted Per. (ft)	6.22	163.26	75.66
Min Ch El (ft)	471.45	Shear (lb/sq ft)	0.11	0.37	0.13
Alpha	1.10	Stream Power (lb/ft s)	0.11	0.88	0.16
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.14	3.46	0.29
C & E Loss (ft)	0.09	Cum SA (acres)	0.03	0.45	0.14

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	473.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.060	
W.S. Elev (ft)	473.65	Reach Len. (ft)	54.66	74.68	154.40
Crit W.S. (ft)		Flow Area (sq ft)		181.24	
E.G. Slope (ft/ft)	0.004466	Area (sq ft)		181.24	
Q Total (cfs)	337.00	Flow (cfs)		337.00	
Top Width (ft)	151.69	Top Width (ft)		151.69	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		1.19	

Conv. Total (cfs)	5042.9	Conv. (cfs)			5042.9
Length Wtd. (ft)	74.68	Wetted Per. (ft)			152.19
Min Ch El (ft)	471.45	Shear (lb/sq ft)			0.33
Alpha	1.00	Stream Power (lb/ft s)			0.62
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		0.02	1.26
0.01					
C & E Loss (ft)	0.01	Cum SA (acres)		0.03	0.44
0.01					

CROSS SECTION

RIVER: Tributary
REACH: Tributary RS: 5987.15

INPUT
Description:
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478	.99	478	1	471.52	10	471.52	87	471.52
87.01	478	88	478						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	10	.06	87	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
10	87	140.02	140.02 140.02	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	10		F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	476.32	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.38	Wt. n-Val.			0.060
0.001					
W.S. Elev (ft)	475.94	Reach Len. (ft)		140.02	140.02
140.02					
Crit W.S. (ft)	473.98	Flow Area (sq ft)			340.03
0.02					
E.G. Slope (ft/ft)	0.005520	Area (sq ft)		39.76	340.03
0.02					
Q Total (cfs)	1684.00	Flow (cfs)			1684.00
0.00					
Top Width (ft)	86.01	Top Width (ft)		9.01	77.00
Vel Total (ft/s)	4.95	Avg. Vel. (ft/s)			4.95
0.04					
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)			4.42
2.21					
Conv. Total (cfs)	22666.6	Conv. (cfs)			22666.6
0.0					
Length Wtd. (ft)	140.02	Wetted Per. (ft)			77.00
4.41					
Min Ch El (ft)	471.52	Shear (lb/sq ft)			1.52
Alpha	1.00	Stream Power (lb/ft s)			7.54
Frctn Loss (ft)		Cum Volume (acre-ft)		0.11	2.61
0.09					
C & E Loss (ft)		Cum SA (acres)		0.02	0.25
0.01					

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	473.33	Element		Left OB	Channel
Right OB					
Vel Head (ft)	0.10	Wt. n-Val.			0.060
0.000					
W.S. Elev (ft)	473.23	Reach Len. (ft)		140.02	140.02
140.02					
Crit W.S. (ft)	472.36	Flow Area (sq ft)			131.58
0.00					
E.G. Slope (ft/ft)	0.005235	Area (sq ft)		15.38	131.58
0.00					
Q Total (cfs)	337.00	Flow (cfs)			337.00
0.00					
Top Width (ft)	86.01	Top Width (ft)		9.00	77.00
Vel Total (ft/s)	2.56	Avg. Vel. (ft/s)			2.56
0.02					
Max Chl Dpth (ft)	1.71	Hydr. Depth (ft)			1.71
0.85					
Conv. Total (cfs)	4657.8	Conv. (cfs)			4657.8
0.0					
Length Wtd. (ft)	140.02	Wetted Per. (ft)			77.00
1.71					
Min Ch El (ft)	471.52	Shear (lb/sq ft)			0.56

```
  Alpha                       1.00    Stream Power (lb/ft s)                1.43

  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.01      0.99
    0.01
  C & E Loss (ft)                     Cum SA (acres)              0.02      0.25
    0.01



CULVERT


RIVER: Tributary
REACH: Tributary          RS: 5957.35

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =  138.02
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0     478       0     200     478       0

Upstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     478     .99     478       1  471.52      10  471.52      87  471.52
   87.01     478      88     478

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06      10     .06      87     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
           10      87             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
       0      10               F

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0     478       0     200     478       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0     478    1.46     478    1.47  471.25    4.79  471.25   81.79  471.25
   85.42  471.25   85.43     478   86.52     478

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .06    4.79     .06   81.79     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
          4.79   81.79             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0    4.79               F
   81.79   86.52               F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box     3.5      10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef
Exit Loss Coef
                  1  138.02     .014     .014        0                    .2
       1
Number of Barrels =  7
Upstream   Elevation =  471.52
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
      16      27      38      49      60      71      82
Downstream Elevation =  471.25
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
   10.29   21.29   32.29   43.29   54.29   65.29   76.29

CROSS SECTION


RIVER: Tributary
REACH: Tributary          RS: 5932.84

INPUT
```

Description:
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478	1.46	478	1.47	471.25	4.79	471.25	81.79	471.25
85.42	471.25	85.43	478	86.52	478				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.06	4.79	.06	81.79	.06

Bank Sta: Left Right Coeff Contr. Expan.
4.79 81.79 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	4.79		F
81.79	86.52		F

CROSS SECTION OUTPUT Profile #Q100

E.G. Elev (ft)	475.55	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.52	Wt. n-Val.		0.060
W.S. Elev (ft)	475.03	Reach Len. (ft)	186.69	186.69
186.69				
Crit W.S. (ft)		Flow Area (sq ft)		290.78
E.G. Slope (ft/ft)	0.009299	Area (sq ft)	12.55	290.78
13.72				
Q Total (cfs)	1684.00	Flow (cfs)		1684.00
Top Width (ft)	83.96	Top Width (ft)	3.33	77.00
3.64				
Vel Total (ft/s)	5.79	Avg. Vel. (ft/s)		5.79
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		3.78
Conv. Total (cfs)	17462.8	Conv. (cfs)		17462.8
Length Wtd. (ft)	186.69	Wetted Per. (ft)		77.00
Min Ch El (ft)	471.25	Shear (lb/sq ft)		2.19
Alpha	1.00	Stream Power (lb/ft s)		12.70
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	0.11	2.49
0.09				
C & E Loss (ft)	0.20	Cum SA (acres)		

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.

CROSS SECTION OUTPUT Profile #0.5 Q2

E.G. Elev (ft)	473.23	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.08	Wt. n-Val.		0.060
W.S. Elev (ft)	473.14	Reach Len. (ft)	186.69	186.69
186.69				
Crit W.S. (ft)		Flow Area (sq ft)		145.87
E.G. Slope (ft/ft)	0.003713	Area (sq ft)	6.29	145.87
6.88				
Q Total (cfs)	337.00	Flow (cfs)		337.00
Top Width (ft)	83.96	Top Width (ft)	3.32	77.00
3.63				
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.89
Conv. Total (cfs)	5530.8	Conv. (cfs)		5530.8
Length Wtd. (ft)	186.69	Wetted Per. (ft)		77.00
Min Ch El (ft)	471.25	Shear (lb/sq ft)		0.44
Alpha	1.00	Stream Power (lb/ft s)		1.01
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.01	0.93
0.01				
C & E Loss (ft)	0.02	Cum SA (acres)		

SUMMARY OF MANNING'S N VALUES

River:Otay Mesa

Reach	River Sta.	n1	n2	n3

Main Reach	7063.61	.06	.06	.06
Main Reach	6863.01	.06	.06	.06
Main Reach	6660.16	.06	.06	.06
Main Reach	6459.63	.06	.06	.06
Main Reach	6350.00	.06	.06	.06
Main Reach	6305.78	.06	.06	.06
Main Reach	6255.99	Culvert		
Main Reach	6190.78	.06	.06	.06
Lower	5671.065	.06	.06	.06
Lower	5521.065	.06	.06	.06
Lower	5327.565	.06	.06	.06
Lower	5198.392	.06	.06	.06
Lower	4852.983	.06	.06	.06
Lower	4519.806	.06	.06	.06
Lower	4222.345	.06	.06	.06
Lower	3830.658	.06	.06	.06
Lower	3634.315	.06	.06	.06
Lower	3496.063	.06	.06	.06
Lower	3319.173	.06	.06	.06
Lower	3150.273	.06	.06	.06
Lower	3130.904	Culvert		
Lower	3111.536	.06	.06	.06
Lower	2928.886	.06	.06	.06
Lower	2691.943	.06	.06	.06
Lower	2521.617	.06	.06	.06
Lower	2300.996	.06	.06	.06

River:Tributary

Reach	River Sta.	n1	n2	n3	n4	n5
Tributary	7595.58	.06	.06	.06	.06	.06
Tributary	7383.07	.06	.06	.06	.06	.06
Tributary	7155.16	.06	.06	.06	.06	.06
Tributary	6955.21	.06	.06	.06		
Tributary	6757.03	.06	.06	.06		
Tributary	6547.49	.06	.06	.06		
Tributary	6330.88	.06	.06	.06		
Tributary	6057.21	.06	.06	.06		
Tributary	5987.15	.06	.06	.06		
Tributary	5957.35	Culvert				
Tributary	5932.84	.06	.06	.06		

SUMMARY OF REACH LENGTHS

River: Otay Mesa

Reach	River Sta.	Left	Channel	Right
Main Reach	7063.61	200.08	200.6	200.03
Main Reach	6863.01	200.06	201.01	200.21
Main Reach	6660.16	200.07	200.11	200.11
Main Reach	6459.63	200.14	200.02	200
Main Reach	6350.00	139.13	109.24	84.86
Main Reach	6305.78	312.25	312.25	312.25
Main Reach	6255.99	Culvert		
Main Reach	6190.78			
Lower	5671.065	198.93	160	158.83
Lower	5521.065	236.18	240	208.29
Lower	5327.565	303.71	329.46	297.63
Lower	5198.392	335.79	345.41	375.66
Lower	4852.983	299.71	333.18	343.44
Lower	4519.806	286.25	297.46	249.21
Lower	4222.345	437.78	391.69	378.47
Lower	3830.658	145.2	166.69	183.22
Lower	3634.315	171.63	167.9	148.3
Lower	3496.063	190.15	176.89	109.02
Lower	3319.173	121.22	168.9	192.71
Lower	3150.273	176.92	95.56	26.1
Lower	3130.904	Culvert		
Lower	3111.536	119.12	125.83	110.91
Lower	2928.886	246.89	236.94	267.61
Lower	2691.943	187.5	170.33	150.06
Lower	2521.617	242.44	220.62	197.71
Lower	2300.996			

River: Tributary

Reach	River Sta.	Left	Channel	Right

Tributary	7595.58	215.16	212.51	200.02
Tributary	7383.07	227.55	227.91	231.99
Tributary	7155.16	199.56	199.95	209.72
Tributary	6955.21	187.73	198.18	95.07
Tributary	6757.03	314.48	209.54	85.08
Tributary	6547.49	221.15	216.61	70.47
Tributary	6330.88	285.17	268.17	173.67
Tributary	6057.21	54.66	74.68	154.4
Tributary	5987.15	140.02	140.02	140.02
Tributary	5957.35	Culvert		
Tributary	5932.84			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Otay Mesa

Reach	River Sta.	Contr.	Expan.
Main Reach	7063.61	.1	.3
Main Reach	6863.01	.1	.3
Main Reach	6660.16	.1	.3
Main Reach	6459.63	.1	.3
Main Reach	6350.00	.3	.5
Main Reach	6305.78	.3	.5
Main Reach	6255.99	Culvert	
Main Reach	6190.78	.3	.5
Lower	5671.065	.1	.3
Lower	5521.065	.1	.3
Lower	5327.565	.1	.3
Lower	5198.392	.1	.3
Lower	4852.983	.1	.3
Lower	4519.806	.1	.3
Lower	4222.345	.1	.3
Lower	3830.658	.1	.3
Lower	3634.315	.1	.3
Lower	3496.063	.1	.3
Lower	3319.173	.1	.3
Lower	3150.273	.3	.5
Lower	3130.904	Culvert	
Lower	3111.536	.3	.5
Lower	2928.886	.1	.3
Lower	2691.943	.1	.3
Lower	2521.617	.1	.3
Lower	2300.996	.1	.3

River: Tributary

Reach	River Sta.	Contr.	Expan.
Tributary	7595.58	.1	.3
Tributary	7383.07	.1	.3
Tributary	7155.16	.1	.3
Tributary	6955.21	.1	.3
Tributary	6757.03	.1	.3
Tributary	6547.49	.1	.3
Tributary	6330.88	.1	.3
Tributary	6057.21	.3	.5
Tributary	5987.15	.3	.5
Tributary	5957.35	Culvert	
Tributary	5932.84	.3	.5

HEC-RAS Exisiting and Proposed Condition Results Summary

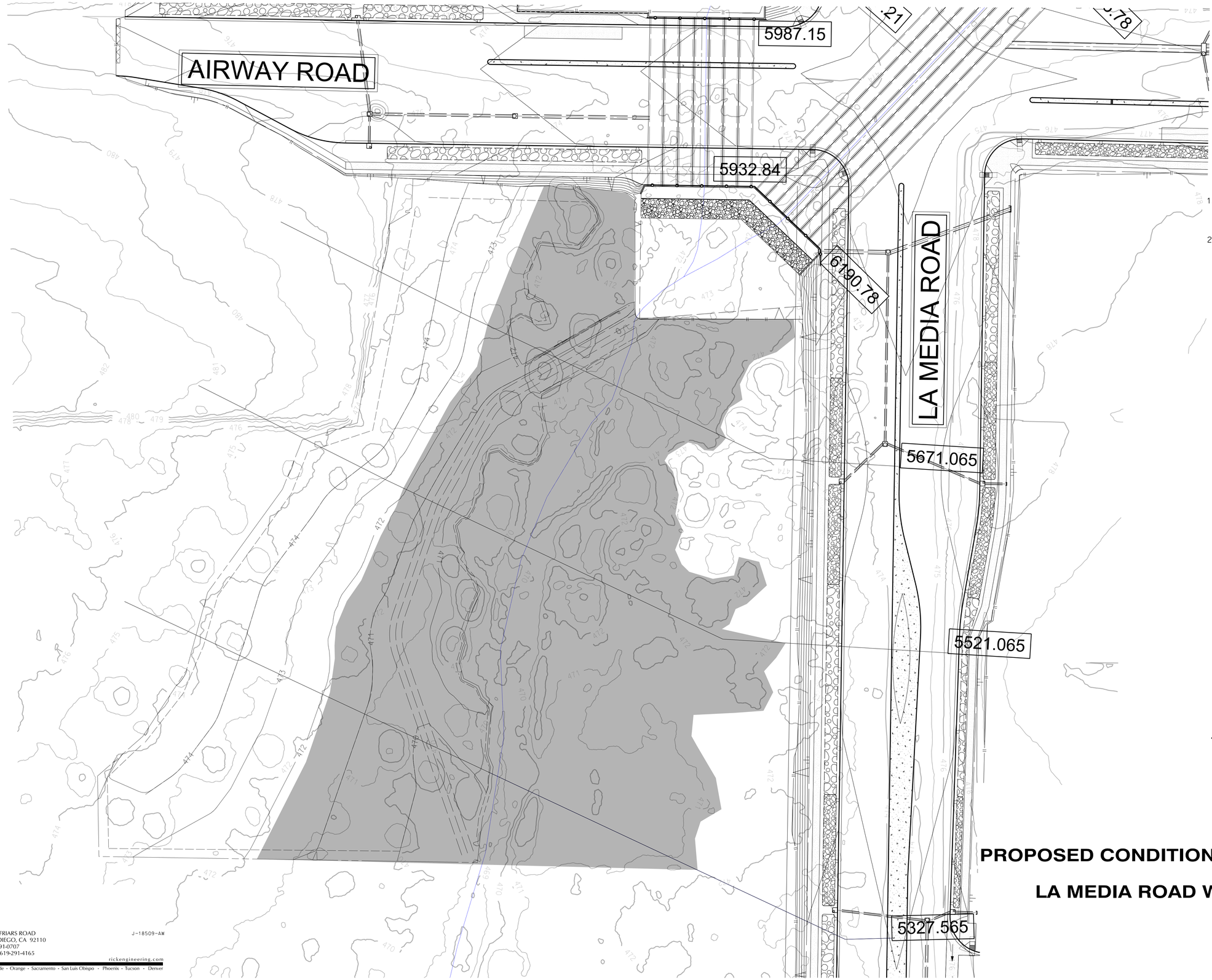
Existing Condition (EX)					Project Drainage Study Proposed Condition (LMR PR)				Project Proposed Condition (PR)				PR - EX WSEL [5] - [1]	PR - EX Velocity [6] - [2]
River - Reach	Cross Section	Flow Rate (cfs)	W.S. Elevation (ft)	Channel Velocity (ft/s)	Cross Section	Flow Rate (cfs)	W.S. Elevation (ft)	Channel Velocity (ft/s)	Cross Section	Flow Rate (cfs)	W.S. Elevation (ft)	Channel Velocity (ft/s)		
			[1]	[2]			[3]	[4]			[5]	[6]		
Main Reach	6190.78	664.70	476.16	1.27	6190.78	871.00	475.14	3.32	6190.8	871.0	475.19	3.29	-1.0	2.0
Otay Mesa - Lower	5671.07	2620.00	474.52	2.76	5327.57	2610.00	474.51	2.84	5327.57	2610.00	474.36	2.86	-0.2	0.1
Otay Mesa - Lower	5521.07	2620.00	474.13	2.58	5521.07	2610.00	474.15	2.30	5521.07	2610.00	474.06	2.14	-0.1	-0.4
Otay Mesa - Lower	5327.57	2620.00	473.59	3.50	5671.07	2610.00	473.60	3.11	5671.07	2610.00	473.56	2.83	0.0	-0.7
Lower	5198.39	2620.00	472.47	3.76	5198.39	2610.00	472.50	3.78	5198.39	2610.00	472.47	3.78	0.0	0.0

Note:

There is a minimal increase in velocity across cross-sections 6190.78 and 5671.07. However, the velocity in the proposed condition is less than 5 fps. Hence, there are considered non-erosive

MAP POCKET 1

Proposed Condition – Hydraulic Workmap



LEGEND:

- EXISTING CHANNEL
- PROPOSED LOW-FLOW CHANNEL
- POST-PROJECT INUNDATION LIMITS FOR 50% OF 2-YEAR STORM EVENT

NOTES:

1. REFER TO THE HYDROLOGIC ANALYSES TABLE IN ATTACHMENT 2 FOR THE WETLAND MITIGATION
2. POST-PROJECT INUNDATION AREA DELINEATED PER 50% OF 2-YEAR STORM EVENT

40 20 0 40 80 120

GRAPHIC SCALE 1" = 40'

PROPOSED CONDITION HEC-RAS WORKMAP FOR LA MEDIA ROAD WETLAND MITIGATION

Date: April 23, 2021

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside · Orange · Sacramento · San Luis Obispo · Phoenix · Tucson · Denver

J-18509-AW

\\cp.rickeng.com\projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\18509A_WM_dm01.dgn
\\cp.rickeng.com\projects\C_SD_R\18509-A-LaMediaMitigation\WaterResources\SD CorpStds 2005.dscrlpt
23-APR-2021 11:31

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

NOT FOR CONSTRUCTION - EXHIBIT FOR HYDRAULIC LETTER REPORT ONLY

APPENDIX N

SAMPLE ARCHAEOLOGY INVOICE

(FOR ARCHAEOLOGY ONLY)
Company Name
Address, telephone, fax

Date: Insert Date

To: Name of Resident Engineer
City of San Diego
Construction Management and
Field Services Division
9573 Chesapeake Drive
San Diego, CA 92123-1304

Project Name: Insert Project Name

SAP Number (WBS/IO/CC): Insert SAP Number

Drawing Number: Insert Drawing Number

Invoice period: Insert Date to Insert Date

Work Completed: Bid item Number – Description of Bid Item – Quantity – Unit Price– Amount

Detailed summary of work completed under this bid item: Insert detailed description of Work related to Archaeology Monitoring Bid item. See Note 1 below.

Summary of charges:

Description of Services	Name	Start Date	End Date	Total Hours	Hourly Rate	Amount
Field Archaeologist	Joe Smith	8/29/2011	9/2/2011	40	$84	$3,360
Laboratory Assistant	Jane Doe	8/29/2011	9/2/2011	2	$30	$60
Subtotal						$3,420

Work Completed: Bid item Number – Description of Bid Item – Quantity – Unit Price– Amount

Detailed summary of work completed under this bid item: Insert detailed description of Work related to Archaeology Curation/Discovery Bid item. See Note 2 below.

Summary of charges:

Description of Services	Where work occurred (onsite vs offsite/lab)	Name	Start Date	End Date	Total Hours	Hourly Rate	Amount
Field Archaeologist		Joe Smith	8/29/2011	9/2/2011	40	$84	$3,360
Laboratory Assistant		Jane Doe	8/29/2011	9/2/2011	2	$30	$60
Subtotal							$3,420

Total this invoice: $_____

Total invoiced to date: $_____

Note 1:

For monitoring related bid items or work please include summary of construction work that was monitored from Station to Station, Native American monitors present, MMC coordination, status and nature of monitoring and if any discoveries were made.

Note 2:

For curation/discovery related bid items or work completed as part of a discovery and curation process, the PI must provide a response to the following questions along with the invoice:

1. Preliminary results of testing including tentative recommendations regarding eligibility for listing in the California Register of Historical Resources (California Register).
    a. Please briefly describe your application (consideration) of all four California Register criteria.
    b. If the resource is eligible under Criterion D, please define the important information that may be present.
    c. Were specialized studies performed? How many personnel were required? How many Native American monitors were present?
    d. What is the age of the resource?
    e. Please define types of artifacts to be collected and curated, including quantity of boxes to be submitted to the San Diego Archaeological Center (SDAC). How many personnel were required? How many Native American monitors were present?
2. Preliminary results of data recovery and a definition of the size of the representative sample.
    a. Were specialized studies performed? Please define types of artifacts to be collected and curated, including quantity of boxes to be submitted to the SDAC. How many personnel were required? How many Native American monitors were present?
3. What resources were discovered during monitoring?
4. What is the landform context and what is the integrity of the resources?
5. What additional studies are necessary?
6. Based on application of the California Register criteria, what is the significance of the resources?
    a. If the resource is eligible for the California Register, can the resource be avoided by construction?
    b. If not, what treatment (mitigation) measures are proposed? Please define data to be recovered (if necessary) and what material will be submitted to the SDAC for curation. Are any specialized studies proposed?

(After the first invoice, not all the above information needs to be re-stated, just revise as applicable).

APPENDIX O

SAMPLE OF PUBLIC NOTICE

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.
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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 P

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 2021 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

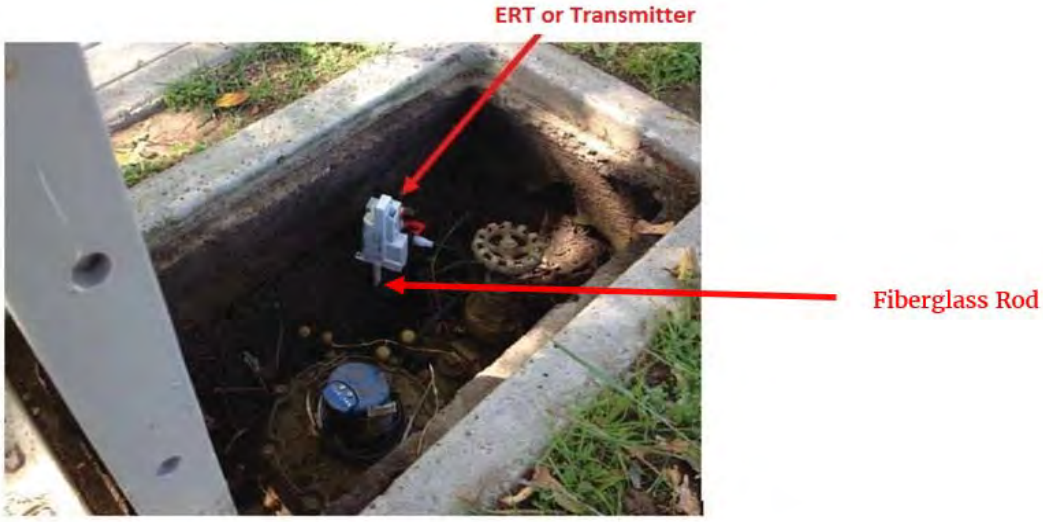


Photo 6 below is an example of disturbance that shall be avoided:

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.

APPENDIX Q

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING

VERNAL POOL MITIGATION NOTES

1. THE PROJECT "VERNAL POOL MITIGATION PLAN FOR THE LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT", PREPARED BY RECON ENVIRONMENTAL, INC, DATED FEBRUARY 25, 2021, IS MADE A PART OF THESE PLANS AND SPECIFICATIONS BY REFERENCE HEREIN.

2. ALL CONTRACTORS PARTICIPATING IN THE VERNAL POOL MITIGATION SHALL MEET AT THE SITE WITH THE PROJECT VERNAL POOL RESTORATION SPECIALIST TO REVIEW PLANS, SITE INFORMATION, AND CONTRACTOR RESPONSIBILITIES A MINIMUM OF 48 HOURS PRIOR TO THE BEGINNING OF WORK IN THE AREA. SPECIFICALLY, THE PROJECT VERNAL POOL RESTORATION SPECIALIST SHALL REVIEW REQUIREMENTS OF THE PLAN THAT CONCERN THE CONTRACTOR, INCLUDING SITE GRADING, SITE PROTECTION, INSPECTIONS, AND LANDSCAPE PROCEDURES. THE PROJECT VERNAL POOL RESTORATION SPECIALIST SHALL HAVE FINAL SUPERVISORY CONTROL OVER FIELD INSTALLATION AND SHALL HAVE THE AUTHORITY TO MAKE CHANGES IN THE FIELD AS DEEMED NECESSARY.

3. THE PROJECT VERNAL POOL RESTORATION SPECIALIST SHALL OVERSEE OTHER SPECIALISTS AND CONTRACTORS INVOLVED IN THE IMPLEMENTATION OF THE VERNAL POOL MITIGATION PLAN.

4. THE PROJECT VERNAL POOL RESTORATION SPECIALIST SHALL SUPERVISE THE PLACEMENT OF CONSTRUCTION FENCING ALONG THE LIMITS OF DISTURBANCE.

5. NO ACTIVITIES SHALL BE CONDUCTED UNLESS APPROVED BY THE RESOURCE AGENCIES AND THE CITY. THE PROJECT VERNAL POOL RESTORATION SPECIALIST SHALL OBTAIN ALL RESOURCE AGENCY PERMITS AND PROVIDE THEM TO THE CONTRACTOR. THE CONTRACTOR SHALL KEEP A COPY OF ALL PERMITS ON THE JOB SITE.

6. BEST MANAGEMENT PRACTICES IN CONFORMANCE WITH THE PROJECT STORM WATER POLLUTION PREVENTION PLAN (SWPPP) SHALL BE IMPLEMENTED BY THE CONTRACTOR AND MAINTAINED, INSPECTED, AND REPAIRED DURING THE LIFE OF THE PROJECT INSTALLATION AND POST-RESTORATION MONITORING PERIOD AS DIRECTED BY THE PROJECT RESTORATION SPECIALIST.

7. GRADING SHALL OCCUR WITH APPROPRIATE EQUIPMENT DESIGNED FOR MICRO-TOPOGRAPHICAL MANIPULATION AND SHOULD AVOID OVER-COMPACTING THE SITE TO THE MAXIMUM EXTENT PRACTICABLE.

8. PROTECTION OF SELECT NATIVE PLANTS SHALL OCCUR AT THE DISCRETION OF THE PROJECT RESTORATION SPECIALIST. IF THIS IS NOT FEASIBLE, SENSITIVE PLANTS SHALL BE SALVAGED AND REPLANTED IN THE RESTORATION AREA PER THE DIRECTION OF THE PROJECT RESTORATION SPECIALIST.

9. EQUIPMENT STAGING, REFUELING AREAS, AND DISPOSAL AREAS SHALL BE LOCATED OUTSIDE OF ANY VERNAL POOL WATERSHEDS. IN DESIGNATED AREAS APPROVED BY THE VERNAL POOL RESTORATION SPECIALIST.

10. VERNAL POOL GRADING SHALL OCCUR WHEN WEATHER AND SOIL CONDITIONS ARE DRY ENOUGH TO CONDUCT THE VERNAL POOL RESTORATION WITHOUT CAUSING DAMAGE TO THE SURROUNDING HABITAT.

11. THE BOUNDARIES OF VERNAL POOLS SHALL BE MARKED IN THE FIELD AND INSPECTED BY THE VERNAL POOL RESTORATION SPECIALIST SO THAT GRADING EQUIPMENT OPERATORS CAN IDENTIFY DISTINCT POOL BOUNDARIES.

12. EXISTING VERNAL POOL BASINS (E1, E2, E3, E18, E19, E20, E22, AND E23) SHALL HAVE THE TOP 2" TOPSOIL SCRAPED PRIOR TO RECONTOURING. AFTER VERNAL POOL GRADING/RECONTOURING, THE TOPSOIL SHALL BE REPLACED IN THE BASIN BOTTOM FOR ESTABLISHMENT OF VERNAL POOL FLORA/FAUNA. (SEE CROSS SECTION ON SHEET NO. 2)

13. THE USE OF VERNAL POOL SOIL FROM AN OFF-SITE SOURCE MUST BE APPROVED BY THE WILDLIFE AGENCIES AND THE CITY.

14. AFTER GRADING, COBBLE GENERATED BY GRADING ACTIVITIES WILL BE PLACED WITHIN THE VERNAL POOL BASINS TO PROVIDE TOPOGRAPHIC COMPLEXITY TO THE BASIN BOTTOMS PER THE DIRECTION OF THE PROJECT VERNAL POOL RESTORATION SPECIALIST.

15. THE VERNAL POOL RESTORATION SPECIALIST (OR LAND SURVEYOR) SHALL CHECK POOL DEPTHS AND MOUND HEIGHTS USING A LASER LEVEL (OR OTHER ACCEPTABLE SURVEY EQUIPMENT) IN THE FIELD IN EACH ACTIVE VERNAL POOL GRADING QUADRANT. THE CONTRACTOR MAY NOT PROCEED TO THE NEXT VERNAL POOL GRADING QUADRANT UNTIL THE PROJECT RESTORATION ECOLOGIST CONFIRMS IN WRITING THAT THE VERNAL POOL PONDING AREAS AND DEPTHS ARE APPROPRIATE.

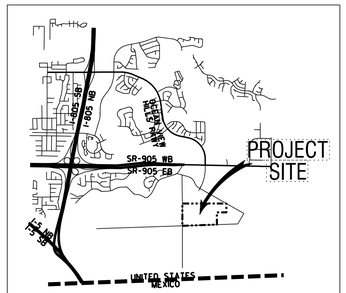
16. THE CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY OF THE FINISHED VERNAL POOL MITIGATION SITE. THE SURVEY SHALL BE ACCURATE TO 0.2'.

GRADING PLANS FOR:

VERNAL POOL MITIGATION FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATION PHASE II PROJECT

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE STANDARD SPECIFICATIONS AND THE STANDARD DRAWINGS OF THE CITY OF SAN DIEGO.



VICINITY MAP

NO SCALE

REFERENCE:

MAP NO. 1264

SHEET INDEX

ABBREVIATIONS

EX. EXIST	EXISTING
FG	FINISH GRADE
HP	HIGH POINT
LP	LOW POINT
VP	VERNAL POOL
VPHCP	CITY OF SAN DIEGO VERNAL POOL HABITAT CONSERVATION PROGRAM

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

CARSON P. EDGINGTON DATE

C-1

VERNAL POOL MITIGATION PLANS FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT

COVER SHEET

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING

RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

CONSTRUCTION CHANGE / ADDENDUM

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.

WARNING

0 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

The City of SAN DIEGO Engineering and Capital Projects

AS-BUILT INFORMATION

MATERIALS	MANUFACTURER
PIPE (STORM DRAIN)	-
STORM DRAIN CLEAN OUTS	-
CURB INLETS	-
STORM DRAIN MANHOLES	-
DISSIPATOR	-
CATCH BASINS	-
	-

SPEC. NO.

REGISTERED PROFESSIONAL ENGINEER — CARSON P. EDGINGTON — NO. 76519 — STATE OF CALIFORNIA

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 1 OF 6 SHEETS

APPROVED:
FOR CITY ENGINEER — DATE
ELHAM LOTFI
PRINT DCE NAME — RCE#

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

STORM DRAIN WBS

SUBMITTED BY: XXXXXXX PROJECT MANAGER

CHECKED BY: XXXXXXX PROJECT ENGINEER

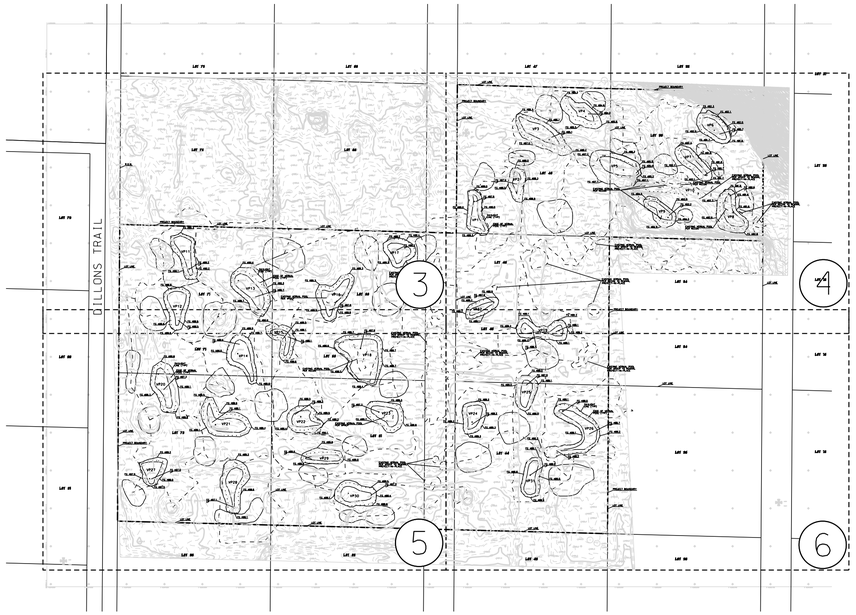
SEE SHEETS CCS27 COORDINATE

SEE SHEETS CCS83 COORDINATE

XXXXX-01 -D

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING

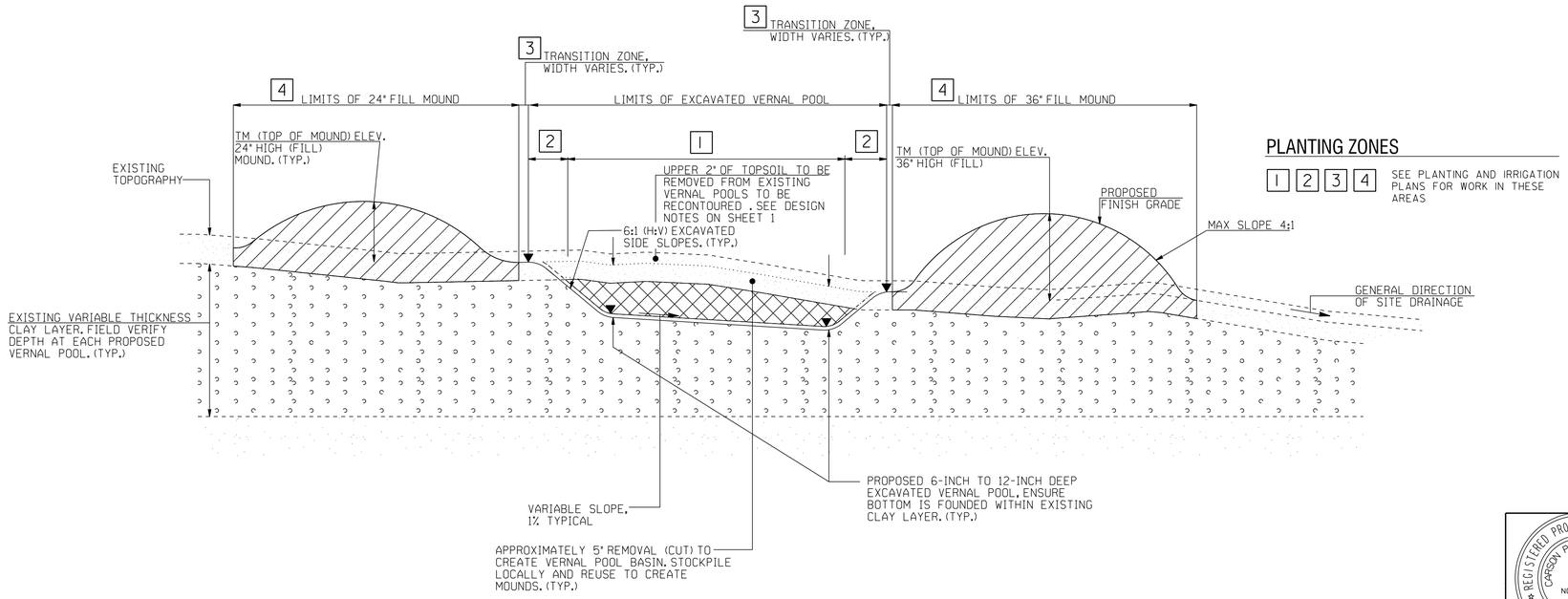


KEY MAP
NOT TO SCALE

LEGEND

4 GRADING SHEET NO.

PROJECT BOUNDARY



▼ FINISH GRADE ELEVATIONS PER PLAN

TYPICAL VERNAL POOL LAYOUT DETAIL
NOT TO SCALE

PLANTING ZONES

1 2 3 4 SEE PLANTING AND IRRIGATION PLANS FOR WORK IN THESE AREAS

C-2

VERNAL POOL MITIGATION PLANS FOR
LA MEDIA ROAD WIDENING & FIRE
RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44–46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 2 OF 7 SHEETS

STORM DRAIN WBS

APPROVED: FOR CITY ENGINEER ELHAM LOTFI PRINT DCE NAME — DATE — RCE#

SUBMITTED BY: XXXXXXX PROJECT MANAGER

CHECKED BY: XXXXXXXXXX PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

206-1719 CCS27 COORDINATE

1846-6276 CCS83 COORDINATE

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

XXXXX– –D

REGISTERED PROFESSIONAL ENGINEER
CARSON P. EDGINGTON
NO. 76519
STATE OF CALIFORNIA

RICK ENGINEERING COMPANY
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619-291-0707
(FAX) 619-291-4165
rickengineering.com
San Diego Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver

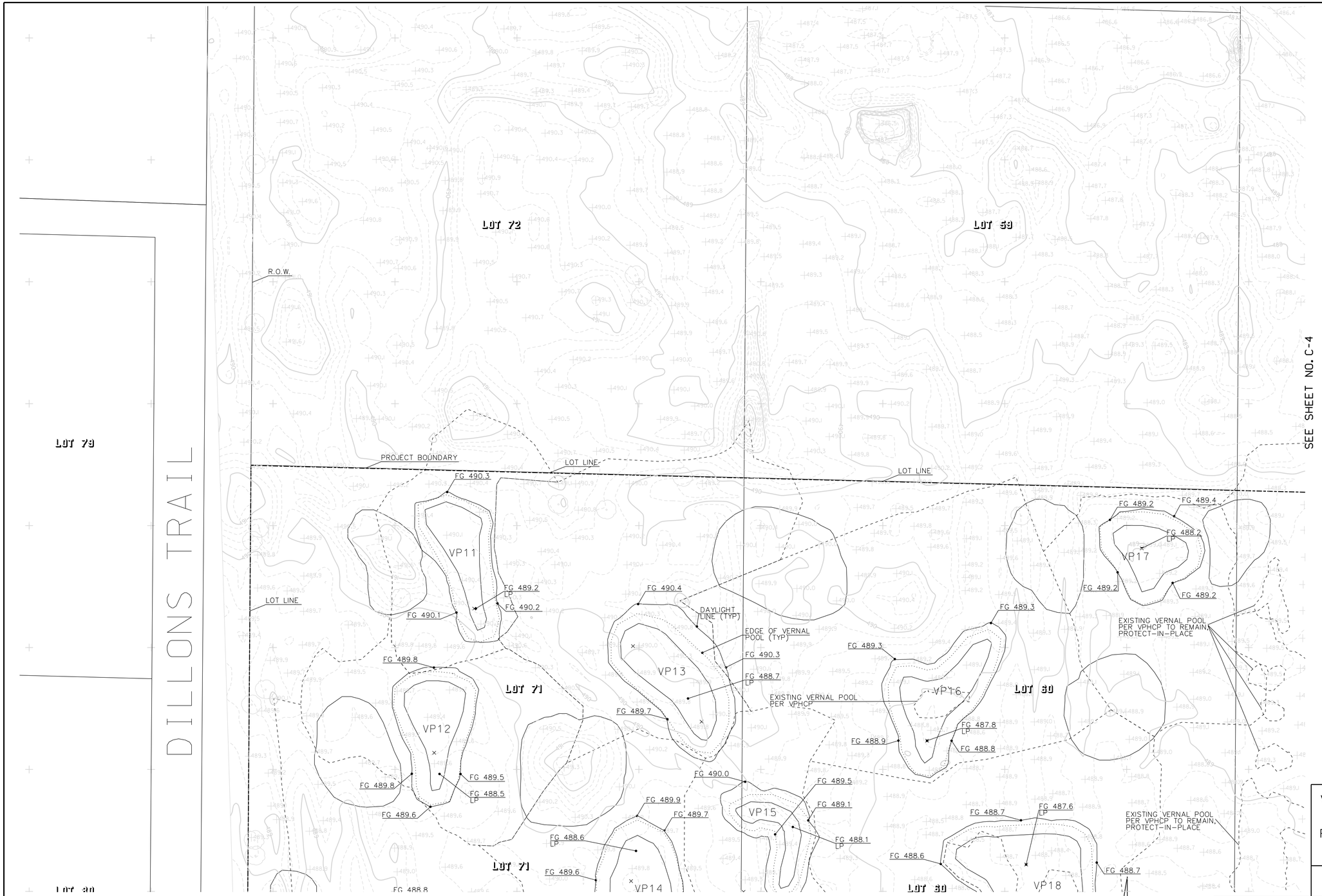
\\cp.rickeng.com\projects\C_SD_R\18509-A-LaMediaMitigation\Civil\Sheets\18509_Hab_Res02.dgn

04-AUG-2021 10:33 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING



LEGEND

- HYDROLOGY SUB-BASIN BOUNDARY
- VP# — PROPOSED OR ENHANCED VERNAL POOL
- PROPOSED MIMA MOUND
- MAXIMUM POTENTIAL EXTENT OF VERNAL POOL PONDING
- EXISTING VERNAL POOL
- LIMITS OF HABITAT RESTORATION SITE
- VP# — VERNAL POOL NUMBERING

N

0 20 40 60

SCALE 1" = 20'

C-3

VERNAL POOL MITIGATION PLANS FOR
LA MEDIA ROAD WIDENING & FIRE
RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44-46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 3 OF 7 SHEETS

STORM DRAIN WBS

APPROVED:
FOR CITY ENGINEER — DATE
ELHAM LOTFI
PRINT DCE NAME — RCE#

SUBMITTED BY: XXXXXXX PROJECT MANAGER
CHECKED BY: XXXXXXXXXX PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

206-1719 CCS27 COORDINATE
1846-6276 CCS83 COORDINATE

CONTRACTOR
INSPECTOR
DATE STARTED
DATE COMPLETED
XXXXX– –D

REGISTERED PROFESSIONAL ENGINEER
CARSON P. EDDINGTON
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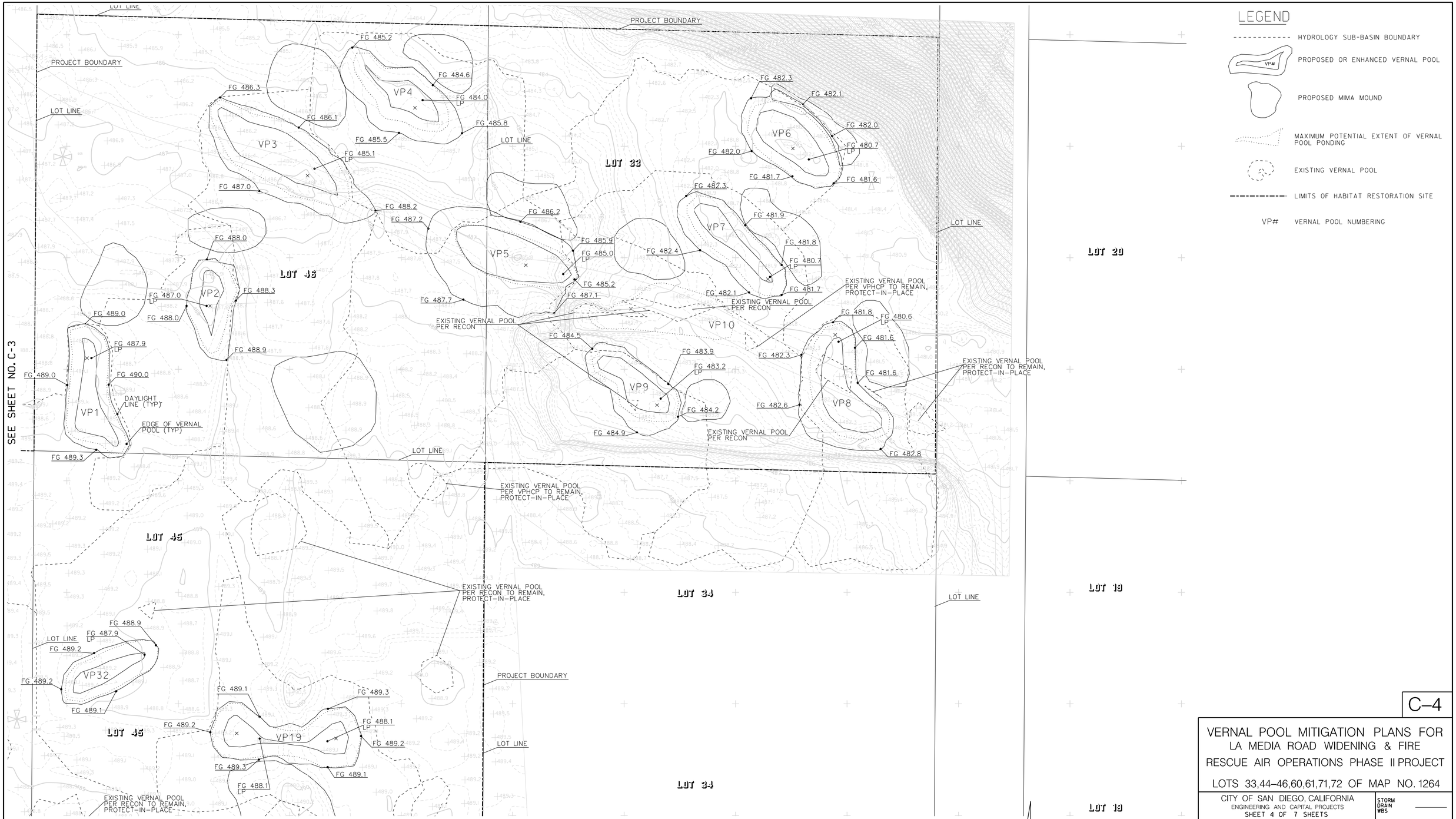
04-AUG-2021 10:34 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING



LEGEND

- HYDROLOGY SUB-BASIN BOUNDARY
- VP# — PROPOSED OR ENHANCED VERNAL POOL
- PROPOSED MIMA MOUND
- MAXIMUM POTENTIAL EXTENT OF VERNAL POOL PONDING
- EXISTING VERNAL POOL
- LIMITS OF HABITAT RESTORATION SITE
- VP# — VERNAL POOL NUMBERING

0 20 40 60

SCALE 1"=20'

C–4

VERNAL POOL MITIGATION PLANS FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44–46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 4 OF 7 SHEETS

STORM DRAIN WBS

APPROVED:
FOR CITY ENGINEER — DATE
ELHAM LOTFI
PRINT DCE NAME — RCE#

SUBMITTED BY: XXXXXXX PROJECT MANAGER

CHECKED BY: XXXXXXXXX PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

206-1719 CCS27 COORDINATE

1846-6276 CCS83 COORDINATE

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

XXXXX– –D

REGISTERED PROFESSIONAL ENGINEER — CARSON P. EDGINGTON — NO.76519 — STATE OF CALIFORNIA

RICK ENGINEERING COMPANY
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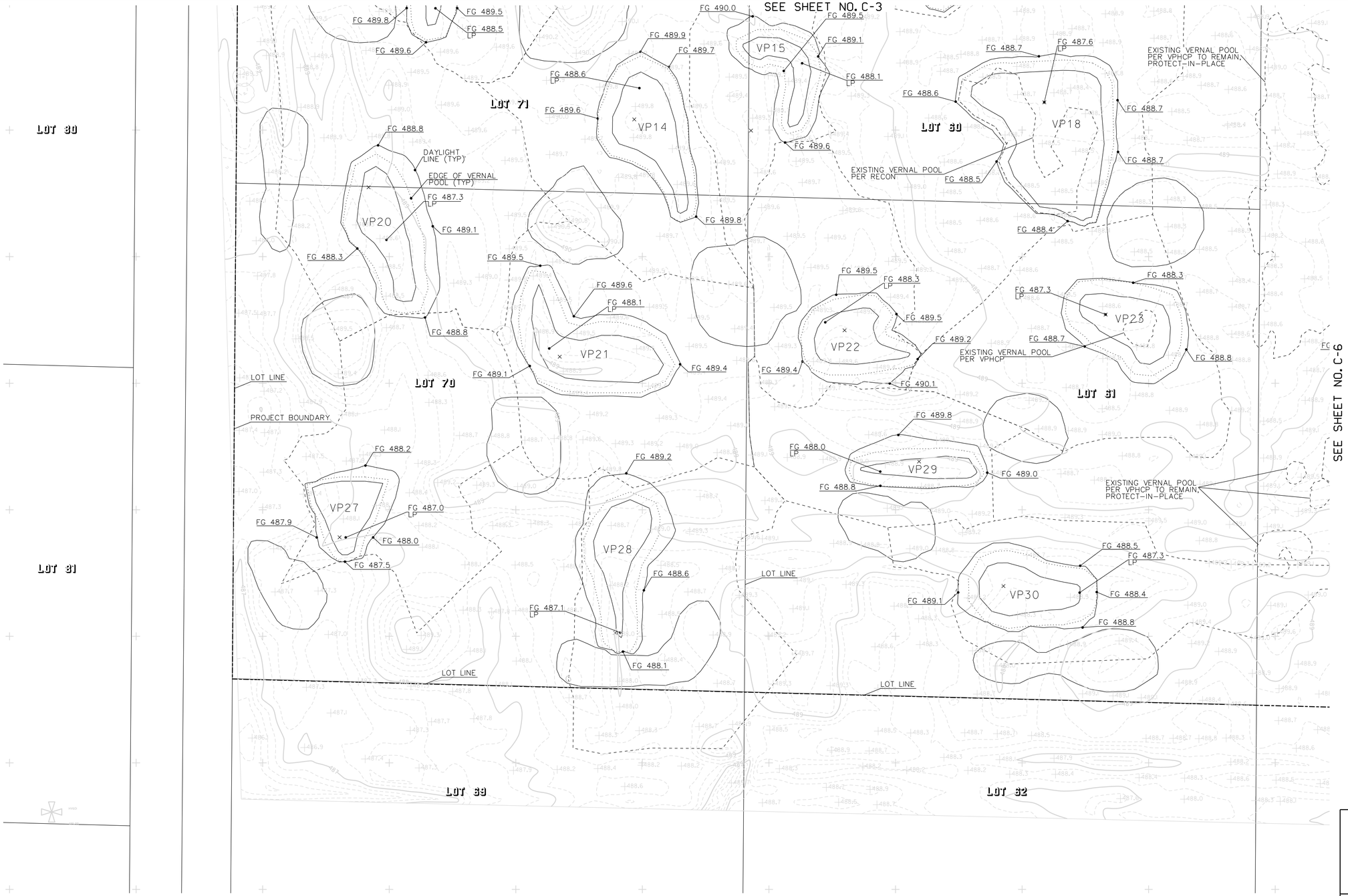
04–AUG–2021 10:34 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING



LEGEND

- HYDROLOGY SUB-BASIN BOUNDARY
- VP# — PROPOSED OR ENHANCED VERNAL POOL
- PROPOSED MIMA MOUND
- MAXIMUM POTENTIAL EXTENT OF VERNAL POOL PONDING
- EXISTING VERNAL POOL
- LIMITS OF HABITAT RESTORATION SITE
- VP# VERNAL POOL NUMBERING

N

0 20 40 60

SCALE 1" = 20'

C–5

VERNAL POOL MITIGATION PLANS FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44–46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 5 OF 7 SHEETS

STORM DRAIN WBS

APPROVED: FOR CITY ENGINEER _____ DATE _____
ELHAM LOTFI
PRINT DCE NAME RCE#

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

CONTRACTOR _____ DATE STARTED _____
INSPECTOR _____ DATE COMPLETED _____

REGISTERED PROFESSIONAL ENGINEER — CARSON P. EDGINGTON — NO. 76519 — STATE OF CALIFORNIA

SUBMITTED BY: XXXXXXX PROJECT MANAGER
CHECKED BY: XXXXXXXXXX PROJECT ENGINEER
206-1719 CCS27 COORDINATE
1846-6276 CCS83 COORDINATE
XXXXX– –D

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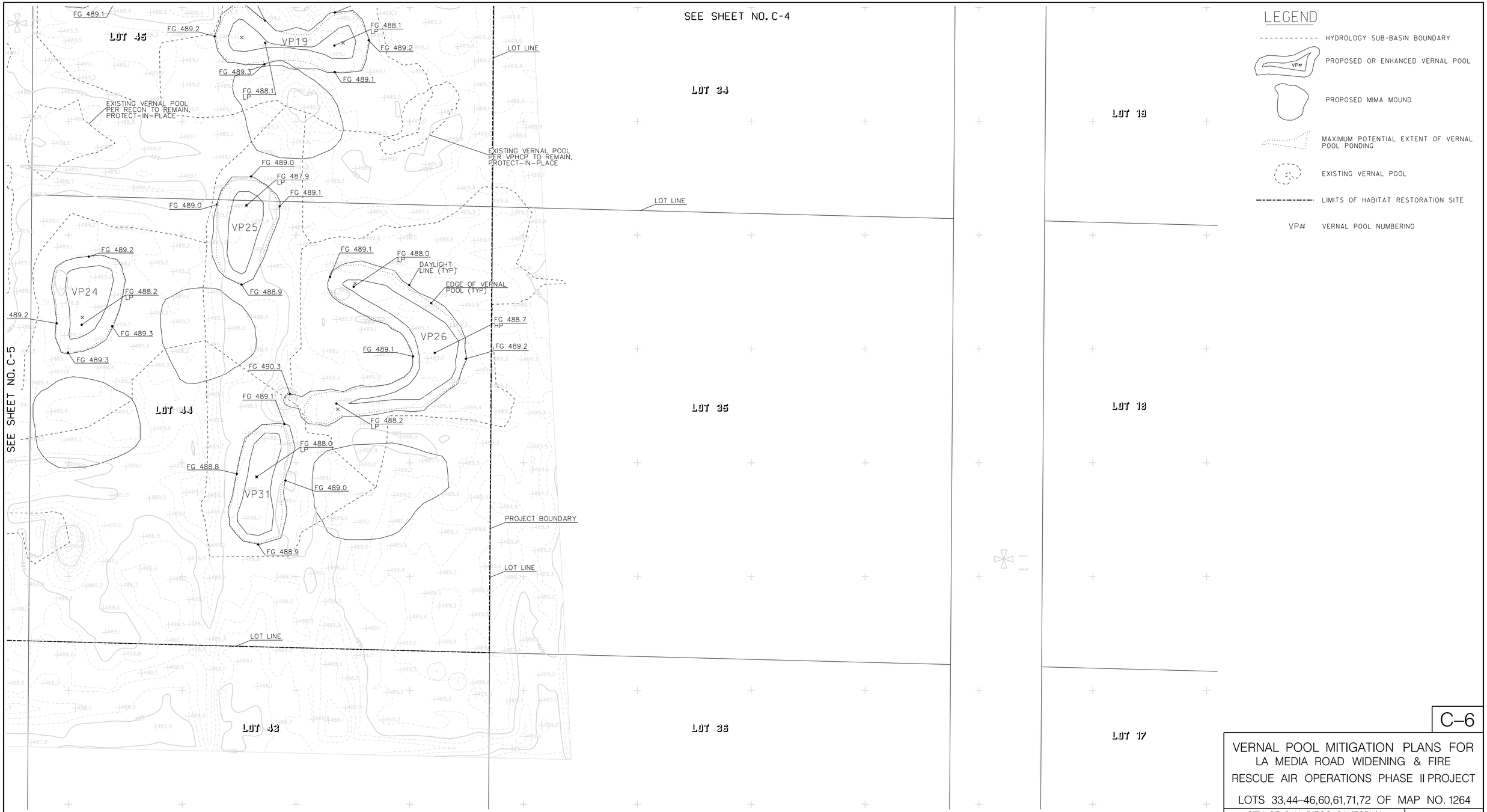
04–AUG–2021 10:35 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEPSB1L 5004(212)

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING



LEGEND

- HYDROLOGY SUB-BASIN BOUNDARY
- VP# — PROPOSED OR ENHANCED VERNAL POOL
- PROPOSED MIMA MOUND
- MAXIMUM POTENTIAL EXTENT OF VERNAL POOL PONDING
- EXISTING VERNAL POOL
- LIMITS OF HABITAT RESTORATION SITE
- VP# VERNAL POOL NUMBERING

N

0 20 40 60

SCALE 1" = 20'

C-6

VERNAL POOL MITIGATION PLANS FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44–46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 6 OF 7 SHEETS

STORM DRAIN WBS

REGISTERED PROFESSIONAL ENGINEER — CARSON P. EDDINGTON — NO. 76519 — STATE OF CALIFORNIA

APPROVED:
FOR CITY ENGINEER — DATE
ELHAM LOTFI
PRINT DCE NAME — RCE#

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

SUBMITTED BY: XXXXXXX — PROJECT MANAGER
CHECKED BY: XXXXXXXXXX — PROJECT ENGINEER
206-1719 — CCS27 COORDINATE
1846-6276 — CCS83 COORDINATE
XXXXX– –D

RICK ENGINEERING COMPANY
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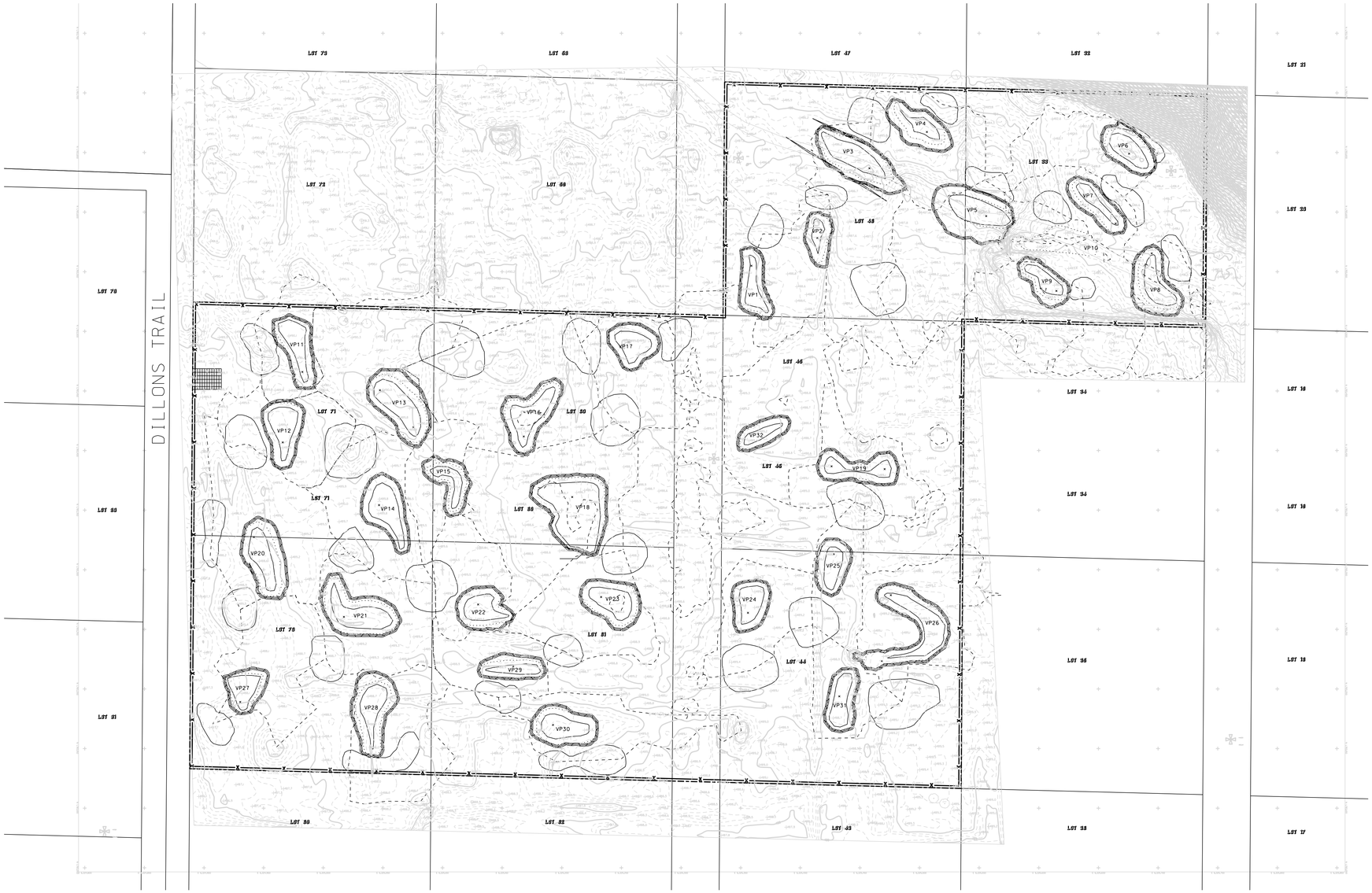
04–AUG–2021 10:35 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEP5B1L 5004(212)

1ST SUBMITTAL

LA MEDIA ROAD VERNAL POOL MITIGATION GRADING



LEGEND

IMPROVEMENT	QUANTITY	SYMBOL
TEMPORARY CONSTRUCTION FENCE	2,860 LF	
STABLIZED CONSTRUCTION ENTRANCE/EXIT	1 EA	
CONSTRUCTION STAGING AREA	1 EA	
FIBER ROLL	4,981 LF	

SCALE 1" = 50'

VERNAL POOL MITIGATION PLANS FOR LA MEDIA ROAD WIDENING & FIRE RESCUE AIR OPERATIONS PHASE II PROJECT

LOTS 33,44–46,60,61,71,72 OF MAP NO. 1264

CITY OF SAN DIEGO, CALIFORNIA
ENGINEERING AND CAPITAL PROJECTS
SHEET 7 OF 7 SHEETS

STORM DRAIN WBS

REGISTERED PROFESSIONAL ENGINEER — CARSON P. EDGINGTON — NO. 76519 — STATE OF CALIFORNIA

APPROVED:
FOR CITY ENGINEER — DATE
ELHAM LOTFI — RCE#
PRINT DCE NAME

SUBMITTED BY: XXXXXXX PROJECT MANAGER
CHECKED BY: XXXXXXXXXX PROJECT ENGINEER

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	REC			
AS-BUILT	REC			

206-1719 CCS27 COORDINATE
1846-6276 CCS83 COORDINATE

CONTRACTOR — DATE STARTED
INSPECTOR — DATE COMPLETED

XXXXX– –D

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04–AUG–2021 10:35 kkawasaki

La Media Road Improvements
K-23-2060-DBB-3
State ID TCEP5B1L 5004(212)

1ST SUBMITTAL

ATTACHMENT F

RESERVED

ATTACHMENT G

CONTRACT AGREEMENT

ATTACHMENT G

CONTRACT AGREEMENT

CONSTRUCTION CONTRACT

This Phase-Funded contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and TC Construction Company, Inc., herein called "Contractor" for construction of **La Media Road Improvements**; Bid No. **K-23-2060-DBB-3;** in the total **Forty Two Million Eight Hundred Eighty Four Thousand Four Hundred Twenty Two Dollars and Twenty Five Cents ($42,884,422.25)**, which is comprised of the Base Bid.

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) Phased Funding Schedule Agreement, Long Term Revegetation Maintenance Agreement

   (e) That certain documents entitled **La Media Road Improvement**s, on file in the office of the City Clerk as Document No. **S-15018**, as well as all matters referenced therein.

2. The City wishes to construct this Project on a Phase-Funded basis. In accordance with Whitebook section 7-3.10, the City is only obligated to pay for Phase I; Contractor cannot begin, nor is the City financially liable for any additional Phases, unless and until Contractor is issued a Notice to Proceed for each additional Phase by the City.

3. 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 La Media Road Improvements**,** Bid Number **K-23-2060-DBB-3,** San Diego, California.

4. 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. (See WHITEBOOK, Section 7-3.10, Phased Funding Compensation).

CONTRACT AGREEMENT (continued)

5. 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.

6. 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 Ordinance No. O-21518 authorizing such execution.

THE CITY OF SAN DIEGO

By _____

Print Name: Matthew Vespi
Chief Financial Officer
Office of the Chief Financial Officer

Date: 12/1/2022

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By _____

Print Name: RYAN P GERRITY
Deputy City Attorney

Date: 12/9/2022

CONTRACTOR

By _____

Print Name: Austin Cameron

Title: President

Date: 10/28/22

City of San Diego License No.: B19870047 73

State Contractor's License No.: 402459

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000003132

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

COVID-19 VACCINATION ORDINANCE

CERTIFICATION OF COMPLIANCE

I hereby certify that I am familiar with the requirements of San Diego Ordinance No. O-21398 implementing the City's Mandatory COVID-19 Vaccination Policy.

TERMS OF COMPLIANCE

The City's Mandatory COVID-19 Vaccination Policy, outlined in San Diego Ordinance O-21398 (Nov. 29, 2021), requires ALL City contractors, who interact in close contact with City employees while providing contracted services indoors in City facilities or while performing bargaining unit work while indoors, to be fully vaccinated against COVID-19, effective January 3, 2022, as a condition for provision or continued provision of contracted services.

1. "City contractor" means a person who has contracted with the City of San Diego to provide public works, goods, services, franchise, or consultant services for or on behalf of the City, and includes a subcontractor, vendor, franchisee, consultant, or any of their respective officers, directors, shareholders, partners, managers, employees, or other individuals associated with the contractor, subcontractor, consultant, or vendor."Person" means any natural person, firm, joint venture, joint stock company, partnership, association, club, company, corporation business trust or organization.

2. "Fully vaccinated" means a person has received, at least 14 days prior, either the second dose in a two-dose COVID-19 vaccine series or a single-dose COVID-19 vaccine,or otherwise meets the criteria for full vaccination against COVID-19 as stated in applicable public health guidance, orders, or law. Acceptable COVID-19 vaccines mustbe approved by the U.S. Food and Drug Administration (FDA) or authorized for emergency use by the FDA or the World Health Organization.

3. "Close contact" means a City contractor is **within 6 feet** of a City employee for a **cumulative total of 15 minutes or more over a 24-hour period** (for example, three individual 5-minute exposures for a total of 15 minutes).

4. City contractors who interact in close contact with City employees must fully comply with the City's Mandatory COVID-19 Vaccination Policy,which may include a reporting program that tracks employee vaccination status.

5. City contractors with employees or subcontractors who interact in close contact with City employees must certify that those members of their workforce, and subcontractors regardless of tier, who work indoors at a City facility, are fully vaccinated and that the City contractor has a program to track employee compliance.

6. City contractors that have an Occupational Safety and Health Administration compliant testing program for members of their workforce, as a reasonable accommodation, may be considered for compliance.

Non-compliance with the City's Mandatory COVID-19 Vaccination Policy may result in termination of a contract for cause, pursuant to the City's General Terms and Provisions, Reference Standards, and the San Diego Municipal Code.

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:

La Media Road Improvements
(Project Title)

as particularly described in said contract and identified as Bid No. **K-23-2060-DBB-3**; SAP No. (WBS) **S-15018**; 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

COMPANY LETTERHEAD

CERTIFICATE OF COMPLIANCE

Materials and Workmanship Compliance

For Contract or Task_____

I certify that the material listed below complies with the materials and workmanship requirements of the Caltrans Contract Plans, Special Provisions, Standard Specifications, and Standard Plans for the contract listed above.

I also certify that I am an official representative for_____, the manufacturer of the material listed above. Furthermore, I certify that where California test methods, physical or chemical test requirements are part of the specifications, that the manufacturer has performed the necessary quality control to substantiate this certification.

Material Description:

Manufacturer: _____

Model:_____

Serial Number (if applicable)_____

Quantity to be supplied:_____

Remarks:_____

Signed by: _____

Printed Name:_____

Title: _____

Company: _____

Date: _____

City of San Diego

Engineering & Capital Projects Department, CMFE Division

NOTICE OF MATERIALS TO BE USED

To:_____ Date: _____, 20____

Resident Engineer

You are hereby notified that the materials required for use under Contract No. _____ for construction of _____

_____,

in the City of San Diego, will be obtained from sources herein designated.

CONTRACT ITEM NO. **(Bid Item)**	**KIND OF MATERIAL** **(Category)**	**NAME AND ADDRESS WHERE MATERIAL CAN BE INSPECTED** **(At Source)**

It is requested that you arrange for a sampling, testing, and inspection of the materials prior to delivery, in accordance with Section 4 – CONTROL OF MATERIALS of the WHITEBOOK, where it is practicable, and in accordance with your policy. It is understood that source inspection does not relieve the Contractor of full responsibility for incorporating in the work, materials that comply in all respects with the contract plans and specifications, nor does it preclude subsequent rejection of materials found to be undesirable or unsuitable.

Distribution:

Supplier

_____ _____

Signature of Supplier Address

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. **MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM**

D. **DEBARMENT AND SUSPENSION CERTIFICATION FOR PRIME CONTRACTOR**

E. **DEBARMENT AND SUSPENSION CERTIFICATION FOR SUBCONTRACTORS,**

BID BOND

See Instructions to Bidders, Bidder Guarantee of Good Faith (Bid Security)

KNOW ALL MEN BY THESE PRESENTS,

That T C Construction Company, Inc. as Principal, and Liberty Mutual 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

La Media Road Improvements K-23-2060-DBB-3

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 12th day of September, 2022

T C Construction Company, Inc. (SEAL)
(Principal)

By: _____
(Signature)
Austin Cameron, President

Liberty Mutual Insurance Company (SEAL)
(Surety)

By: _____
(Signature)
Tara Bacon, Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

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 September 15, 2022 before me, Sandra Weeks, Notary Public
Date *Here Insert Name and Title of the Officer*

personally appeared Austin Cameron
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.

SANDRA WEEKS
Notary Public - California
San Diego County
Commission # 2365749
My Comm. Expires Aug 9, 2025

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 Sandra Weeks
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: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

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: _____

ACKNOWLEDGMENT

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 September 12, 2022 before me, Minna Huovila, Notary Public
(insert name and title of the officer)

personally appeared Tara Bacon,
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 _____ **(Seal)**

CSC1 MINNA HUOVILA
COMM. #2313883
NOTARY PUBLIC-CALIFORNIA
SAN DIEGO COUNTY
My Commission Expires
DECEMBER 6, 2023 CSC1

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 Loera; 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 12th day of September, 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.

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: T C Construction Company, Inc.

Certified By Austin Cameron Title President

Name

Date 9-27-22

Signature

USE ADDITIONAL FORMS AS NECESSARY

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

Legal Name		DBA	
T C Construction Company, Inc.		N/A	
Street Address	**City**	**State**	**Zip**
10540Prospect Ave	Santee	CA	92071
Contact Person, Title		**Phone**	**Fax**
Austin Cameron, President		619-448-4560	619-448-3341

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
Austin Cameron	President
City and State of Residence	**Employer (if different than Bidder/Proposer)**
El Cajon, CA	N/A
Interest in the transaction	
40% Owner	

Name	Title/Position
Terry Cameron	CEO
City and State of Residence	**Employer (if different than Bidder/Proposer)**
El Cajon, CA	N/A
Interest in the transaction	
10% Owner	

*** 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.

Austin Cameron, President		9-27-22
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.

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

Legal Name		DBA	
T C Construction Company, Inc.		N/A	
Street Address	**City**	**State**	**Zip**
10540 Prospect Ave	Santee	CA	92071
Contact Person, Title		**Phone**	**Fax**
Austin Cameron, President		619-448-4560	619-448-3341

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
Jack Gieffels	SecretaryTreasurer
City and State of Residence	**Employer (if different than Bidder/Proposer)**
El Cajon, CA	N/A
Interest in the transaction	
10% Owner	

Name	Title/Position
Chad Cameron	Vice President
City and State of Residence	**Employer (if different than Bidder/Proposer)**
El Cajon, CA	N/A
Interest in the transaction	
20% Owner	

*** 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.

Austin Cameron, President		9-27-22
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.

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

Legal Name		DBA	
T C Construction Company, Inc.		N/A	
Street Address	**City**	**State**	**Zip**
10540 Prospect Ave	Santee	CA	92071
Contact Person, Title		**Phone**	**Fax**
Austin Cameron, President		619-448-4560	619-448-3341

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
Darren Tharp	Vice President
City and State of Residence	**Employer (if different than Bidder/Proposer)**
Alpine, CA	N/A
Interest in the transaction	
10% Owner	

Name	Title/Position
Robert Kostyrka	Vice President
City and State of Residence	**Employer (if different than Bidder/Proposer)**
El Cajon, CA	N/A
Interest in the transaction	
10% Owner	

*** 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.

Austin Cameron, President		9-27-22
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 c*ontractors* 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
Austin Cameron	President
Terry Cameron	CEO
Jack Gieffels	Secretary/Treasurer
Darren Tharp	Vice President

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: T C Construction Company, Inc.

Certified By Austin Cameron Title President

Name

Signature Date 9-27-22

NOTE: Providing false information may result in criminal prosecution or administrative sanctions.

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
Chad Cameron	Vice President
Robert Kostyrka	Vice President

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: T C Construction Company, Inc.

Certified By Austin Cameron Title President

Name

Date 9-27-22

Signature

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)

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) for their subcontractor/supplier/manufacturers.

Please indicate if principal owner is serving in the capacity of **subcontractor**, **supplier,** and/or **manufacturer**:

☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Blue Star Steel, Inc.	Tim McCormick RMO
	Brandon Reber President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

Contractor Name: T C Construction Company, Inc.

Certified By Austin Cameron Title President

Name

Signature Date 9-27-22

USE ADDITIONAL FORMS AS NECESSARY*

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**:

☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Dick Miller Inc.	Glen Bullock President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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NAME	TITLE

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Fence Corp	Perry Massie - President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Loveless & Linton	Rebekah Loveless - COO Brandon Linton - CEO

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Makelele Systems	Jose Cardenas President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Maxim Engineering	Tania Tischler - President
	Derek Franken - Vice President
	Lawrence Findahl - Vice President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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NAME	TITLE
Pavement Recycling Systems	Steve Corcannon President
	Nathan Beyler Treasurer

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Southwest Traffic Signal	Ryan Clark - President & general Manager

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

Contractor Name: T C Construction Company, Inc.

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Statewide Stripes	David Brilhante- President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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NAME	TITLE
Tierra Data	Elizabeth Kellogg President

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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☒ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE
Two Rivers Strategies	Reema Boccia - Principal

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

☐ SUBCONTRACTOR ☐ SUPPLIER ☐ MANUFACTURER

NAME	TITLE

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NAME	TITLE

Contractor Name: T C Construction Company, Inc.

Certified By Austin Cameron Title President

Name

Date 9-27-22

Signature

USE ADDITIONAL FORMS AS NECESSARY*

Bid Results

SELF PERFORMANCE 65% = MET

Bidder Details

Vendor Name	TC Construction Company, Inc.
Address	10540 Prospect Avenue Austin Cameron 619-726-7023 Santee, California 92071 United States
Respondee	Elan Schier
Respondee Title	Chief Estimator
Phone	619-448-4560
Email	eschier@tcincsd.com
Vendor Type	CADIR, MALE, CAU
License #	402459
CADIR	1000003132

Bid Detail

Bid Format	Electronic
Submitted	10/12/2022 1:53 PM (PDT)
Delivery Method	
Bid Responsive	
Bid Status	Submitted
Confirmation #	303929

Respondee Comment

Buyer Comment

Attachments

File Title	File Name	File Type
Certifications of Pending Actions.pdf	Certifications of Pending Actions.pdf	Contractor's Certification of Pending Actions
Mandatory Disclosure.pdf	Mandatory Disclosure.pdf	Mandatory Disclosure of Business Interests Form
Sub Disbarment.pdf	Sub Disbarment.pdf	Debarment and Suspension Form - Subs/Supp/MFR
Debarment Prime.pdf	Debarment Prime.pdf	Debarment and Suspension Form - Prime
Bid Bond La Media.pdf	Bid Bond La Media.pdf	Bid Bond

SUBCONTRACTOR LISTING

(OTHER THAN FIRST TIER)

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 is to list below the name, address, license number, DIR registration number of any (known tiered subcontractor) -** who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement pursuant to the contract. **If none are known at this time, mark the table below with non-applicable (N/A)**.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	DIR REGISTRATION NUMBER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK
Name: San Diego Natural History Museum-Paleo Services Address: 1788 La Prado City: San Diego State: CA Zip: 92101 Phone: 760-255-0346 Email: rhubschier@sdnhm.org	Designer	NA-Non Profit	N/A	Paleo
Name: Pacific Rim Hydroseeding Inc. Address: 28319 Valley Center Road City: Valley Center State: CA Zip: 92028 Phone: 760-751-7055 Email: teresa.pacificrim@yahoo.com	Constructor	1000006248	886257	Hydroseeding
Name: Curtis Drilling Co. Address: 1249 W. Washington Ave City: Escondido State: CA Zip: 92029 Phone: 760-727-7330 Email: estimiating@curtisdrilling.com	Constructor	1000006928	624663	Foundations Driling
Name: Address: City: State: Zip: Phone: Email:				

**** USE ADDITIONAL FORMS AS NECESSARY ****

Subcontractors

Showing 11 Subcontractors

Name & Address	Desc	License Num	CADIR	Amount	Type
BLUE STAR STEEL INC 9484 MISSION PARK PLACE P.O. BOX 713130 Santee, California 92071	Constructor Concrete Reinforcing Steel	257630	1000033568	$1,409,000.00	WBE, CAU, FEM, Local
Dick Miller Inc. 930 Boardwalk, Suite H San Marcos, California 92078	Constructor Concrete Flatwork SLBE	380204	1000004547	$1,552,032.00	DVBE, CADIR, SLBE, MALE, SDVSB, CAU, Local
FenceCorp Inc. 3045 Industry Street Oceanside, California 92054	Constructor Protective railing, handrails, fence and gates	886544	1000000850	$266,514.00	Local
Loveless Linton, Inc. Archaeological 1421 W. Lewis St San Diego, California 92103	Consultant Archeo,Cultural & Biological Monitoring SLBE	na	1000047263	$152,780.00	DBE, SDB, MBE, CADIR, NAT, MALE, Local
Makelele Systems Landscape & Mai PO BOX 2044 Makelele Systems San Marcos, California 92079	Constructor Landscape & Irrigation and Rain gardens ELBE	987557	1000028415	$1,281,179.00	MBE, CADIR, MALE, LAT, Local
Maxim Construction Company, Inc. 2107 Twisted Oak Lane Alpine, California 91901	Constructor Fiber Optics & Portions of reinforced concrete box culverts ELBE	1000689	1000048900	$3,352,050.00	DBE, ELBE, CADIR, FEM, WOSB, Asian, Local
Pavement Recycling Systems, Inc. 10240 San Sevaine Way Jurupa Valley, California 91752	Constructor Lime treated Soil	569352	1000003363	$2,551,884.00	PQUAL
Southwest Signal Service PO Box 1297 El Cajon, California 92022	Constructor Street lights,traffic signals and push buttons SLBE	451115	1000004265	$1,028,262.34	Local
Statewide Stripes Inc. PO Box 600710 San Diego, California 92160	Constructor Striping & Markings	788286	1000047263	$162,293.50	CADIR, DBE, Local
Tierra Data Inc. 10110 W. Lilac Road Escondido, California 92026	Consultant Vernal Pools & wetland implementation & monitoring SLBE	959555	1000011413	$3,186,249.00	DBE, WBE, SDB, CADIR, FEM, WOSB, CAU, Local
Two Rivers Strategies 9820 Alto Dr. La Mesa, California 91941	Consultant Community Liaison ELBE	na	1000871377	$40,000.00	SDB, WBE, MBE, FEM, WOSB, Local

Line Items

Discount Terms No Discount

Item #	Item Code	Type	Item Description	UOM	QTY	Unit Price	Line Total	Response	Comment
Main Bid							$42,884,422.25		
1	524126		Bonds (Payment and Performance)	LS	1	$225,000.00	$225,000.00	Yes	
2	237310		Caltrans Encroachment Permit (EOC Type I): Contractor Double Permit and Inspection Deposit	AL	1	$70,280.00	$70,280.00	Yes	
3	237110		Sewage Bypass and Pumping Plan (Diversion Plan)	LS	1	$35,000.00	$35,000.00	Yes	
4	541820		Exclusive Community Liaison Services	LS	1	$47,000.00	$47,000.00	Yes	
5	541690		Archaeological and Native American Monitoring Program	LF	4640	$8.00	$37,120.00	Yes	
6	541690		Paleontological Monitoring Program	LF	780	$9.00	$7,020.00	Yes	
7	541690		Archaeological and Native American Mitigation and Curation (EOC Type I)	AL	1	$5,000.00	$5,000.00	Yes	
8	541690		Paleontological Mitigation and Excavation	CY	70	$50.00	$3,500.00	Yes	
9	237310		Mobilization	LS	1	$1,280,000.00	$1,280,000.00	Yes	
10			Field Orders (EOC Type II)	AL	1	$1,000,000.00	$1,000,000.00	Yes	
11	238910		Clearing and Grubbing	LS	1	$1,980,000.00	$1,980,000.00	Yes	
12	237310		Unsuitable Material/Export	CY	11060	$37.00	$409,220.00	Yes	
13	237310		Unclassified Excavation	CY	17500	$31.50	$551,250.00	Yes	
14	237310		Remedial Grading	CY	33000	$13.00	$429,000.00	Yes	
15	237310		Imported Parkway Backfill (DG)	CY	5000	$85.00	$425,000.00	Yes	
16	237310		Class 2 Aggregate Base	TON	42320	$26.00	$1,100,320.00	Yes	
17	237310		Excavation and Lime Treated Soil	CY	39700	$45.60	$1,810,320.00	Yes	
18	237310		Lime	TON	4650	$560.00	$2,604,000.00	Yes	
19	237310		Asphalt Concrete	TON	28850	$109.00	$3,144,650.00	Yes	
20	237310		Asphalt Concrete Overlay	TON	60	$125.00	$7,500.00	Yes	
21	237310		Asphalt Concrete Reinforcement Paving Grid	SF	11700	$0.65	$7,605.00	Yes	
22	237310		Asphalt Concrete Dike (Type A)	LF	1000	$21.00	$21,000.00	Yes	
23	237310		Bus Stop Pad (9 Inch thick)	CY	56	$670.00	$37,520.00	Yes	
24	237110		Curb Inlet (Type B)	EA	18	$7,700.00	$138,600.00	Yes	
25	237110		Curb Inlet (7', Type B-1)	EA	1	$9,400.00	$9,400.00	Yes	
26	237110		Curb Inlet (8', Type B-1)	EA	1	$9,900.00	$9,900.00	Yes	
27	237110		Curb Inlet (9', Type B-1)	EA	1	$9,800.00	$9,800.00	Yes	
28	237110		Curb Inlet (15', Type B-1)	EA	2	$4,000.00	$8,000.00	Yes	
29	237110		Curb Inlet (11', Type B-2)	EA	1	$9,500.00	$9,500.00	Yes	
30	237110		Catch Basin (Type I)	EA	1	$6,900.00	$6,900.00	Yes	
31	237110		Catch Basin (Type F)	EA	2	$6,700.00	$13,400.00	Yes	
32	237110		Storm Drain Clean Out (Type A-4)	EA	14	$9,900.00	$138,600.00	Yes	
33	237110		Structural Design Storm Drain Cleanout, 7' x 12.5'	EA	3	$72,000.00	$216,000.00	Yes	
34	237110		Storm Drain Clean Out (Type A-5)	EA	1	$10,000.00	$10,000.00	Yes	
35	237110		Storm Drain Clean Out (Type A-8)	EA	1	$16,000.00	$16,000.00	Yes	
36	237110		Storm Drain Concrete Cap	EA	4	$1,100.00	$4,400.00	Yes	
37	237110		Rip Rap Energy Dissipator	TON	850	$168.00	$142,800.00	Yes	
38	237110		Wing Type Headwall (18" Pipe)	EA	1	$5,900.00	$5,900.00	Yes	
39	237110		Modified Wing Type Headwall, (79' W x 4' H)	EA	1	$220,000.00	$220,000.00	Yes	
40	237110		Mod Wing Type Headwall, (104' W x 3.5' H)	EA	1	$290,000.00	$290,000.00	Yes	
41	237110		Mod Wing Type Headwall, (112' W x 3.5' H)	EA	1	$310,000.00	$310,000.00	Yes	
42	237110		Mod Wing Type Headwall, (176' W x 3.5' H)	EA	1	$570,000.00	$570,000.00	Yes	
43	237110		Mod Wing Type Headwall, (73' W x 5' H)	EA	1	$200,000.00	$200,000.00	Yes	
44	237110		Mod Wing Type Headwall, (66' W x 5' H)	EA	1	$200,000.00	$200,000.00	Yes	
45	238110		Cast-in-Place Reinforced Concrete Retaining Wall (La Media)	LS	1	$230,000.00	$230,000.00	Yes	
46	238110		Cast-in-Place Reinforced Concrete Retaining Wall (Airway)	LS	1	$230,000.00	$230,000.00	Yes	
47	237110		[4] Box Culvert (8 ft Wide x 4 ft High) Reinforced Concrete, Single Box Culvert	LF	555	$5,720.00	$3,174,600.00	Yes	
48	237110		[7] Box Culvert (8 ft Wide x 3.5 ft High) Reinforced Concrete, Single Box Culvert	LF	311	$12,440.00	$3,868,840.00	Yes	
49	237110		[7] Box Culvert (10 ft Wide x 3.5 ft High) Reinforced Concrete, Single Box Culvert	LF	140	$15,200.00	$2,128,000.00	Yes	

Item #	Item Code	Type	Item Description	UOM	QTY	Unit Price	Line Total	Response	Comment
50	237110		Box Culvert (10 ft Wide x 5 ft High) Reinforced Concrete, Double Box Culvert	LF	145	$4,400.00	$638,000.00	Yes	
51	237110		Box Culvert (5 ft Wide x 2.5 ft High) Reinforced Concrete, Single Box Culvert	LF	160	$1,300.00	$208,000.00	Yes	
52	237110		Box Culvert Manholes	EA	98	$2,500.00	$245,000.00	Yes	
53	237310		Curb and Gutter (6 Inch Curb, Type H)	LF	9235	$54.00	$498,690.00	Yes	
54	237310		Median Curb and Gutter (Type B-1)	LF	6590	$45.00	$296,550.00	Yes	
55	237310		Rolled Curb (Caltrans)	LF	65	$41.00	$2,665.00	Yes	
56	237310		Modified Alley Apron	SF	2700	$19.00	$51,300.00	Yes	
57	237310		Cross Gutter	SF	2190	$19.00	$41,610.00	Yes	
58	237310		Commercial Concrete Driveway	SF	1120	$19.00	$21,280.00	Yes	
59	237310		Sidewalk (SDG-155), 4" PCC	SF	56930	$7.00	$398,510.00	Yes	
60	237310		Curb Ramp (Type A) with Detectable Warning Tiles	EA	14	$3,400.00	$47,600.00	Yes	
61	237310		Curb Ramp (Mod Type A) with Detectable Warning Tiles	EA	1	$4,000.00	$4,000.00	Yes	
62	237310		Curb Ramp (Type B) with Detectable Warning Tiles	EA	3	$4,000.00	$12,000.00	Yes	
63	237310		Curb Ramp (Mod Type B) with Detectable Warning Tiles	EA	2	$4,000.00	$8,000.00	Yes	
64	237310		Curb Ramp (Type C1) with Detectable Warning Tiles	EA	2	$4,000.00	$8,000.00	Yes	
65	237310		Concrete Raised Median	SF	35050	$20.50	$718,525.00	Yes	
66	237310		Turf Block Open Celled Pavers filled with DG	SF	6300	$35.00	$220,500.00	Yes	
67	237310		Pedestrian Protective Railing and Handrail	LF	520	$315.00	$163,800.00	Yes	
68	238990		6' Chain Link Fence	LF	75	$202.00	$15,150.00	Yes	
69	238990		Chain Link Gate	EA	3	$6,400.00	$19,200.00	Yes	
70	238990		Remove and Replace Existing Chain Link Fence	LF	1480	$79.00	$116,920.00	Yes	
71	237110		Storm Drain (18 Inch, RCP)	LF	550	$179.00	$98,450.00	Yes	
72	237110		Storm Drain with Water Tight Joints (18 Inch, RCP)	LF	1035	$174.00	$180,090.00	Yes	
73	237110		Storm Drain with Water Tight Joints (24 Inch, RCP)	LF	190	$2,300.00	$437,000.00	Yes	
74	237110		Storm Drain with Water Tight Joints (30 Inch, RCP)	LF	615	$210.00	$129,150.00	Yes	
75	237110		Storm Drain with Water Tight Joints (36 Inch, RCP)	LF	3110	$246.00	$765,060.00	Yes	
76	237110		Storm Drain with Water Tight Joints (42 Inch, RCP)	LF	30	$376.00	$11,280.00	Yes	
77	237110		Sewer Main (10 Inch, C900, DR-14 Fusible PVC)	LF	170	$303.00	$51,510.00	Yes	
78	237110		Sewer Main (15 Inch, SDR-26)	LF	180	$260.00	$46,800.00	Yes	
79	237110		Sewer Main (36 Inch, C905, DR-21 Fusible PVC)	LF	205	$1,350.00	$276,750.00	Yes	
80	237110		Engineered Trench Shoring	LS	1	$18,000.00	$18,000.00	Yes	
81	237110		18-Inch Welded Steel Casing (0.5-Inch Thick)	LF	90	$314.00	$28,260.00	Yes	
82	237110		48-Inch Welded Steel Casing (0.5-Inch Thick)	LF	120	$750.00	$90,000.00	Yes	
83	237110		Manhole (4 ft x 3 ft)	EA	3	$10,000.00	$30,000.00	Yes	
84	237110		Manhole (6 ft x 3 ft)	EA	1	$21,000.00	$21,000.00	Yes	
85	237310		Painted Traffic Stripes and Painted Curb Markings	LS	1	$58,000.00	$58,000.00	Yes	
86	237310		Thermoplastic Pavement Markings	SF	2650	$8.00	$21,200.00	Yes	
87	237310		Continental Crosswalks	SF	5550	$5.00	$27,750.00	Yes	
88	237110		Removal of Existing Asphalt Concrete	CY	3700	$51.00	$188,700.00	Yes	
89	237110		Removal of Existing Rip Rap	SF	2320	$5.00	$11,600.00	Yes	
90	237310		Adjust Existing Manhole Frame and Cover to Grade	EA	10	$1,600.00	$16,000.00	Yes	
91	237310		Adjust Existing Survey Monument to Grade	EA	2	$2,100.00	$4,200.00	Yes	
92	237310		Cold Mill AC Pavement (> 1½ inch - 3 inch)	SF	5000	$2.60	$13,000.00	Yes	
93	237310		Traffic Control	LS	1	$880,000.00	$880,000.00	Yes	
94	238210		Install Traffic Sign On Post	EA	75	$490.00	$36,750.00	Yes	
95	238210		Street Lighting, Type 15	EA	51	$9,000.00	$459,000.00	Yes	
96	238210		Traffic Signal	EA	1	$690,000.00	$690,000.00	Yes	
97	238210		Relocate APS Push Button	EA	1	$5,100.00	$5,100.00	Yes	
98	238210		Relocate Traffic Signal and Street Light Conduit (SR-905)	LS	1	$62,000.00	$62,000.00	Yes	
99	238210		Communication Conduit System (For Future Fiber Optic)	LS	1	$600,000.00	$600,000.00	Yes	

Item #	Item Code	Type	Item Description	UOM	QTY	Unit Price	Line Total	Response	Comment
100	561730		Landscape Rock Cobble	TON	570	$130.00	$74,100.00	Yes	
101	561730		32 Month Revegetation and Monitoring Program	LS	1	$190,000.00	$190,000.00	Yes	
102	561730		Landscape Boulders (Lg, Md, Sm) at Cobble Swale, Rain Garden and Boulder Retaining Wall (at Tree Planting Basins)	LS	1	$220,000.00	$220,000.00	Yes	
103	561730		Decomposed Granite (Stabilized)	SF	25385	$3.00	$76,155.00	Yes	
104	561730		Landscape Fabric at Decomposed Granite	SF	25385	$0.65	$16,500.25	Yes	
105	561730		24" Box Tree	EA	204	$520.00	$106,080.00	Yes	
106	561730		1 Gallon Shrub	EA	634	$14.00	$8,876.00	Yes	
107	561730		Wood Mulch (at Plant Basins)	SF	8200	$2.00	$16,400.00	Yes	
108	561730		Soil Amendments	CY	109	$80.00	$8,720.00	Yes	
109	541330		Biological Monitoring and Reporting	LS	1	$140,000.00	$140,000.00	Yes	
110	561730		Vernal Pool Implementation and 120-day (4-month) Plant Establishment Period	LS	1	$1,200,000.00	$1,200,000.00	Yes	
111	541330		Vernal Pool Seven-Year (84-month) Maintenance	LS	1	$390,000.00	$390,000.00	Yes	
112	561730		Wetland Implementation and 120-day (4-month) Plant Establishment Period	LS	1	$775,000.00	$775,000.00	Yes	
113	541330		Wetland Five-year (60-month) Maintenance	LS	1	$315,000.00	$315,000.00	Yes	
114	541330		SWPPP Development	LS	1	$10,000.00	$10,000.00	Yes	
115	237310		SWPPP Implementation	LS	1	$500,000.00	$500,000.00	Yes	
116	541330		SWPPP Permit Fee (EOC Type I)	AL	1	$4,000.00	$4,000.00	Yes	
117	561730		Rain Garden (Green Street Element)	LS	1	$710,000.00	$710,000.00	Yes	
118	237110		Thrust Anchor for 16" Water Main	EA	2	$22,000.00	$44,000.00	Yes	
119	237110		Thrust Anchor for 18" Water Main	EA	2	$22,000.00	$44,000.00	Yes	
120	237110		Cathodic Protection	LS	1	$30,000.00	$30,000.00	Yes	
121	237110		Removal or Abandonment of Existing Water Facilities	LF	1133	$22.00	$24,926.00	Yes	
122	237110		Handling and Disposal of Non-friable Asbestos Material	LF	704	$35.00	$24,640.00	Yes	
123	237110		Adjusting Existing Gate Valve Cover to Grade	EA	5	$1,100.00	$5,500.00	Yes	
124	237110		Furnished Materials for Contractor High-line Work	LF	620	$15.00	$9,300.00	Yes	
125	237110		High-lining Installation by the Contractor	LF	620	$40.00	$24,800.00	Yes	
126	237110		High-lining Removed by the Contractor	LF	620	$21.00	$13,020.00	Yes	
127	237110		Connections to The Existing System by Contractor (16 Inch)	EA	4	$22,000.00	$88,000.00	Yes	
128	237110		Connections to The Existing System by Contractor (18 Inch)	EA	3	$32,000.00	$96,000.00	Yes	
129	237110		Cut and Plug by Contractor	EA	1	$14,000.00	$14,000.00	Yes	
130	237110		16-Inch PVC Water Main (C900, CL305, DR-14) with Restrained Joints	LF	496	$610.00	$302,560.00	Yes	
131	237110		16-Inch PVC Water Main (C900, CL305, DR-14) with Restrained Joints and EBAA Mega-Stops Bell Protection System	LF	315	$580.00	$182,700.00	Yes	
132	237110		16-Inch Ductile Iron Water Main (AWWA C115) with Restrained Joints	LF	14	$1,400.00	$19,600.00	Yes	
133	237110		18-Inch PVC Water Main (C900, CL305, DR-14) with Restrained Joints	LF	151	$1,100.00	$166,100.00	Yes	
134	237110		18-Inch PVC Water Main (C900, CL305, DR-14) with Restrained Joints and EBAA Mega-Stops Bell Protection System	LF	90	$660.00	$59,400.00	Yes	
135	237110		18-Inch Ductile Iron Water Main (AWWA C115) with Restrained Joints	LF	38	$1,300.00	$49,400.00	Yes	
136	237110		Blow-Off Valve Assembly (4-Inch)	EA	5	$12,000.00	$60,000.00	Yes	
137	237110		Blow-Off Valve Assembly (6-Inch)	EA	2	$15,000.00	$30,000.00	Yes	
138	237110		Relocate Existing Blow-Off	EA	2	$3,800.00	$7,600.00	Yes	
139	237110		Adjust Existing Blowoff to Grade	EA	1	$1,700.00	$1,700.00	Yes	
140	237110		Butterfly Valve (16 Inch)	EA	5	$13,000.00	$65,000.00	Yes	
141	237110		Butterfly Valve (18 Inch)	EA	4	$17,000.00	$68,000.00	Yes	
142	237110		4-Inch Automatic Combination Air Release and Air/Vacuum Valve	EA	2	$14,000.00	$28,000.00	Yes	
143	237110		30-Inch Welded Steel Casing (0.5-Inch Thick)	LF	345	$610.00	$210,450.00	Yes	
144	237110		6-Inch Fire Hydrant Assembly (3-Port)	EA	3	$15,000.00	$45,000.00	Yes	
145	237110		2" Water Service w/ Meter Box	EA	2	$10,000.00	$20,000.00	Yes	

Line Item Subtotals

Section Title	Line Total
Main Bid	**$42,884,422.25**
Grand Total	**$42,884,422.25**