City of San Diego

CONTRACTORS' NAMES: NEO San Diego LLC / Aptim Environmental & Infrastructure, Inc.
ADDRESS: 1 North Lexington Ave., Suite 1450, White Plains, NY 10601 / 4171 Essen Lane, Baton Rouge, LA 70809
TELEPHONE NO.:951-833-4153 / 225-932-2549
CITY CONTACT: Brittany Friedenreich, Contract Specialist, Email: BFriedenreic@sandiego.gov
Phone No. (619) 533-3104, Fax No. (619) 533-3633
L. Campos / A. James / mlw

BIDDING DOCUMENTS

e - Bidding

FOR

MIRAMAR LANDFILL GAS RECOVERY IMPROVEMENTS

BID NO.: K-18-1707-DBB-3
SAP NO. (WBS/IO/CC): S-16052
CLIENT DEPARTMENT: 2115
COUNCIL DISTRICT: 4, 6
PROJECT TYPE: FA

THIS CONTRACT WILL BE SUBJECT TO THE FOLLOWING:

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

BID DUE DATE:

2:00 PM
JANUARY 16, 2018
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTS
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

ENGINEER OF WORK

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

12-11-2017

1) Registered Engineer — Date — Seal:

12-11-17

2) For City Engineer — Date — Seal

TABLE OF CONTENTS

NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **Miramar Landfill Gas Recovery Improvements.** For additional information refer to Attachment A.

2. **FULL AND OPEN COMPETITION:** This contract is open to full competition and may be bid on by Contractors who are on the City's current 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 **$6,950,000**.

4. **BID DUE DATE AND TIME ARE: JANUARY 16, 2018 at 2:00 PM**

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

6. **LICENSE REQUIREMENT**: The City has determined that the following licensing classification(s) are required for this contract: **A**

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

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

1. SLBE participation **7.8%**
2. ELBE participation **16.0%**
3. Total mandatory participation **23.8%**

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

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

7.2.2. Submit Good Faith Effort documentation, saved in searchable Portable Document Format (PDF) and stored on Compact Disc (CD) or Digital Video Disc (DVD), demonstrating the Bidder made a good faith effort to outreach to and include SLBE-ELBE Subcontractors required in this document within 3 Working

Days of the Bid opening if the overall mandatory participation percentage is not met.

8. AWARD PROCESS:

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

8.2. Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening. The City will then award the Contract within approximately 14 days of receipt of properly signed Contract, bonds, and insurance documents.

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

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

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

9. SUBMISSION OF QUESTIONS:

9.1. The Director (or Designee) of Public Works 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:

Public Works Contracts
1010 Second Avenue, 14th Floor
San Diego, California, 92101
Attention: Brittany Friedenreich

OR:

BFriedenreic@sandiego.gov

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

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

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

10. ADDITIVE/DEDUCTIVE ALTERNATES:

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

10.2. For water pipeline projects, the Plans typically show all cut and plug and connection work to be performed by City Forces. However, Bidders shall refer to Bidding Documents to see if all or part of this work will be performed by the Contractors.

INSTRUCTIONS TO BIDDERS

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

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

1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening. For additional information or the answer to questions about the prequalification program, contact David Stucky at 619-533-3474 or dstucky@sandiego.gov.

1.3. 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 which 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 Public Works 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 (90 days for federally funded contracts and contracts valued at $500,000 or less) 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 Contractors 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 Contractors 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.shtml.

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 10 Working Days after receiving the Contract forms. See 7-6, "The Contractors Representative" in The GREENBOOK and 7-6.1 in The WHITEBOOK.

7. **PREVAILING WAGE RATES WILL APPLY:** Refer to Attachment D.

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

9. INSURANCE REQUIREMENTS:

9.1. 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.

9.2. Refer to sections 7-3, "LIABILITY INSURANCE", and 7-4, "WORKERS' COMPENSATION INSURANCE" of the Supplementary Special Provisions (SSP) for the insurance requirements which must be met.

10. 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/	2015	PWPI070116-01
City of San Diego Standard Specifications for Public Works Construction ("The WHITEBOOK")* https://www.sandiego.gov/publicworks/edocref/greenbook	2015	PWPI070116-02
City of San Diego Standard Drawings* https://www.sandiego.gov/publicworks/edocref/standarddraw	2016	PWPI070116-03
Citywide Computer Aided Design and Drafting (CADD) Standards https://www.sandiego.gov/publicworks/edocref/drawings	2016	PWPI092816-04
California Department of Transportation (CALTRANS) Standard Specifications – http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2015	PWPI092816-05
CALTRANS Standard Plans http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2015	PWPI092816-06
California Manual on Uniform Traffic Control Devices Revision 1 (CA MUTCD Rev 1) - http://www.dot.ca.gov/trafficops/camutcd/	2014	PWPIO92816-07
NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml		

11. 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.

12. 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.

13. 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.

14. SUBCONTRACTOR INFORMATION:

14.1. 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 Contractors 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 - General; Paragraph 2-3, "Subcontracts", 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.

14.2. 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.

14.3. 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.

15. SUBMITTAL OF "OR EQUAL" ITEMS: See Section 4-1.6, "Trade Names or Equals" in The WHITEBOOK and as amended in the SSP.

16. AWARD:

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

16.2. 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.

16.3. 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.

17. SUBCONTRACT LIMITATIONS: The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 2-3, "SUBCONTRACTS" in The GREENBOOK and as amended in the SSP which requires the Contractors 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.

18. 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 Public Works Contracts.

19. 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.

20. SAN DIEGO BUSINESS TAX CERTIFICATE: The Contractors 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.

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

21.1. 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.

21.2. 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.

21.3. 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.

21.4. 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. Within twenty-four (24) hours after the bid due date and time, the first five (5) apparent low bidders must provide the City with the original bid security.

21.5. Failure to submit the electronic version of the bid security at the time of bid submission AND failure to provide the original within twenty-four (24) hours may cause the bid to be rejected and deemed **non-responsive**.

22. AWARD OF CONTRACT OR REJECTION OF BIDS:

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

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

22.3. 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.

22.4. 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.

22.5. 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.

22.6. 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.

22.7. 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.

22.8. 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.

23. BID RESULTS:

23.1. 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.

23.2. 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.

24. THE CONTRACT:

24.1. 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.

24.2. 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 Contractors 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.

24.3. 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.

24.4. 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.

24.5. 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 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.

25. 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 2-7, 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.

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

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

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

26.3. The City of San Diego Municipal Code §22.3004 for Contractors Standards.

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

26.5. 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.

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

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

27. PRE-AWARD ACTIVITIES:

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

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

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

Aptim Environmental & Infrastructure, Inc., a corporation, as principal, and Everest Reinsurance 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 Four Million Three Hundred Ninety One Thousand Two Hundred Ninety One and 00/100 Dollars ($4,391,291.00) for the faithful performance of the annexed contract, and in the sum of Four Million Three Hundred Ninety One Thousand Two Hundred Ninety One and 00/100 Dollars ($4,391,291.00) for the benefit of laborers and materialmen designated below.

Conditions:

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

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

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

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

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

Dated July 30, 2018

Aptim Environmental & Infrastructure, Inc.

Principal

By _____

Stephen R. Martin Vice President

Printed Name of Person Signing for Principal

APTIM ENVIRONMENTAL & INFRASTRUCTURE, INC. CORPORATE SEAL LOUISIANA

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

Approved as to Form

Mara W. Elliott, City Attorney

By _____
Deputy City Attorney

Everest Reinsurance Company
Surety

By _____
Frances Rodriguez, Attorney-in-fact

Approved:

By _____
Stephen Samara
Interim Deputy Director
Public Works Department

461 5th Avenue
Local Address of Surety

New York, NY 10017
Local Address (City, State) of Surety

212-441-2096
Local Telephone No. of Surety

Premium $ N/A

Bond No. ES00000435

ATTACHMENTS

ATTACHMENT A

SCOPE OF WORK

SCOPE OF WORK

1. **SCOPE OF WORK:** This project is for Landfill Gas Recovery Improvements at the Miramar Landfill. Work included in the contract consists primarily of the construction of a new Central Blower System (CBS), consisting of Blower System and Aftercooler System skid units to be located at a centralized location of the Project Site. In addition, the Work will include the addition of landfill gas (LFG) collection and conveyance piping, valves, condensate sumps, electrical connection to aforementioned facilities, and miscellaneous appurtenances to provide connection to these facilities located on the landfill property. These facilities are both City owned and operated and/or owned and operated by other entities for the Project Site.

1.1. **SEE Technicals Section 01010 for additional information**

1.2. The Work shall be performed in accordance with:

1.3. The Notice Inviting Bids and Plans numbered **40382-1-D** through **40382- 35**-**D**, inclusive.

2. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **$6,950,000.**

3. **LOCATION OF WORK: The location of the Work is as follows:** Miramar Landfill, 5180 Convoy Street, San Diego, CA 92111.

4. **CONTRACT TIME:** The Contract Time for completion of the Work shall be **180 Working Days**.

ATTACHMENT B

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ATTACHMENT C

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ATTACHMENT D

PREVAILING WAGES

PREVAILING WAGES

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 Contractors 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. Contractors 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. Contractors 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.** Contractors 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. Contractors shall require its subcontractors to also comply with section 1776. Contractors and its subcontractors shall submit weekly certified payroll records online via the City's web-based Labor Compliance Program. Contractors is responsible for ensuring its subcontractors submit certified payroll records to the City.

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

1.5. **Working Hours.** Contractors 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.** Contractors 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.** Contractors in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractors 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 Equal Opportunity Contracting Department at 619-236-6000.

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, Contractors 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 Contractors 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 Contractors 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 City may ask Contractors for the most current list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Agreement at any time during performance of this contract, and Contractors shall provide the list within ten (10) working days of the City's request. Additionally, Contractors shall provide the City with a complete list of all subcontractors utilized on this contract (regardless of tier), within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Contractors until at least 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 Contractors 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 4.20.11 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 **2015 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
2. The **2015 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
   a) General Provisions (A) for all Contracts.

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

1-2 **TERMS AND DEFINITIONS.** To the "WHITEBOOK", item 54, "Normal Working Hours", ADD the following:

The **Normal Working Hours** are 7:00 AM to 5:00 PM.

SECTION 2 - SCOPE AND CONTROL OF WORK

2-3.2 **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 20% of the base Bid **AND** 20% of any alternates.

ADD:

2-10 **AUTHORITY OF THE BOARD AND THE ENGINEER.** To the "GREENBOOK", Paragraph (2), DELETE in its entirety and SUBSTITUTE with the following:

The decision of the Engineer is final and binding on all questions relating to: quantities; acceptability of material, equipment, or work; execution, progress or sequence of work; requests for information (RFI), and interpretation of the Plans, Specifications, or other Contract Documents. This shall be precedent to any payment under the Contract. The Engineer shall be the single point of contact and shall be included in all communications.

2-16 **CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM.** To the "WHITEBOOK", item 1, DELETE in its entirety.

SECTION 3 – CHANGES IN WORK

3-5.1 **Claims.** To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

ADD:

3-5.1 Claims.

1. A Claim is a written demand by you that seeks an adjustment in the Contract Price, Contract Time, or other relief associated with a dispute arising under or relating to the Contract, including a breach of any provision thereof. A voucher, invoice, or other routine request for payment is not a Claim.
2. A Claim shall conform to these specifications and may be considered after the City has previously denied a request by you for a Change Order seeking the demanded relief.
3. You shall submit a Claim to the Engineer if a dispute occurs that arises from or relates to the Contract. The Claim shall seek all relief to which you assert you are entitled as a result of the event(s) giving rise to the dispute. Your failure to process a Claim in accordance with these specifications shall constitute a waiver of all relief associated with the dispute. Claims are subject to 6-11, "Right to Audit".
4. You shall continue to perform the Services and Work and shall maintain the Schedule during any dispute proceedings. The Engineer will continue to make payments for undisputed Services and Work.
5. The City's Claims process specified herein shall not relieve you of your statutory obligations to present claims prior to any action under the California Government Code.

3-5.1.1 Initiation of Claim.

1. You shall promptly, but no later than 30 Days after the event(s) giving rise to the Claim, deliver the Claim to the Engineer.
2. You shall not process a Claim unless the Engineer has previously denied a request by you for a Change Order that sought the relief to be pursued in the claim.

3-5.1.1.1 Claim Certification Submittal.

1. If your Claim seeks an increase in the Contract Price, the Contract Time, or both, submit with the Claim an affidavit certifying the following:
   a) The Claim is made in good faith and covers all costs and delays to which you are entitled as a result of the event(s) giving rise to the Claim.

b) The amount claimed accurately reflects the adjustments in the Contract Price, the Contract Time, or both to which you believe you are entitled.

c) All supporting costs and pricing data are current, accurate, and complete to the best of your knowledge. The cost breakdown per item of Work shall be supplied.

d) You shall ensure that the affidavit is executed by an official who has the authority to legally bind you.

3-5.1.2 Initial Determination.

1. The Engineer will respond in writing to your Claim within 30 Days of receipt of the Claim.

3-5.1.3 Settlement Meeting.

1. If you disagree with the Initial Determination, you shall request a Settlement Meeting within 30 Days. Upon receipt of this request, the Engineer will schedule the Settlement Meeting within 15 Working Days.

3-5.1.7 City's Final Determination.

1. If a settle agreement is not reached, the City shall make a written Final Determination within 10 Working Days after the Settlement Meeting.

2. If you disagree with the City's Final Determination, notify the Engineer in writing of your objection within 15 Working Days after receipt of the written determination and file a "Request for Mediation" in accordance with 3-5.2, "Dispute Resolution Process".

3. Failure to give notice of objection within the 15 Working Days period shall waive your right to pursue the Claim.

3-5.1.8 Mandatory Assistance.

1. If a third party dispute, litigation, or both arises out of or relates in any way to the Services provided under the Contract, upon the City's request, you shall agree to assist in resolving the dispute or litigation. Your assistance includes, but is not limited to the following:

   a) Providing professional consultations.

   b) Attending mediations, arbitrations, depositions, trials, or any event related to the dispute resolution and litigation.

3-5.1.8.1 Compensation for Mandatory Assistance.

1. The City will reimburse you for reasonable fees and expenses incurred by you for any required assistance rendered in accordance with 3-5.1.8, "Mandatory Assistance" as Extra Work.

2. The Engineer will determine whether these fees and expenses were necessary due to your conduct or failure to act.

3. If the Engineer determines that the basis of the dispute or litigation in which these fees and expenses were incurred were the result of your conduct or your failure to act in part or in whole, you shall reimburse the City for any payments made for these fees and expenses.

4. Reimbursement may be through any legal means necessary, including the City's withholding of your payment.

3-5.2.3 Selection of Mediator. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. A single mediator, knowledgeable in construction aspects and acceptable to both parties, shall be used to mediate the dispute.

2. To initiate mediation, the initiating party shall serve a Request for Mediation at the American Arbitration Association (AAA) on the opposing party.

3. If AAA is used, the initiating party shall concurrently file with AAA a "Request for Mediation" along with the appropriate fees, a copy of requested mediators marked in preference order, and a preference for available dates.

4. If AAA is selected to coordinate the mediation (Administrator), within 10 Working Days from the receipt of the initiating party's Request for Mediation, the opposing party shall file the following:

    a) A copy of the list of the preferred mediators listed in preference order after striking any mediators to which they have any objection.

    b) A preference for available dates.

    c) Appropriate fees.

5. If the parties cannot agree on a mediator, then each party shall select a mediator and those mediators shall select the neutral third party to mediate the matter.

3-5.3 Forum of Litigation. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. It is the express intention that all legal actions and proceedings related to the Contract or Agreement with the City or to any rights or any relationship

between the parties arising therefrom shall be solely and exclusively initiated and maintained in courts of the State of California for the County of San Diego.

SECTION 4 - CONTROL OF MATERIALS

4-1.3.1 **General.** To the "WHITEBOOK", ADD the following:

1. Steel pipe in sizes larger than 18 inches shall require inspection at the source of production.

2. City lab staff or a qualified inspection agency approved by the Engineer shall witness all welding, lining, coating, and testing. You shall incur additional inspection costs outlined in 4-1.3.3, "Inspection of Items Not Locally Produced".

3. All parts of production (including but not limited to product fabrication, welding, testing, lining, and coating of straight pieces and specials) shall be performed or produced in the United States.

4. Welding and all testing shall be performed by certified welders and testing staff with credentials traceable in the United States.

4-1.3.2 **Inspection by the Agency.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The City will provide inspection and testing laboratory services within the continental United States within a 200-mile radius of the geographical limits of the City.

4-1.3.3 **Inspection of Items Not Locally Produced.** To the "WHITEBOOK", DELETE in its entirety.

ADD:

4-1.3.3 **Inspection of Items Not Locally Produced.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. When you intend to purchase materials, fabricated products, or equipment from sources located more than 200 miles (321.9 km) outside the geographical limits of the City, City Lab staff or a qualified inspection agency approved by the Engineer, shall be engaged at your expense to inspect the materials, equipment, or process.

2. This approval shall be obtained before producing any material or equipment. City Lab staff or inspector shall evaluate the materials for conformance with the requirements of the Plans and Specifications. You shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by City Lab staff or the approved agent. Approval by said agent shall not relieve you of responsibility for complying with the requirements of the Contract Documents.

3. The Engineer may elect City Lab staff to perform inspection of an out-of-town manufacturer. You shall incur additional inspection costs of the Engineer including lodging, meals, and incidental expenses based on Federal Per Diem Rates, along with travel and car rental expenses. If the manufacturing plant operates a double shift, a double shift shall be figured in the inspection costs.

   a) At the option of the Engineer, full time inspection shall continue for the length of the manufacturing period. If the manufacturing period will exceed 3 consecutive weeks, you shall incur additional inspection expenses of the Engineer's supervisor for a trip of 2 Days to the site per month.

   b) When the Engineer elects City Lab staff to perform out-of-town inspections, the wages of staff employed by the City shall not be part of the additional inspection expenses paid by you.

   c) Federal Per Diem Rates can be determined at the location below:

      https://www.gsa.gov/portal/content/104877

4-1.3.5 Special Inspection. To the "WHITEBOOK", ADD the following:

5. The payment for special inspection Work specified under this section shall be paid in accordance with 4-1.3.4.1, "Payment".

4-1.3.6 Preapproved Materials. To the "WHITEBOOK", ADD the following:

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

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF WORK

ADD:

6-3.2.1.1 Environmental Document.

1. The City of San Diego has prepared a **Consistency Evaluation and Final Environmental Impact Report** for **Miramar Landfill Gas Recovery Improvements Project**, with **Project No. 122833**, as referenced in the Contract Appendix. You shall comply with all requirements of the Consistency Evaluation as set forth in **Appendix A.**

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

6-8.1.1 Requirements Preparatory to Requesting a Walk-through. To the "WHITEBOOK", ADD the following:

2. You shall notify the Engineer to arrange a final inspection of permanent BMPs installed and shall obtain the completed, signed, and stamped DS-563 Form 30 Days prior to the issuance of the Notice of Completion**.**

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7-3 INSURANCE. To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

7-3 INSURANCE.

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

7-3.1 Policies and Procedures.

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

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

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

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

5. Policies of insurance shall provide that the City is entitled to 30 Days (10 Days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

7-3.2 Types of Insurance.

7-3.2.1 Commercial General Liability Insurance.

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

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

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

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

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

7-3.2.2 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.

7-3.3 Rating Requirements. Except for the State Compensation Insurance Fund, all insurance required by this Contract as described herein shall be carried only by responsible insurance companies with a rating of, or equivalent to, at least "A-, VI" by A.M. Best Company, that are authorized by the California Insurance Commissioner to do business in the State, and that have been approved by the City.

7-3.3.1 **Non-Admitted Carriers.** The City will accept insurance provided by non-admitted, "surplus lines" carriers only if the carrier is authorized to do business in the State and is included on the List of Approved Surplus Lines Insurers (LASLI list).

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

7-3.4 **Evidence of Insurance.** Furnish to the City documents e.g., certificates of insurance and endorsements evidencing the insurance required herein, and furnish renewal documentation prior to expiration of this insurance. Each required document shall be signed by the insurer or a person authorized by the insurer to bind coverage on its behalf. We reserve the right to require complete, certified copies of all insurance policies required herein.

7-3.5 **Policy Endorsements.**

7-3.5.1 **Commercial General Liability Insurance.**

7-3.5.1.1 **Additional Insured.**

1. You shall provide at your expense policy endorsement written on the current version of the ISO Occurrence form CG 20 10 11 85 or an equivalent form providing coverage at least as broad.

2. To the fullest extent allowed by law e.g., California Insurance Code §11580.04, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured.

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

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

    b) your products,

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

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

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

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

    b) your products, or

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

7-3.5.1.2 **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.

7-3.5.1.3 **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.

7-3.5.2 **Commercial Automobile Liability Insurance.**

7-3.5.2.1 **Additional Insured.** Unless the policy or policies of Commercial Auto Liability Insurance are written on an ISO form CA 00 01 12 90 or a later version of this form or equivalent form providing coverage at least as broad, the policy shall be endorsed to include the City and its respective elected officials, officers, employees, agents, and representatives as additional insured, with respect to liability arising out of automobiles owned, leased, hired or borrowed by you or on your behalf. This endorsement is limited to the obligations permitted by California Insurance Code §11580.04.

7-3.6 **Deductibles and Self-Insured Retentions.** You shall pay for all deductibles and self-insured retentions. You shall disclose deductibles and self-insured retentions to the City at the time the evidence of insurance is provided.

7-3.7 **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.

7-3.8 **Notice of Changes to Insurance.** You shall notify the City 30 Days prior to any material change to the policies of insurance provided under this Contract.

7-3.9 **Excess Insurance.** Policies providing excess coverage shall follow the form of the primary policy or policies e.g., all endorsements.

7-4 **NOT USED.** To the "GREENBOOK", DELETE in its entirety and SUBSTITUTE with the following:

7-4 **WORKERS' COMPENSATION INSURANCE AND EMPLOYERS LIABILITY INSURANCE.**

1. In accordance with the provisions of §3700 of the California Labor Code, you shall provide at your expense Workers' Compensation Insurance and

Employers Liability Insurance to protect you against all claims under applicable state workers compensation laws. The City, its elected officials, and employees will not be responsible for any claims in law or equity occasioned by your failure to comply with the requirements of this section.

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

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

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

7-4.1. **Waiver of Subrogation.** The policy or policies shall be endorsed to provide that the insurer will waive all rights of subrogation against the City and its respective elected officials, officers, employees, agents, and representatives for losses paid under the terms of the policy or policies and which arise from Work performed by the Named Insured for the City.

ADD:

7-6 **THE CONTRACTORS REPRESENTATIVE.** To the "GREENBOOK", ADD the following:

1. Both the representative and alternative representative shall be employees of the Contractors and shall not be assigned to a Subcontractor unless otherwise approved by the City in writing.

7-8.6 **Water Pollution Control.** To the "WHITEBOOK", ADD the following:

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

7-20 **ELECTRONIC COMMUNICATION.** To the "WHITEBOOK", ADD the following:

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

7-21.1 **General.** To the "WHITEBOOK", item 3, DELETE in its entirety and SUBSTITUTE with the following:

3. During the construction phase of projects, the minimum waste management reduction goal is 90% of the inert material (a material not subject to decomposition such as concrete, asphalt, brick, rock, block, dirt, metal, glass, and etc.) and 65% of the remaining project waste. You shall provide

appropriate documentation, including a Waste Management Form attached as an appendix, and evidence of recycling and reuse of materials to meet the waste reduction goals specified.

SECTION 209 – PRESSURE PIPE

209 PRESSURE PIPE. To the "WHITEBOOK", ADD the following:

2. 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.

SECTION 217 – BEDDING AND BACKFILL MATERIALS

217-2.2 Stones, Boulders, and Broken Concrete. To the "GREENBOOK", Table 217-2.2, DELETE in its entirety and SUBSTITUTE with the following:

TABLE 217-2.2

Zone	Zone Limits	Maximum Size (greatest dimension)	Backfill Requirements in Addition to 217-2.1
Street or Surface Zone	From ground surface to 12" (300 mm) below pavement subgrade or ground surface	2.5" (63 mm)	As required by the Plans or Special Provisions.
Street or Surface Zone Backfill of Tunnels beneath Concrete Flatwork		Sand	Sand equivalent of not less than 30.
Trench Zone	From 12" (300 mm) below pavement subgrade or ground surface to 12" (300 mm) above top of pipe or box	6" (150 mm)	
Deep Trench Zone (Trenches 3' (0.9 m) wide or wider)	From 60" (1.5 m) below finished surface to 12" (300 mm) above top of pipe or box	Rocks up to 12" (300 mm) excavated from trench may be placed as backfill	
Pipe Zone	From 12" (300 mm) above top of pipe or box to 6" (150 mm) below bottom of pipe or box exterior	2.5" (63 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour).
Overexcavation	Backfill more than 6" (150 mm) below bottom of pipe or box exterior	6" (150 mm)	Sand equivalent of not less than 30 or a coefficient of permeability greater than 1-½ inches/hour (35 mm per hour). Trench backfill slurry (100-E-100) per 201-1 may also be used.

SECTION 302 – ROADWAY SURFACING

302-4.12.4 **Measurement and Payment.** To the "WHITEBOOK", item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. The payment for RPMS shall be the total square footage used on the project calculated using the method described and shall be paid under the following Bid items:

BID DESCRIPTION	UNIT
Rubber Polymer Modified Slurry (RPMS) Type I	SF
Rubber Polymer Modified Slurry (RPMS) Type II	SF
Rubber Polymer Modified Slurry (RPMS) Type III	SF
Rubber Polymer Modified Slurry (RPMS) Type I (Bike Lane)	SF

The Bid items for RPMS shall include full compensation for the specified surface preparation not included in other Bid items and shall include the Work necessary to construct the RPMS as specified on the Plans. Sweeping, removals, and furnishing the aggregate required for the mix design shall also be included in this Bid item.

302-5.9 **Measurement and Payment.** To the "WHITEBOOK", item 2, DELETE in its entirety

SECTION 304 –METAL FABRICATION AND CONSTRUCTION

304-5 **PAYMENT.** To the "WHITEBOOK", REVISE section "**304-5**" to "**304-6**".

SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

306-7.8.2.1 **General.** To the "WHITEBOOK", item 2, ADD the following:

a) Specified test pressure for Class 235 pipe shall be 150 psi.

b) Specified test pressure for Class 305 pipe shall be 200 psi.

SECTION 600 - ACCESS

ADD:

600-1 **GENERAL.** To the "WHITEBOOK", item 5, DELETE in its entirety and SUBSTITUTE with the following:

5. If the City's crews are unable to provide the citizens with the mandated services due to your failure to comply with these specifications, you shall

collect trash, recyclables, and yard waste on the City's schedule and deliver to the City's designated locations. If you fail to perform this Work, you shall incur additional costs for the City to reschedule pick up of an area.

EQUAL OPPORTUNITY CONTRACTING PROGRAM (EOCP) SECTION A – GENERAL REQUIREMENTS

4.1 **Nondiscrimination in Contracting Ordinance.** To the "WHITEBOOK", subsection 4.1.1, paragraph (2), sentence (1), DELETE in its entirety and SUBSTITUTE with the following:

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.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

TECHNICALS

SCS ENGINEERS

Technical Specifications
Miramar Landfill Gas Recovery Improvements Project
San Diego, California

Presented to:

City of San Diego

Environmental Services Department
Waste Reduction and Disposal Division
9601 Ridgehaven Court
San Diego, California 92123-1686

Presented By:

SCS ENGINEERS
8799 Balboa Avenue, Suite 290
San Diego, California 92123
(858) 571-5500

December 11, 2017
File No. 01210150.01 Task 2241

Offices Nationwide
www.scsengineers.com

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SPECIFICATION TABLE OF CONTENTS

SPECIFICATION TABLE OF CONTENTS, continued

DIVISION 1

GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 PROJECT LOCATIONS AND ACCESS

A. PROJECT LOCATION:
   1. The Site (also referred to as Project Site) is at the Miramar Landfill located at 5180 Convoy Street, in San Diego, CA 92111. The Site is owned and operated by the City of San Diego Environmental Services Department (OWNER). [Note that other facilities, including the North City Compressor Station (NCCS) (currently operated by Fortistar, LLC (Fortistar)), the Metro Biosolids Center (MBC), and the North Flare Facility (NFF) will require connections of valves and associated landfill gas (LFG) piping and other appurtenances under this Contract Work.]

1.2 SCOPE OF WORK

A. DEFINITION OF OWNER'S DESIGNATED REPRESENTATIVES AND AGENTS
   1. Where ever referenced within these Contract Documents, the term "OWNER" would also include any of its designated representatives or agents, including:
      a. SCS Engineers, Long Beach, California, Project Design.

1.3 SCOPE OF WORK

A. General: Work included in the contract consists primarily of the construction of a new Central Blower System (CBS), consisting of Blower System and Aftercooler System skid units to be located at a centralized location of the Project Site. In addition, the Work will include the addition of landfill gas (LFG) collection and conveyance piping, valves, condensate sumps, electrical connection to aforementioned facilities, fiber optic installation and miscellaneous appurtenances to provide connection to these facilities located on the landfill property. These facilities are both City owned and operated and/or owned and operated by other entities for the Project Site. The Work is more fully detailed in the Drawings and Specifications included herein.

B. Principal Features include the following:
   1. Mobilization and demobilization of equipment, labor, construction of temporary facilities, and adherence to environmental and storm water requirements.
   2. Installation of LFG components, which include but are not limited to, a new central blower system (CBS), landfill collection and header piping, pneumatic and electric control valves and associated appurtenances, electrical connections and operation (to and of aforementioned facilities), electrical controls, programming, integration, fiber optic installation and condensate collection sumps.
   3. Installation of a new centralized blower system.
   4. Surveying/record documentation.

C. The above description of the Work is for general information only, and does not limit the responsibility of the CONTRACTOR to accomplish the Work in strict accordance with the Drawings and Technical Specifications (Contract Documents).

D. Environmental Observations: The Work shall be performed in strict accordance with the applicable requirements of the federal, state and local agencies having jurisdiction, and in accordance with the requirements of the Drawings, Special Provisions, and these Technical Specifications (Contract Documents).

1.4 DRAWINGS, CODES AND STANDARDS

A. All work to be completed by the CONTRACTOR under the Contract; and, materials and equipment transported, handled, stored or installed shall be performed in strict conformance with the applicable orders, rules and regulations of the United States Government, State of California, and with all other applicable federal, state and local requirements. Nothing contained in these specifications or shown or noted on the Drawings shall be construed to permit work not conforming to these orders, rules and regulations.

B. When drawings or specifications call for material or construction of a better quality or larger size or capacity than may be required by applicable codes or standards, the provisions of the Drawings and/or Technical Specifications shall take precedence over the requirements of the code or standard. If there is any other conflict between the Drawings or Technical Specifications and the requirements of applicable codes and standards, the more stringent provisions shall govern.

C. See also Section 01090 – References.

1.5 MANUFACTURERS' SPECIFICATIONS AND INSTRUCTIONS

A. *Unless otherwise indicated or specified*, all manufactured materials, products, processes, equipment, or the like shall be installed or applied in accordance with the manufacturers' instructions, directions, or specifications. Said installation or application shall be in accordance with printed instructions furnished by the manufacturer of the material or equipment concerned for use under conditions similar to those at the Project Site. Copies of such instructions shall be furnished to the OWNER and his/her acceptance thereof obtained before work under this Contract is begun.

B. Any deviation from the specified or manufacturers' printed recommendations shall be explained and acknowledged as correct for the circumstances, in writing by the particular manufacturer. Such acknowledgement and explanation shall be included as part of the approved submittal. The CONTRACTOR will be held responsible for all installations not conforming to the manufacturers' recommendations. If any item of material or equipment is found to be not installed in accordance with the manufacturer's recommendations, the CONTRACTOR shall make all changes necessary to achieve such compliance at their own expense.

1.6 WORK QUALITY

A. Shop and field work shall be performed by mechanics and workers skilled and experienced in the fabrication and installation of the work feature involved. All Work under this Contract shall be performed in accordance with the best practices of the various trades involved and in accordance with the U.S. Code of Federal Regulations, Title 49, Part 192, the Contract Drawings, reviewed shop drawings, and these Technical Specifications.

B. All Work shall be erected and installed plumb, level, square and true, or true to indicated angle, and in proper alignment and relationship to the work of other trades. All finished Work shall be free from defects and damage.

C. The OWNER reserves the right to reject any materials and work qualities which are not considered to meet the general standards of the various trades involved. Such inferior material or work quality shall be repaired or replaced by the CONTRACTOR, as directed by the OWNER or their authorized representative, at no additional cost to the OWNER.

1.7 FIELD MEASUREMENT AND TEMPLATES

A. CONTRACTOR shall secure all field measurements required for proper and accurate fabrication and installation of the Work included in this Contract. Exact measurements are the CONTRACTOR's responsibility. CONTRACTOR shall also furnish or obtain all templates, patterns, and setting instructions

required for the installation of all Work. All dimensions shall be verified by the CONTRACTOR in the field, and documentation of measurements shall be furnished to the OWNER or their representative. Final dimensions of field fabricated work shall be documented in as-built drawings.

1.8 TESTING LABORATORY

A. The OWNER will select and pay for the services of a testing laboratory(s) to conduct compaction tests on the engineered fill, concrete testing, test welds on pipe and other tests, unless otherwise specified in the Contract Documents. The costs of retests or additional testing caused by the CONTRACTOR's failure to meet specified installation or material requirements may be deducted from the payment due to CONTRACTOR at the discretion of the OWNER.

B. The CONTRACTOR will be responsible for notifying the OWNER at least 48-hours in advance to schedule the services of testing laboratory personnel so that an OWNER authorized representative may be present for such testing.

1.9 PERMITS AND LICENSES

A. CONTRACTOR shall obtain a business license for his work and the work of each of his subcontractor's, and a construction permit (plumbing, electrical, fire etc.) from the Building Department or other departments as applicable and pay for all licenses and permits. The CONTRACTOR shall also currently be licensed to handle hazardous waste associated with landfills. Failure of the CONTRACTOR to obtain the required licenses and permits in a timely manner so as to not delay work progress shall not be grounds for change order or price adjustments. Contractor responsible for coordinating all work and scheduling inspections required to satisfy Building Department.

1.10 MITIGATION MEASURES

A. CONTRACTOR comply with all Federal, State and Local regulations applicable to the activities related with the construction of the project. This includes compliance with any existing permit conditions and /or mitigation measures issued by the San Diego Air Pollution Control District (SDAPCD) or any other regulatory agency.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. This section summarizes the work included in each bid item listed on the Schedule of Quantities and Prices, and defines the methods of measurement and payment for each.

B. Pay items listed in the bid schedule are the only pay items for the project. Any other items necessary for a complete project, but not shown in the bid schedule shall be considered incidental and costs are to be included in other items.

C. The bid items will be paid by Unit Prices or Lump Sum, as applicable. They constitute all of the materials, equipment, labor costs, profit, markup, and overhead for the completion of the scope of work.

D. Expenses for project management, meetings, construction quality control, Health and Safety or for providing miscellaneous temporary or accessory works and services, including but not limited to Contractor's field offices and sheds, job signs, sanitary requirements, testing, safety devices, submittals, water supplies, dust control, power, maintaining traffic, removal of CONTRACTOR generated waste, watchmen, security, cleanup, and all other conditions of the Contract Documentsshall be equally distributed across all bid items.

E. Monthly Payment Applications for Lump Sum and Unit Price Items in progress, if applicable, shall be based on actual or observed quantities at the end of each month as documented by the CONTRACTOR and approved by the OWNER and/or ENGINEER, if requested by the OWNER. During the last week of the month, the CONTRACTOR is responsible for providing the OWNER with current red-lines and updated construction schedule for construction that has occurred during that month. The OWNER will consider the information provided by the CONTRACTOR and other information as necessary before making a determination on the percent complete on each pay item for the month.

1.2 RELATED DOCUMENTS

A. Construction Drawings, Special Provisions, and Technical Specification apply to this Section.

1.3 FIELD MEASUREMENT FOR PAYMENT

A. The Contractor shall compute all quantities of work performed or of materials and equipment delivered to the site for payment purposes.

B. The OWNER will conduct his own conformance survey to verify quantities calculated by the Contractor.

1.4 PAYMENT

A. Payment will be full compensation for furnishing all labor, materials, tools, equipment, transportation, permit fees, services, and incidentals, as specified, and for performing all work necessary for completing the erection or installation of the item or work classification, including all adjusting, testing, cleaning, and all other incidental work.

B. Full compensation for all expenses involved in conforming to the requirements for measuring materials or work shall be considered as included in the unit or lump sum prices paid for the materials or work being measured, and no additional compensation will be permitted.

C. Full compensation for an item of work for which no measurement or payment is specified will be considered to be included in the applicable related item of work in the Bid Schedule or incidental of the Contract.

1.5 VALUES OF UNIT PRICES

A. The number of units and quantities contained in the Bid Schedule are approximate only, and final payment will be made for the actual number of units and quantities, which are incorporated in or made necessary by the work included in this Contract.

B. In the event that work and materials or equipment are required to be furnished to a greater or lesser extent than is indicated by the Construction Drawings and Specifications, such work and materials or equipment shall be furnished in greater or lesser quantities.

1.6 CHANGES AND EXTRA WORK

A. Changes and extra work ordered by the OWNER will be measured and paid for consistent with the requirements of City of San Diego's (City's) Greenbook and/or Whitebook.

1.7 REJECTED MATERIALS

A. Quantities of material wasted or disposed of in a manner not called for under the Contract. Rejected loads of material, including material rejected after it has been placed by reasons of the failure of the CONTRACTOR to conform to the provisions of the Contract; material not unloaded from the transporting vehicle; material placed outside the limits indicated on the Construction Drawings or established by the City; or material remaining on hand after completion of the work, will not be paid for, and such quantities shall not be included in the final total quantities. No compensation will be permitted for loading, hauling, and disposing of rejected material. Contractor is responsible for removing rejected and unused materials from site.

PART 2 - PRODUCTS

NOT USED.

PART 3 - EXECUTION

3.1 DESCRIPTION OF PAYMENT ITEMS

A. Central Blower System (CBS) - 3-300 Hp Blower, Aftercooler System with Demisters (2) +Interconnect Piping (Complete, Supplied by PEI or Equivalent)

1. Measurement: Measurement for this item will be on a lump sum (LS) basis, as determined by the OWNER.

2. Payment:

a. Payment for this item will be at the contract lump sum price, and shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Contract Documents. Payment shall cover all Work for procurement and installation of the CBS, tested and ready for use.

b. Payment for this item will include the following sub-items:

i. Site preparation, removal and restoration of existing ground surfaces, grading and compaction (of underlying foundation soils),

ii. Placement and compaction of coarse aggregate beneath concrete foundation and base aggregate over the surface of the facility;

iii. Supply and placement of non-woven geotextile weed barrier below base aggregate;

iv. Transportation, unloading and installation of Blower Skid and Aftercooler Skid Equipment (CBS),

v. Installation of interconnecting piping between new CBS, existing NCCS and wellfield. Furnishing and installing of HDPE pipe and fittings, flow element, pressure transmitters, SS instrumentation tubing, valves, pipe support, fittings, gauges, lighting, mounting post, brackets, hardware, and associated fittings and appurtenances, complete and in place, tested and ready for use.

vi. Anchoring equipment; and miscellaneous materials (i.e., bolts, nuts, washers, gaskets, piping [condensate drains and air supply line], valves [condensate drain line valves, and air supply valves at pneumatic fail safe valve], etc. not provided by suppliers of equipment) for successful connection of equipment. Payment shall constitute full compensation for all materials, labor, equipment, and work incidental thereto, including blower laser alignment, participation in the equipment start-up and validation tests, and providing performance demonstration, necessary to complete this item in accordance with the Technical Specifications and Construction drawings.

B. Equipment Concrete Pads (2 CBS)

1. Measurement: Measurement for this item shall be on an installed cubic yard (CY) basis, as measured during the conformance survey conducted by the OWNER on the project.

2. Payment:

a. Payment for this item will be at the contract per cubic yard price will include compensation for all labor, material, equipment, transportation, tools, forms, falsework, bracing, and all other items necessary, to install equipment structural concrete pads at the CBS.

b. No separate payment will be made for structural permits, clearing and grubbing, excavation and/or removal and/or relocating obstructions, vegetating adjacent areas disturbed by slab construction, preparing the subgrade; for furnishing and placing all materials including cushion material, all reinforcement, bar supports, joints, expansion joint materials, and for any other materials, manipulations, labor, tools, equipment, finishing, curing, testing and incidentals necessary to complete the work.

C. 36", 30", 20" HDPE SDR-26 Pipe - Above/Below grade

1. Measurement: Measurement for this item shall be on an installed linear foot (LF) basis of 36-inch, 30-inch, and 20-inch diameter HDPE SDR-26 header/lateral piping, as measured during the conformance survey conducted by the OWNER on the project.

2. Payment: Payment will be on an installed linear foot basis of 36-inch, 30-inch and 20-

inch diameter SDR-26 HDPE header piping. Payment includes excavation, trenching and backfill, concrete collars, soil compaction, warning tape, fittings (including flanges, tees and reducers), piping, connections, testing (pneumatic pressure test and backfill field density testing), and incidentals. Contractor shall note that based on the topographic surface provided in the construction drawings is dated 2014 and may be different from actual field conditions. It is the Contractor's responsibility to account for all necessary trench depths to complete the project in bid price for other items. Payment shall constitute full compensation for all material, labor, equipment and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

D. 12", 8", 6",4" HDPE SDR-17 Pipe - Above/Below grade

1. Measurement: Measurement for this item shall be on an installed linear foot (LF) basis of 12-inch, 8-inch, 6-inch and 4-inch diameter HDPE SDR-17 header/lateral piping, as measured during the conformance survey conducted by the OWNER on the project.

2. Payment: Payment for this item will be at the contract unit price per linear foot. Payment includes excavation, trenching and backfill, transport of excavated materials, placement and compaction of backfill, fittings (including flanges, tees and reducers), pipe, testing (pneumatic pressure test and backfill field density testing), and incidentals. Contractor shall note that based on the topographic surface provided in the construction drawings is dated 2014 and may be different from actual field conditions. It is the Contractor's responsibility to account for all necessary trench depths to complete the project in bid price for other items. Payment shall constitute full compensation for all material, labor, equipment and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

E. 4" HDPE SDR 11 Condensate Drip Pipe

1. Measurement: Measurement for this item shall be on an installed linear foot (LF) basis, as measured during the conformance survey conducted by the OWNER on the project.

2. Payment: Payment for this item will be at the contract unit price per linear foot of installed 4-inch condensate drip leg for the project. Payment includes fabrication of sump drip leg by Contractor or Supplier. The Work shall include, but not be limited to, excavation, backfill placement and compaction, bentonite, pipe, fittings, QED easy level indicator and easy bolts, equalization valve assembly, monitoring port assembly, other required accessories/ materials, connections, and testing (pneumatic pressure test and backfill field density testing). Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

F. 3" x 6" HDPE SDR-11 Dual-Contained Condensate Return Pipe/Forcemain Pipe

1. Measurement: Measurement for this item will be on an installed linear foot (LF) basis of 3-inch x 6-inch diameter dual contained SDR-11 HDPE condensate forcemain piping installed in a separate or common lateral trench, as measured during the conformance survey conducted by the OWNER on the project. Dual contained condensate return piping will be installed outside the waste footprint/on native ground.

2. Payment: Payment for this item will be at the contract unit price per linear foot. Payment includes fittings, piping, connections, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

G. 2" HDPE SDR-11 Condensate Return Pipe/Forcemain Pipe

1. Measurement: Measurement for this item will be on an installed linear foot (LF) basis of 2-inch diameter single contained SDR-11 HDPE condensate force main piping installed above grade or below grade (a separate or common lateral trench), as measured during the conformance survey conducted by the OWNER on the project. Single contained condensate return piping will be installed within the waste footprint.

2. Payment: Payment for this item will be at the contract unit price per linear foot. Payment includes excavation, trenching and backfill, soil compaction, warning tape, fittings (including flanges), piping, connections, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

H. 3", 2" HDPE SDR-9 Compressed Air Line Pipe

1. Measurement: Measurement for this item will be on an installed linear foot (LF) basis of 3-inch and 2-inch diameter SDR-9 HDPE air supply line installed above grade or below grade (in a separate or common lateral trench), as measured during the conformance survey conducted by the OWNER on the project.

2. Payment: Payment for this item will be at the contract unit price per linear foot. Payment includes fittings, piping, connections, testing, and incidentals. Payment for this item will be at the contract unit price per linear foot. Payment includes excavation, trenching, sand bedding and clean soil backfill, and soil compaction; and, fittings, piping, connections, testing, and incidentals. Payment shall constitute full compensation for all material, labor, equipment and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction drawings.

I. 42", 36" CMP Road Crossing

1. Measurement: Measuring for payment will be on an installed linear foot (LF) basis of 42-inch and 36-inch corrugated metal pipe (CMP), as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per linear foot. Payment includes pipe, excavation, backfilling, compaction, testing (backfill field density testing) HDPE pipe placement inside the casing, repair of the road to its original condition after construction and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

J. 36", 30", 24", 20", 12", 8" Manual Isolation Valves – Gear Operated Butterfly Type

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 36-inch, 30-inch, 24-inch, 20-inch, 12-inch and 8-inch diameter isolation valve (gear-operated butterfly valve) on the project area. Payment includes excavation, trenching, transport of excavated materials, backfill placement and compaction, valves, fittings, valve spacers, stem extensions, valve vaults, monitoring ports, bolt packs, gaskets, connections, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

K. 6", 4" Manual Isolation Valve – Lever Operated Butterfly Type

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 6-inch and 4-inch diameter isolation valve (lever-operated butterfly valve) on the project area. Payment includes excavation, trenching, transport of excavated materials, backfill placement and compaction, valves, valve vaults, fittings, valve spacers, stem extensions, monitoring ports, bolt packs, gaskets, connections, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

L. 20" SS Flowserv V-Port Modulating Valves and Pressure Transmitters for MBC flow/pressure control (Supplied by CBS manufacturer Perennial Energy Inc. or Equivalent)

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) unit basis, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract lump sum price to furnish and install a 20-inch stainless steel v-port modulating valve, flanges, pressure transmitter and any affiliated piping and fittings for connection to existing 20" LFG Header. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

M. 10" SS Flowserv V-Port Modulating Valves with 100% Duty Cycle Electric with modulating actuators (Supplied by CBS manufacturer Perennial Energy Inc. or Equivalent)

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) unit basis, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract lump sum price to furnish and install 10-inch stainless steel v-port modulating valves, actuators, flanges, reducers, pressure transmitter and any affiliated piping and fittings for connection to 2 existing fiber reinforced pipe (FRP) at the inlet to each of the flares at the North Flare Facility (NFF). Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

N. 10" SS Flowserv V-Port Modulating valve, 12" SS LFG Interconnect piping and instrumentation (Supplied by PEI or Equivalent)

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) unit basis, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract lump sum price to furnish and install a 10-inch stainless steel v-port modulating valve, pressure transmitter, flow transmitter, 12-inch stainless steel piping fully fabricated and welded (provided by manufacturer), and any affiliated piping and fittings for transition from stainless steel to HDPE for connection to existing 12-inch North City Compressor Station (NCCS) inlet header. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

O. 16", 12" Automatic Isolation Valve – Pneumatic

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 16-inch and 12-inch automatic isolation valve (pneumatic), as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 16-inch and 12-inch diameter automatic isolation valve (pneumatic) on the project area. Payment includes valves, fittings, solenoids, stainless steel tubing, valve spacers, stem extensions, monitoring ports, bolt packs, gaskets, connections, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

P. 3", 2" Air Line Isolation Valve

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 3-inch and 2-inch isolation valve, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed air supply isolation and blow-off valve. Payment will include 316 stainless steel ball valves with level handle and rated for 200 psi maximum pressure, fittings, pipe extensions and supports, connections, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

Q. 3", 2" Condensate Return/Forcemain Isolation Valve

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 2-inch isolation valve, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 2-inch diameter isolation valve. Payment will include 316 stainless steel ball valve with lever handle and rated for 150 psi maximum pressure, fittings, pipe extensions and supports, connections, and other incidentals. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

R. 20", 16", 14" Electrofusion Coupling

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 20-inch, 16-inch and 14-inch electrofusion coupling, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed coupling. Payment will include appropriate diameter coupling, pipe extensions and supports, connections, and other incidentals required to make the connection. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

S. 24" SS 10 x 24" HDPE SDR-26 Flange Assembly

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 24-inch flange assembly to transition from 24-inch stainless steel to 24-inch HDPE SDR 26, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed flange assembly to transition from 24-inch stainless steel to 24-inch HDPE SDR-26. Payment will include flanges, fittings, gaskets, bolt packs, pipe extensions and supports, connections, and other incidentals to transition from the 24-inch stainless steel tee and blind flange for future compressor station connection to 24-inch HDPE SDR-17 to

facilitate connecting to the discharge of the CBS to the 36-inch LFG pipe with a 30-inch x 24-inch and 36-inch x 30-inch reducers. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

T. 12" SS 10 x 12" HDPE SDR-17 Flange Assembly

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 12-inch flange assembly required to install new v-port modulating from 12-inch stainless steel to 12-inch HDPE SDR-17, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed flange assembly to transition from 12-inch stainless steel to 12-inch HDPE SDR-26. Payment will include flanges, fittings, gaskets, bolt packs, pipe extensions and supports, connections, and other incidentals to transition from the manufacturer provided 12-inch stainless steel LFG pipe (equipped with flow and pressure transmitters) to 12-inch HDPE SDR-17 to facilitate connecting to the existing NCCS 12-inch HDPE inlet pipe with a full size 12-inch tee. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

U. 12" FRP Flange Assembly

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 12-inch flange assembly to transition from 12-inch Fiberglass Reinforced Plastic (FRP) to new modulating valves (MVs), as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 12-inch flange assembly. Payment includes providing, fabricating, and installing new FRP in locations where new MVs (Item No. 29) and pressure transmitters (PTs) are required to be installed, flanges, reducers, pressure transmitter and any affiliated piping and fittings to connect to 2 existing fiber reinforced pipe at the inlet to each of the flares at the North Flare Facility (NFF). Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

V. 12" Inner /18" Outer HDPE SDR-17 Dual-Wall Condensate Sump (CS-1, CS-2, CS-3, CS-4 ad CS-5) w/4" Drainline, Isolation valves, QED AB-4BL Pump (Complete, Supplied by REP or Equivalent)

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of dual-wall condensate sump, as measured during the conformance survey conducted by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per each installed 18-inch/12-inch dual-contained condensate sump and pump. Payment includes fabrication of sump by Supplier (Real Environmental Products or approved equal). The Work shall include, but not be limited to, excavation, backfill, compaction, pipe, fittings, QED AP4 Ultra Short Bottom Inlet Pneumatic Pump, QED easy fittings and accessories, valves, sump cap, pressure gauge, air filter, air regulator, and cycle counter, piping, air supply and condensate discharge assemblies, other required accessories/materials, connections, and testing. Payment also includes connection of the pump to the condensate return/force main and air supply line and associated fittings and valves. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

W. Burn Ash (may contain Lead) Abatement for Vertical Extraction Well (Complete)

1. OWNER may elect to re-locate wells within the burn ash area as shown on the Construction Drawings.

2. Measurement: Measurement for this item shall be on a vertical foot (VF) unit basis of drilled vertical extraction well, as measured from existing ground surface to the bottom of the wellbore measured in the field and verified by the OWNER.

3. Payment: Payment for this item will be at the contract unit price per vertical foot drilled basis. Payment includes all materials, labor, equipment, work and health and safety including personal protection equipment requirements, to drill, remove, handle and dispose waste cuttings potentially containing burn ash (lead) in accordance with the latest provisions of Occupational Health and Safety Administration (OSHA) and other local, state, and federal regulations, the Technical Specifications and Construction Drawings.

X. Asbestos Abatement for Vertical Extraction Well (Complete)

1. Measurement: Measurement for this item shall be on a vertical foot (VF) unit basis of drilled vertical extraction well, as measured from existing ground surface to the bottom of the wellbore measured in the field and verified by the OWNER.

2. Payment:

   a. Payment for this item will be at the contract unit price per vertical foot drilled basis. Payment includes all materials, labor, equipment, work and health and safety requirements, to drill, remove, handle, line dump trucks with Visqueen, dispose on-site waste cuttings potentially containing asbestos in accordance with the latest provisions of Occupational Health and Safety Administration (OSHA) and other local, state, and federal regulations, the Technical Specifications and Construction Drawings.

   b. Offsite handling is not includes in these costs.

   c. Contractor shall include costs for water truck(s) to wet waste cuttings as they are brought to the surface.

   d. Drilling shall not commence prior to the approval of National Emission Standards for Hazardous Air Pollutants (NESHAP) form which shall be filed a minimum of 45-days prior to the anticipated start of drilling.

Y. 6" HDPE SDR-11 Vertical Extraction Well (Complete)

1. Measurement: Drilling and installation of vertical LFG extraction wells at the project site shall be measured on an installed vertical foot (VF) basis measured from existing ground surface to the bottom of the wellbore as measured in the field and verified by the OWNER.

2. Payment:

   a. Payment for this item will be at the contract unit price per vertical foot installed. Payment includes all drilling, boring, transport of waste materials, well aggregate quality control testing, transport and installation, soil and bentonite backfill, installing perforated and solid piping, pipe connections, well safety grates, and health and safety requirements. Payment shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

b. All activities necessary for handling refuse derived from gas extraction well drill cuttings. Also includes loading, hauling, and disposal of soil and refuse at an onsite location designated by the Owner.

Z. 6" SDR-11 HDPE Vertical Extraction Well (Complete) - Additional Drilling

1. Measurement: Additional drilling and installation of vertical LFG extraction wells at the project site beyond that established in the draft well schedule, shall be measured on an installed vertical foot (VF) basis measured from existing ground surface to the bottom of the wellbore as measured in the field and verified by the OWNER.

2. Payment:

a. Payment for this item will be at the contract unit price per additional vertical foot installed above and beyond footages established in the draft well schedules.

b. Payment includes all drilling, boring, transport of waste materials, well aggregate quality control testing, transport and installation, soil and bentonite backfill, installing perforated and solid piping, pipe connections, and health and safety requirements. Payment shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

c. All activities necessary for handling refuse derived from gas extraction well drill cuttings. Also includes loading, hauling, and disposal of soil and refuse at an onsite location designated by the Owner.

AA. Well Bore Abandonment

1. Measurement: Wellbore abandonment shall be measured on a vertical foot (VF) basis measured from existing ground surface to the bottom of the abandoned wellbore as measured in the field.

2. Payment. Payment for this item will be at the contract unit price per vertical foot of wellbore abandonment.

3. If drilling refusal is encountered by the CONTRACTOR due to any reasons including hard obstructions or perched liquids, CONTRACTOR shall continue drilling to attempt to pass the obstruction for at least 1-hour in the area of refusal.

4. If a borehole cannot be drilled to a sufficient depth to function as an effective extraction well, the Contractor will be directed by the Engineer to abandon the borehole. Therefore, this pay item will only be used as directed by the Engineer in writing. Payment includes all drilling, boring, transport of waste materials, transport and placement of waste, soil and bentonite backfill, and health and safety requirements. Payment shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Plans.

BB. Wellheads QED Quick-Change Orifice Plate Wellheads

1. Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of 2-inch wellheads, as measured during the conformance survey conducted by the OWNER.

2. Payment.

a. Payment for this item will be at the contract unit price per each installed 2-inch diameter QED Quick-Change Orifice Plate wellhead on LFG extraction wells and remote wellhead risers. Payment includes complete orifice plates, valving, fittings, piping, Solarguard™ flex hose, Fernco fittings, power clamps, extraction well and lateral HDPE SDR 17 riser piping above existing grade connections to laterals or headers and other necessary connections, gauges, monitoring/access ports, flow measurement devices, testing, and other incidentals.

b. Payment shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

CC. Well Bore Seal

1. Measurement: Measurement: Measurement for this item shall be on an installed per each (EA) unit basis of well bore seals, as measured during the conformance survey conducted by the OWNER.

2. Payment.

a. Payment for this item will be at the contract unit price per each installed 10 foot x 10 foot geomembrane well bore seal (HDPE, PVC, or approved equal. Payment includes all excavation, installation of wellbore seal, boot; stainless steel mounting clamps, backfill with protective cover and all other necessary connections, other incidentals.

b. Payment shall constitute full compensation for all material, labor, equipment, and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

DD. Electrical Pole work and Interconnect with Controls at CBS

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) basis as measured during conformance survey by the OWNER.

2. Payment.

a. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings. Complete, tested, and ready for use.

b. Payment shall also include the following sub-items:

i. A new 35 ft. Class 2 terminal pole with a 100 amp fusible cutout switch on the pole to disconnect the 15 kV power, near the existing terminal pole in the vicinity of the existing NCCS,

ii. 4” conduit with 15kV, 1/0 conductors, new 2 MW, 15 kV to 277/480V, stepdown transformer installed on a new 10-foot x 12-foot x 8-inch thick, 5,500 pounds per square inch (psi), pre-cast reinforced concrete slab with 5’ depth below-grade concrete enclosure, associated electrical duct work,

iii. (8) 4” conduits with (3) 600 kcMIL THHN conductors to the new CBS control panel,

iv. PLC-based Allen-Bradley CompactLogix control panel, copper to fiber ethernet switch to allow communications with the other PLCs/Control Panels located at various locations around the landfill via a new fiber optic network strung along

existing pole lines (see Item Nos. 58 and 59).

v. 1" conduit from the new terminal pole to the CBS skid control panel to bring the fiber optic cable to the control panel. A 1" conduit would also need to be run to the existing NCCS compressor skid ZTR control panel in order to run a Cat5 Ethernet cable, to allow communication from the CBS control panel to the NCCS Facility.

EE. Electrical Interconnect at Other locations with Controls and Programming/Start-up

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) basis as measured during conformance survey by the OWNER.

2. Payment.

a. Payment for this item will be at the contract lump sum price to furnish and install all material, equipment, and software for electrical and fiber interconnect, programming, start-up for communication between all control panels to continuously measure, display, transmit, and record flows and pressures at the control panel at the CBS. Includes excavation and backfill for concrete base and electrical conduit.

b. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings. Complete, tested and ready for use. Payment also includes the following sub-items:

i. Design and fabrication of an Allen-Bradley CompactLogix PLC control panel with an Allen-Bradley Panel View Plus 7 HMI touch screen and a copper to fiber Ethernet switch for the North Flare Facility (NFF). This control panel would control two modulating valves and monitor two pressure transmitters located on the 12-inch inlet FRP to each flare.

ii. Design and fabrication an Allen-Bradley CompactLogix PLC control panel with an Allen-Bradley Panel View Plus 7 HMI touch screen and a copper to fiber Ethernet switch for the Main Tee location. This control panel would control one modulating valve and monitor one pressure transmitter. Payment shall also include a 120V, 20A circuit to the control panel from the existing service panel located across the dirt haul road (distance approximately 150'), a 2MW stepdown transformer, as required, with 10-foot x 12-foot x 8-inch thick, 5,500 pounds per square inch (psi), pre-cast reinforced concrete slab with 5' depth below-grade concrete enclosure, associated electrical duct work, and other incidentals.

iii. Design and fabrication of an Allen-Bradley CompactLogix PLC control panel with an Allen-Bradley Panel View Plus 7 HMI touch screen and a copper to fiber Ethernet switch for Metro Biosolids Center (MBC). This control panel would control one modulating valve and monitor one pressure transmitter. The contractor would also need to provide a 120V, 20A circuit to the control panel from an existing lighting panel located in the MBC.

iv. PLC programming required for the controls and communication for each of the above control panels. Based on the process conditions at each control panel, the PLCs will control the modulating valves and monitor the pressure transmitters. The contractor will also be responsible for setting the IP addresses for each of the various control panels.

FF. Fiber Optic Installation including splices, termination and testing – CBS to North Flare Facility and Main Tee Location (Approximately 9,500 LF)

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) basis as measured during conformance survey by the OWNER.

2. Payment.

a. Payment for this item will be at the contract lump sum price to furnish and install fiber optic network connecting the consolidated blower system skid control panel with the two other control panels located at different locations at the landfill (North flare facility and Main Tee location) as shown on the drawings, including but not limited to main 6 fiber single-mode fiber optic cable starting at CBS, branches consisting of 6 fiber single-mode fiber optic cable; splicing, termination and testing of 6 fibers from each branch, thereby providing spare terminated tested fibers for backup as well.

b. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings. Complete, tested, and ready for use.

GG. 6" thick Pavement Removal and Replacement

1. Measurement: Measurement for payment is on a square foot (SF) basis, as measured during the preparation of conformance surveys performed by the OWNER.

2. Payment: Payment for this item will be at the contract unit price per square foot for pavement removal and replacement in like kind, including sub base aggregate materials.

a. Payment includes the following sub-items:

i. Special utility surveys to identify underground subsurface utilities, traffic coordination, and special City or other governing body oversight during the road crossing, trenching for the LFG Pipe placement work, backfill, testing, and repair of pavement.

ii. Procurement, hauling, placing and compacting embedment material, final backfill material, embankment and road surface structure.

iii. Payment shall constitute full compensation for all material, labor, equipment and Work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings.

HH. Fiber Optic Installation including splices, termination and testing – CBS to MBC (Approximately 7,000 LF)

1. Measurement: Measurement for this item shall be on an installed lump sum (LS) basis as measured during conformance survey by the OWNER.

2. Payment.

c. Payment for this item will be at the contract lump sum price to furnish and install fiber optic network connecting the consolidated blower system skid control panel with the one other control panel located at Metro Biosolids Center location as shown on the drawings, including but not limited to main 6 fiber single-mode fiber optic cable starting at CBS, branches consisting of 6 fiber single-mode fiber optic cable; splicing, termination and testing of 6 fibers from each branch, thereby providing spare terminated tested fibers for backup as well.

d. Payment shall constitute full compensation for all material, labor, equipment, and work incidental thereto, necessary to complete this item in accordance with the Technical Specifications and Construction Drawings. Complete, tested, and ready for use.

END OF SECTION

SECTION 01030

PROJECT PROVISIONS

PART 1. GENERAL

1.1 LFG ANALYSIS

A. Landfill gas (LFG) is approximately 50 percent methane, 50 percent carbon dioxide, and trace amounts of other gases. The gas is saturated with moisture and will support combustion.

1.2 UTILITIES

A. The CONTRACTOR is responsible for providing any temporary water, power, and sanitary facilities required at the site during the construction of the work.

B. The CONTRACTOR is responsible for locating above-ground and underground utilities and taking all necessary precautions to prevent damage or disruption to existing utility systems and hazards to the public and CONTRACTOR personnel and equipment.

1.3 ENVIRONMENTAL PROTECTION

A. The CONTRACTOR shall comply with the following:

1. Environmental Constraints:

a. Dust Control. Trucked water shall be used for dust control.

b. Odor Control. The odor control measures taken by the CONTRACTOR shall comply with the requirements of governing Agencies. Excavated materials causing odors shall be trucked to the accepting active face of Miramar landfill. Emphasis shall be given to the reduction of any other circumstances causing odors.

c. VOC Control. The CONTRACTOR shall be responsible for mitigating the release of volatile chemicals during all Contract Work activities, including monitoring chemical concentrations to protect site residents, the public, and workers.

d. Asbestos and lead Control. The CONTRACTOR shall comply with all applicable regulatory requirements for lead and asbestos. The CONTRACTOR shall be responsible for mitigating the release of asbestos fibers and lead ash, where designated on the Construction Drawings.

e. Explosion Protection. Caution shall be exercised on overnight stoppages to prevent methane accumulation. The CONTRACTOR shall be responsible for enforcing all additional explosion protection precautions according to the Guidelines prepared by SWANA Landfill Gas Division, Health and Safety Task Force.

f. Litter. The CONTRACTOR shall be required to control, collect, and truck all litter excavated or exposed by his work.

1.4 SAFETY AND PROTECTION

A. General. The CONTRACTOR is advised that the project site is an active municipal solid waste (MSW) landfill. As such, the CONTRACTOR shall prepare and submit a site- and job-specific health and safety plan to the OWNER in advance of the work, and be responsible for implementing those health and safety

procedures during the work. General and other considerations for health and safety plans at landfills are outlined in Sections A-H below.

1. The shall comply with all federal, state, and local safety codes, ordinances, and regulations, including the requirements of the Occupational Safety and Health Administration, the Division of Industrial Safety, State of California (Cal OSHA), and other such safety measures as may be required by the above-mentioned regulatory agencies whenever any work is being done within 50 feet of a refuse-filled area.

2. Landfill gas is colorless, can be odorless, may contain hydrogen sulfide, is combustible, and contains no oxygen. Landfill gas can also migrate through soil near the landfill. The CONTRACTOR is therefore advised of the need for precautions against fire, explosion, and asphyxiation when working in or near refuse-filled areas.

3. First aid facilities conforming at least to the minimum requirements of the Occupational Safety and Health Administration shall be provided in a readily accessible location or locations.

4. The CONTRACTOR shall make all reports as required by any authority having jurisdiction and shall permit all safety inspections of the work being performed under the Contract. Before proceeding with any construction work, the CONTRACTOR shall take the necessary action to comply with all provisions for safety and accident prevention.

5. The CONTRACTOR shall be prepared to respond to potential injuries, illnesses, or situations of imminent hazard to employees or public health and safety. Personnel from the nearest, local medical facility shall be contacted in case of a medical need, and the quickest route to this facility shall be determined in advance.

B. Landfill Safety Hazards:

1. Hazards that might occur could be one or more of the following:

   a. Fires may start or be started from exposed and/or confined decomposing solid waste.

   b. Fires or explosions may occur in confined or enclosed spaces.

   c. Landfill gases displace oxygen and may cause an oxygen deficiency in underground trenches, vaults, conduits, and structures.

   d. Heavy acid gases, including hydrogen sulfide (H_2S), may be present. H_2S is a colorless, toxic, flammable gas which, in low concentrations, has an offensive odor described as that of rotten eggs. It is unlikely that hazardous concentrations of H_2S will build up except in vaults or other confined spaces. In addition, H_2S quickly numbs the olfactory senses so that reliance upon odor can lead to a very dangerous condition and cause instant death.

   e. Wildlife which could represent hazards to humans includes rattlesnakes and black widow spiders. Rodents, birds, and stray dogs should be treated as potential hazards.

2. Air quality studies consistently show that concentrations of most potentially hazardous substances (Priority Pollutants) in the ambient air on and in the vicinity of sanitary landfills are well below threshold limits. However, in confined or enclosed areas or venting sources of gas on or adjacent to landfills, dangerous concentrations of combustible and possibly toxic gases may accumulate. Oxygen depletion may also occur in these areas of confinement; therefore, planning shall be performed followed by safety procedures, which shall be continuously observed.

3. The landfills may contain asbestos. CONTRACTOR shall have appropriate asbestos license or accreditation for abatement or training for all staff on the project. Additionally, appropriate level of Personal Protective Equipment (PPE) shall be used when working on the landfill.

4. A designated area of the landfill as shown on the Construction Drawings may contain lead ash. CONTRACTOR shall have appropriate licensure or accreditation for abatement or training for all staff on the project. Additionally, appropriate level of PPE shall be used when working on this designated area of the landfill.

C. Level of Protection:

1. Three levels of protection are described as follows:

   a. Level D: Coveralls, chemical-resistant boots with steel toe and shank, 5-minute escape mask and goggles.

   b. Level C: A NIOSH-approved half-face air purifying respirator with acid gas/organic vapor cartridges and goggles (or safety glasses) may be worn when none to very limited accidental exposure is anticipated. Appropriate protective clothing, e.g., Tyvek suit, chemical-resistant boots with steel toe and shank, goggles, inner and outer chemical-resistant gloves, and hard hat.

   OR

   c. Level C: A NIOSH-approved full-face air purifying mask connected by a hose to a portable combination-type nonorganic vapor/acid gas canister with HEPA filter. Appropriate protective clothing, e.g., Tyvek suit with gloves and boots.

   d. Level B: A portable, self-contained breathing apparatus with same protective clothing as mentioned above.

2. All clothing must be appropriately donned, secured, taped, and worn.

3. Based on prevailing site conditions, it is anticipated that Level C protection shall be enforced for activities performed within the waste footprint and Level D protection shall be enforced for activities performed in native areas. However, if higher levels of protection are necessary or anticipated, the CONTRACTOR will be compensated for the additional levels of protection; as provided by a Change Order when approved by the OWNER.

4. With consideration for the fact that excessive application of “level of protection” can also be a safety hazard (e.g., by causing accidents due to limitations of vision, clumsiness, and heat stress), the level of protection may be adjusted with the approval of the OWNER. Under no circumstances will personnel be allowed to be overexposed beyond allowable limits. If the OWNER/Engineer feels it is necessary to adjust the level of protection, the proper recommendations will be made.

5. Chemical cartridge respirators can be used for gaseous contaminants (not H2S) only if oxygen concentration is satisfactory and if the chemical contaminants have been identified, the concentrations are monitored, the cartridges are effective in removing the contaminants, and if the contaminants have good warning properties. If all of the above conditions cannot be satisfied, a special auxiliary plan is required. Air purifying respirators will not be used for protection in environments containing constituents which have poor warning properties and which are near, at, or above, or can reasonably be expected to be near, at, or above the threshold limit value. Initial characterization in conjunction with continuous monitoring of total hydrocarbons in ppm as methane can be used to monitor conditions to ensure dangerous levels are not reached. Written records of monitoring should be maintained.

6. Self-contained breathing apparatus or supplied-air masks shall be used when entering areas containing oxygen deficient atmospheres, unknown atmospheres, or atmospheres considered to be at or above Immediately Dangerous to Life and Health (IDLH) levels (as declared and published by NIOSH). Under no circumstances should any worker ever inhale raw, undiluted landfill gas.

7. The length of time a canister or cartridge is effective in removing hazardous material from the ambient air will depend on the concentration of hazardous material in the air and the level of effort required for a

worker to accomplish his assigned tasks. The higher the breathing rate, the more frequently canisters will need to be replaced. These maximum operating periods vary according to manufacturer, so it will be necessary to monitor the total usage of cartridges and canisters during all work requiring a respirator. Monitoring will be the responsibility of the CONTRACTOR.

8. The cartridges or respirators chosen will be rated for the removal of both organic vapors and acid gases. The type of respirator recommended has been based on an 8-hour day for each worker at the site. Disposable clothing, if worn, shall be worn only once and then securely bagged in plastic and placed in a trash receptacle. Under no circumstances shall workers be permitted to wear the disposable clothing or rubber boots off site.

D. Planning:

1. The address, telephone number, and location map of the local hospital and medical emergency room shall be prominently posted. In addition, the telephone number of ambulance and fire department/rescue units shall be posted.

2. Fires or explosions in confined areas are caused by a source of ignition. Smoking shall be strictly forbidden. Nonsparking and/or explosion-proof tools shall be used in vaults, trenches, or other enclosed areas. Positive ventilation is required in construction shacks or other structures on or near a landfill. Temporary structures on the landfill surface shall be constructed on supports with a ventilated area under the main floor.

E. General Requirements:

1. The CONTRACTOR shall assign a site Safety Officer during the course of the work. The site Safety Officer shall conduct safety orientation and instruction at all meetings with all workers prior to the start of operations. This person shall be trained in the use of all of the recommended safety equipment. The workers shall be advised concerning the kind and degree of hazard associated with the operations and the safety precautions required. Any persons employed after the initiation of operations shall also be oriented and instructed on said safety hazards and precautions.

2. Smoking or open flames are prohibited within the site construction area (Work Area) or as directed by the OWNER.

3. No worker shall be allowed to work alone at any time in or immediately near trenching/excavation areas. Another worker shall be present at the site, but shall maintain a safe distance to preclude possible adverse impacts from landfill gas or potential cave-ins.

4. Periodically during construction, the work area shall be monitored for levels of methane and hydrogen sulfide with results recorded and available for review by the OWNER.

5. No worker shall handle excavated refuse, if present, without wearing work gloves.

6. Construction equipment shall be equipped with a vertical exhaust at least 5 feet above grade and/or with spark arrestors.

7. Motors utilized in the excavation/trenching area(s) shall be explosion-proof.

8. No welding shall be permitted in or within 50 feet of an excavation/trench area or as directed by the OWNER.

9. All personnel must wear hard hats.

10. A minimum of two fire extinguishers of the 50-pound dry chemical type shall be maintained or kept within easy access of working area.

11. Startup and shutdown of equipment shall not be done in areas of exposed refuse.

12. In addition to conforming to the safety rules and regulations of governmental authorities having jurisdiction, the CONTRACTOR is advised of the presence of methane gas emanating from the natural decomposition of refuse buried at or near the work area and shall take precautions to ensure the safety of workers and the public.

13. The CONTRACTOR shall demonstrate to the OWNER on a daily basis that all safety equipment is functioning properly, that all monitoring instruments are calibrated, and that the instrument operators are sufficiently knowledgeable in the use of the safety equipment.

14. A copy of the safety plan shall be posted at the job-site (work area). Scheduled meetings shall be held to review the safety program.

15. The CONTRACTOR shall adequately identify and guard all hazardous areas and conditions by visual warning devices and, where necessary, physical barriers. Such devices shall, at a minimum, conform to the requirements of Cal OSHA.

16. No excavation or trench greater than 12 inches deep shall be left open overnight unless securely covered with a steel plate of sufficient size to prevent access to the hole/excavation and sufficient thickness to support expected loads. The plate shall be weighted down to discourage removal by unauthorized persons. The edges of the plate shall be covered with a sufficient quantity of soil to prevent gas from escaping. Barricades shall be placed around the covered hole/excavation outside the range of possible cave-in.

F. Safety Equipment:

1. Prior to commencement of the construction of any work item under the Contract, the CONTRACTOR shall provide the following equipment:

a. Hard hats, work gloves, coveralls, and chemical-resistant boots with steel-toe and shank for all personnel.

b. First aid kit, eye wash station, stretcher, and blankets.

c. Two fire extinguishers, 50-pound dry chemical-type.

d. No smoking signs.

e. Air purifying respirators (with acid gas/organic vapor cartridge) for each worker and observer with replacement cartridges which fit the respirator.

f. Two parachute-type harnesses and safety lines (as applicable).

g. Methane/oxygen indicator.

h. Hydrogen sulfide indicator.

i. Barricades.

j. Ladders.

k. Clean water, soap, and paper towels.

G. Procedures for Trenching and Pipe Installation

1. CONTRACTOR shall submit to the OWNER, in advance of the excavation of any trench or trenches 4 feet or more in depth, detailed plans showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during excavation of such

trench or trenches. The plans shall be prepared and signed by a registered civil or structural engineer, and shall comply with the shoring system standards set forth in the Construction Safety Orders in Article 6, Chapter 4, Subchapter 4, Title 8 of the California Code of Regulations. Shoring, bracing, sloping, or other protective systems shall not be less effective than the ones required by the California Construction Safety Orders.

2. Safe and suitable ladders, which project 2 feet over the top of the trench, shall be provided for all trenches over 5 feet in depth. A minimum of one ladder shall be provided for every 100 feet of open trench or fraction thereof and shall be located so that workmen in the trench need not move more than 50 feet to a ladder.

3. All persons working near the edge of the excavations shall be secured with a safety belt and life line for protection from caving. No more than 4 feet of slack shall be allowed in the tether line.

4. Solvent cleaning, gluing, bonding, and/or welding pipe shall be performed outside the excavation whenever possible. Forced ventilation shall be provided when such work is performed in a trench deeper than 3 feet.

5. The construction of piping trench, which exposes landfill trash to the atmosphere, shall be staged such that no more than 100 linear feet of trench is exposed at any time prior to backfilling. The trenches shall not be left open overnight or when work is not in progress.

1.5 SITE CONDITIONS

A. The CONTRACTOR shall be responsible for having determined to his/her satisfaction, prior to the submission of his bid, the nature and location of the work, the conformation of the ground, the character and quality of the landfill, the type and quantity of materials to be encountered, the character of equipment and facilities needed preliminary to and during the execution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract. The prices established for the work to be done will reflect all costs pertaining to the work. Any claims for extras based on landfill or groundwater table conditions will not be allowed.

PART 2 PRODUCTS

NOT USED.

PART 3. EXECUTION

NOT USED.

END OF SECTION

SECTION 01090

REFERENCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. References and abbreviations of various industry associations, trade associations, societies, organizations, and regulatory agencies, as referenced in the Contract Documents.

1.2 REFERENCES

A. The Contract Documents contain references to various standard specifications, codes, practices, and requirements for materials, workmanship, installation inspections, and tests, which references are published and issued by the organizations, societies, and associations listed below by abbreviation and name. Such references are hereby made a part of the Contract Documents to the extent cited.

B. Any material, method, or procedure specified by reference to the number, symbol, or title of a specific specification or standard, such as a Commercial Standard, American National Standard, Federal or State Specification, Industry or Government Code, a trade association code or standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the date of Award of the Contract.

C. The code, specification, or standard referred to, except as modified in these Technical Specifications (Specifications), shall have full force and effect as though printed in these Specifications. These Specifications and standards are not furnished to bidders since manufacturers and trades involved are assumed to be familiar with their requirements. The OWNER will furnish, upon request, information as to how copies of the referenced specifications and standards may be obtained.

D. Whenever the abbreviation is specified, it shall be understood to mean the full name of the respective organization as listed in paragraph 1.03 of this Section.

1.3 ABBREVIATIONS

A. Whenever the abbreviation is specified, it shall be understood to mean the full name of the respective organization as listed below.

1. AASHTO American Association of State Highway and Transportation Officials.
2. ACI American Concrete Institute.
3. AGA American Gas Association.
4. AI Asphalt Institute.
5. AIA American Institute of Architects.
6. AICHE American Institute of Chemical Engineers.
7. AISC American Institute of Steel Construction.
8. AISI American Iron and Steel Institute.
9. ANSI American National Standards Institute.
10. API American Petroleum Institute.
11. AREA American Railway Engineering Association.
12. ARI Air-Conditioning and Refrigeration Institute.
13. ASCE American Society of Civil Engineers.
14. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers.
15. ASME American Society of Mechanical Engineers.
16. ASQC American Society for Quality Control.

17. ASTM ASTM International.
18. AWS American Welding Society.
19. AWWA American Water Works Association.
20. CEC California Electric Code.
21. CBM Certified Ballast Manufacturers.
22. CFR Code of Federal Regulations.
23. CGA Compressed Gas Association.
24. CRSI Concrete Reinforced Steel Institute.
25. EPA Environmental Protection Agency.
26. ETL Electrical Testing Laboratories.
27. FS Federal Specification.
28. IEEE Institute of Electrical and Electronics Engineers.
29. IES Illuminating Engineering Society.
30. IPCEA Insulated Power Cable Engineer Association.
31. ISA Instrument Society of America.
32. ITL Independent Testing Laboratories.
33. MIL U.S. Military Specification.
34. NEC National Electrical Code.
35. NEMA National Electrical Manufacturers Association.
36. NETA International Electrical Testing Association.
37. NFPA National Fire Protection Association.
38. NSF National Sanitation Foundation.
39. OSHA Occupational Safety and Health Administration.
40. PPI Plastics Pipe Institute.
41. SMACNA Sheet Metal and Air Conditioning Contractor's National Association.
42. SSPC Society for Protective Coatings.
43. UBC Uniform Building Code.
44. UL Underwriters Laboratories.
45. UMC Uniform Mechanical Code.
46. UPC Uniform Plumbing Code.
47. USBR U.S. Bureau of Reclamation.
48. WCRSI Western Concrete Reinforcing Steel Institute.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01190

HEALTH AND SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hazardous site conditions, potential for hazards, and general requirements for the protection of health and safety of personnel involved in the execution of the Work

B. General requirements for trench safety systems, and requires the CONTRACTOR to include trench safety within the Health and Safety Plan required by the CONTRACTOR.

C. General requirements for furnishing services of a Safety Monitor.

D. Requires that the CONTRACTOR submit a Health and Safety Program prior to the commencement of Work.

1.2 REFERENCES

A. The provisions of this Section are supplementary to other provisions specified elsewhere in the Contract Documents. If the requirements of this Section and General Conditions conflict, the CONTRACTOR shall adhere to the more stringent requirement as determined by the OWNER.

B. The CONTRACTOR shall be familiar with the Safety Guidelines as prepared by the Solid Waste Association of North America (SWANA) National Landfill Gas Committee. Copies may be obtained by writing or contacting SWANA Headquarters, 8750 Georgia Avenue, Suite 140, Silver Spring, Maryland 20910, telephone number (301) 585-2898.

C. Nothing in this Section shall preclude the CONTRACTOR from complying with the more stringent requirements of the most current applicable Federal, State, County, OWNER, and industry standards, rules and regulations.

1.3 RELATED SECTIONS

A. Section 01030 – Project Provisions

B. Section 01650 – Startup and Demonstration.

C. Section 01669 – Testing Piping Systems.

D. Section 02221 – Excavating.

E. Section 02225 – Trenching and Backfilling.

F. Section 02780 – Landfill Gas Piping.

G. Division 3 – Concrete.

H. Section 11310 – Condensate Sump Pumps and Pump Controls.

I. Section 11950 – Blower Skid and Enclosed Flare System.

J. Division 16000 – Electrical.

1.4 HAZARDOUS SITE CONDITIONS

A. The CONTRACTOR is advised that the construction of this project is being performed within, over and adjacent to buried wastes and refuse. As these buried materials decompose anaerobically, they will generate landfill gas (LFG), which normally consists of carbon dioxide (CO_2), methane (CH_4), and occasionally hydrogen sulfide (H_2S) and other gases, depending on the composition of the buried materials. These gases usually vent to the atmosphere through the cover soil, but may migrate laterally over 1,000 feet to adjacent areas depending on site and weather conditions.

B. Installation of LFG wells and gas collection piping will occur on the North, West Phase I (WPI) and West Phase II (WPII) landfills under this Contract Work. WPII is permitted for the disposal of "nonhazardous municipal solid waste". West Phase I (WPI) is an inactive landfill, and North landfill is closed. Notwithstanding the above, the OWNER cannot guarantee that toxic or hazardous materials or vapors will not be encountered by the CONTRACTOR during LFG drilling operations and gas collection system component installation in any area where work is to be completed under the Contract during the performance of this project.

C. The landfills may contain asbestos. CONTRACTOR shall have appropriate asbestos license or accreditation for abatement or training for all staff on the project. Additionally, appropriate level of Personal Protective Equipment (PPE) shall be used when working on the landfill.

D. A designated area of the landfill as shown on the Construction Drawings may contain lead ash. CONTRACTOR shall have appropriate licensure or accreditation for abatement or training for all staff on the project. Additionally, appropriate level of PPE shall be used when working on this designated area of the landfill. Note that City may elect to re-locate wells from designated lead ash area to other areas.

1.5 POTENTIAL FOR HAZARDS

A. The following landfill and LFG related information is included to assist the CONTRACTOR in developing his Safety Program and is not intended to encompass all steps that may be necessary to protect the CONTRACTOR's workers and comply with the most current version of the applicable regulations. A copy of the CONTRACTORS's Safety Program shall be submitted to the OWNER for its information.
   1. Landfill gases usually vent to the atmosphere through the cover soils, but may migrate laterally to adjacent areas depending on site and weather conditions.
   2. Landfill gases have the potential to create hazardous conditions if not controlled or recognized. Some of the hazards are:
      a. Fires may start spontaneously from exposed and/or decomposing refuse.
      b. Fires and explosions may occur from the presence of methane gas.
      c. Landfill gases may cause an oxygen deficiency in underground trenches, vaults, conduits, and structures.
      d. Hydrogen sulfide, a highly toxic and flammable gas, or other toxic gas may be present.
      e. Possible caving of trenches and excavations when working over or in refuse fills.

B. Pressure testing of header pipe components is required. This pressure test is designed to find leaks. If leaks are present, dangerous conditions may exist, and the header or lateral pipe requires repair.

C. Deep excavations, below water table are not expected. However, if encountered, shoring and dewatering the excavations will be required and appropriate safety precautions must be taken.

1.6 SAFETY MONITOR

A. The CONTRACTOR shall provide a person who will be designated as the Safety Monitor. The Safety Monitor shall be thoroughly trained in rescue procedures, and in the use of safety equipment and gas detectors. The Safety Monitor shall be present at all times during working hours whenever open trenches or excavations are greater than 2 feet in depth, when refuse is exposed or when LFG is likely to be present.

B. The Safety Monitor shall have appropriate and functional instruments (detector[s]) (i.e., 4-gas meter) to test for oxygen deficiency and for the presence of methane and hydrogen sulfide gases. Personal gas monitors suitable for the purpose intended shall be available at the work area for this purpose. The Safety Monitor shall periodically calibrate the instruments (at least once daily and maintain a log) (and regularly test the excavation areas, and other work space(s)) to ensure safe working conditions exist prior to and during the work; and, to ensure that appropriate safety equipment is available at the site.

C. The Safety Monitor shall have the delegated authority to order workers on the Project Site to comply with the site safety requirements. Failure to observe the Safety Monitor's order shall be cause for removal of the worker from the project.

1.7 SAFETY PROGRAM

A. Supplemental to the CONTRACTOR's regular safety program, develop appropriate additions to the plan that address the impact of landfill gas in the work area(s) and institute procedures to inform all workers and site visitors of the potential for the presence of methane and other landfill gases emanating from the natural decomposition of refuse buried at or near the job site and the importance of safety precautions to ensure the safety of workers and the public. The CONTRACTOR shall also instruct all workers and maintain strict control of construction activities to protect and maintain the integrity of the work features as they are installed.

B. CONTRACTOR shall prepare a Health and Safety Plan (H&S Plan), signed by a Certified Industrial Hygienist in the State of California, addressing worker safety during excavation, trenching, and backfill; and relocation of waste (if required). CONTRACTOR shall submit a copy of the H&S Plan to the OWNER. However, the OWNER will not be responsible for the adequacy of the H&S Plan in providing worker protection, or execution of the measures set forth in the H&S Plan. This H&S Plan will also include trench safety and LFG well drilling, as specified herein. A trench shall be defined as a narrow excavation (in relation to its length) made below the surface of the ground.

1.8 RECOMMENDED SAFETY PRECAUTIONS

A. In addition to conforming to the safety rules and regulations of governmental authorities having jurisdiction, the CONTRACTOR shall take the following precautionary measures:
   1. During construction, the workspace should be monitored for concentrations of methane and hydrogen sulfide. Workers shall not be permitted to enter a workspace where there is an oxygen deficiency or a combustible mixture of gases without appropriate protection. Positive fan-forced ventilation to dilute gas mixtures and avoid oxygen deficiency should be provided when work is necessary in any workspace.
   2. Smoking shall be strictly prohibited in all areas of the landfill.
   3. In the event toxic gases are present at concentration hazardous to the workers and the general public, the CONTRACTOR shall immediately evacuate all persons from the area until the area is determined safe by the Safety Monitor.
   4. Soil shall be stockpiled adjacent to work space in areas of exposed refuse for firefighting purposes.
   5. The use of explosives or firearms shall not be permitted on the site.
   6. If refuse is exposed during construction activities, it shall be covered as soon as possible after exposure with at least a 6-inch layer of soil. In no event shall the refuse remain exposed overnight, unless otherwise approved by the OWNER and/or the local health authorities.
   7. If refuse is excavated during construction activities, it shall be disposed of at the landfill working face or as directed by the OWNER. CONTRACTOR shall comply with San Diego County Air Pollution Control District rules and site operating practices for covering any excavated or exposed

refuse to control odors while performing this project. Refuse stockpiles shall be removed from the work site before the end of work each day.

8. No welding shall be permitted in trenches, enclosed areas, or over refuse unless performed in areas of the site tested and approved by the Safety Monitor.
9. Combustion engine powered construction equipment used in excavating activities and/or refuse removal operations shall be equipped with vertical exhaust and spark arrestors.
10. Electric motors and controls utilized in excavation areas and in below ground work space shall be explosion-proof.
11. As construction progresses, all pipe openings and valves shall be closed as soon as installed to prevent the migration of gases through the pipeline systems.

B. If not already included in the standard safety practices, the CONTRACTOR should include OSHA training (29 CFR 1910) and the following measures in his safety program:

1. Any personnel working near the edge of open excavations, manholes or similar construction should wear a parachute-type harness securely attached to a lanyard. The lanyard should be made as short as possible and securely fastened to a secure, non-movable object per the requirements of OSHA.
2. Workers shall not be allowed to work alone at any time in an excavation. Work parties of at least three workers shall be mandatory, with one worker outside of the hazard area and another worker within hailing distance to assist in an emergency.
3. Inhalation of landfill gases shall be avoided. Such gases or oxygen-deficient air may cause nausea and dizziness, which could lead to accidents. Work shall be performed upwind of the excavation where possible, unless the excavation is constantly monitored and declared safe. Stakes with flagging should be set at 100-foot intervals along the trench to show wind direction.
4. Workers shall avoid contact with exposed refuse, condensate, landfill gas, or leachate. Irritants or hazardous materials may be present.
5. No excavation or drilled hole greater than 12 inches deep shall be left unattended or left open at any time unless it is securely covered in a safe manner acceptable to the regulatory agency having jurisdiction.
6. Fire extinguishers consistent with the latest California Fire Code and with a rating of at least A, B, and C shall be available at all times on the site.
7. Startup and shutdown of equipment shall be avoided in areas of exposed refuse.
8. Personnel, when in an open excavation or in the presence of landfill gas, shall be fully clothed with non-sparking cloth, wear shoes with non-metallic soles, and wear a hard hat and safety goggles or glasses. The excavation shall be monitored continuously in a manner satisfactory to the Safety Monitor for the presence of methane, hydrogen sulfide and oxygen for the duration that personnel are in an excavation. Workers should immediately vacate an excavation if methane, hydrogen sulfide or oxygen deficiency is detected therein, and shall not be permitted to re-enter the excavation unless satisfactory precautionary measures for a safe work environment are implemented.
9. Assembly of construction work shall be performed outside of trenches or excavations. Prefabricated items shall be lowered into excavations. Only final connections may be made within trenches with the necessary precautions stated.

C. The previously listed recommended action levels are provided as reference only. The CONTRACTOR is fully responsible for developing their own site specific action levels as part of their Health and Safety Plan.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

SECTION 01650

STARTUP AND DEMONSTRATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Starting Systems.

B. Demonstration and Instructions.

C. Testing, Adjusting, and Balancing.

1.2 RELATED SECTIONS

A. Section 01700 – Contract Closeout.

B. Section 11310 – Condensate Pump and Pump Controls.

C. Section 11187 – Landfill Gas Blower and Aftercooler Skids.

D. Section 15100 – Valves and Appurtenances.

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify OWNER in writing a minimum of 7 days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of responsible manufacturer's representative for each specific system, and CONTRACTOR'S personnel in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel 2 weeks prior to date of final inspection.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months. Until all seasonal, if applicable, operation has been demonstrated the CONTRACTOR is not released from responsibility of equipment.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at designated location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01669

TESTING PIPING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The CONTRACTOR shall furnish all labor, materials, equipment, tools, and appurtenances required to pneumatically pressure test landfill gas and landfill gas related piping systems.

B. CONTRACTOR is responsible for repairing damage caused to pipe or related equipment as a result of the pipe test. All damaged items must be replaced or repaired to the satisfaction of the OWNER.

1.2 RELATED SECTIONS

A. Section 15100 – Landfill Gas Piping.

1.3 SUBMITTALS

A. CONTRACTOR shall submit a plan detailing how pipe tests will be conducted including a list of all equipment and materials that will be utilized. The plan shall indicate how, if any, the plan deviates from this Specification.

B. Test Reports.

PART 2 PRODUCTS

2.4 PROVISIONS

A. Provide air compressor flanges, caps, bulkheads and monitoring apparatus as necessary to complete the pressure test.

PART 3 EXECUTION

3.1 PREPARATION

B. Commence test procedures when following conditions have been met.
   1. Pipe section to be tested is clean and free of dirt, sand or other foreign material.
   2. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts. Use concrete if necessary.
   3. Add air slowly.
   4. Pressurizing equipment shall include regulator set to avoid over-pressurizing and damaging otherwise acceptable lines.

C. Provide necessary piping connections between section of line being tested and air supply, together with test pressure equipment, meters, pressure gauge, and other equipment, materials, and facilities necessary to make specified tests.

D. Furnish and install bulkheads, flanges, valves, bracing, blocking or other temporary sectionalizing devices that may be required.

3.2 TESTING EQUIPMENT

A. Provide equipment for this testing procedure.

B. Testing Equipment:
1. High Density Polyethylene flange adapter with steel blind flange.
2. Temperature gauge (0ºC to 100ºC) tapped and threaded into blind flange.
3. Pressure gauge (0 to 15 psig).
4. Ball valve to release pipe pressure at test completion.
5. High Density Polyethylene reducers to be used to adapt test flange to size of pipe being tested.
6. Air compressor shall provide adequate air supply for testing.
7. Pressurizing equipment shall include a regulator set to avoid over-pressurizing and damaging otherwise acceptable pipe.

C. Provide verification and results of gauge calibration performed less than 60 days prior to test.

3.3 TESTING EQUIPMENT

A. OWNER shall be given 2 working day notification prior to test.

B. Appropriate safety precautions must be in-place.

C. Pipe Test Segments:
1. Butt-fusion welded pipe segments.
2. Maximum test section length: 2,000 lineal feet.
3. Provide blind flange with test apparatus on one end and fused cap or blind flange assembly on opposite end.

D. Environment:
1. Bury test segment or lay test segment on ground surface and allow it to reach ambient temperature before test.
2. Perform test during period when pipe segment will be out of direct sunlight to minimize pressure changes as a result of temperature fluctuations.

E. Test:
1. Apply static test pressure of 10 psig to test segment.
2. Observe test pressure for 1-hour.
3. Correct pressure drop for temperature change.
4. Pressure drop over 1-hour period should not exceed 1%.
5. If retest is necessary, allow pressure to relax to 0 psig for a minimum of 4 hours prior to retest.

F. Test Failure.
1. If retest is necessary, allow pressure to relax to 0 psig prior to retest.
2. Perform the following when pipe segment fails test.
   a. Check entire length of pipe and fusion welds for cracks, pinholes, perforations or other possible leakage points.
   b. Check blocked risers and capped end for leakage and check gaskets at blind flanges.
   c. Verify leaks by applying soap water solution and observe for bubble formation.
3. Repair pipe and fused joint leaks by cutting out leak area and re-welding suitable replacement segments – as approved by the Engineer.
4. After leaks are repaired, retest.

G. Remove temporary sectionalizing device after tests have been completed.

3.4 TESTING EQUIPMENT

A. Each test shall be reported in writing to OWNER with 24 hours of completing each test. Provide report on Attachment 1 included with this section.

B. Include following information if failure occurs:
1. Location of failure segment.
2. Nature of leaks.
3. Details of repairs performed.
4. Retest results.

END OF SECTION

ATTACHMENT 1 TO SECTION01669
FORM
PIPE PRESSURE TEST REPORT

Project Name/No.: _____ Date: _____

Contractor: _____ Time: _____

Person Performing Tests: _____

Description/Location of Test Segment: (Pipe Diameter, Length, and SDRs).

Location of Pipe Test Segment
Station From: Station To:

T_i = Initial Temperature = _____ °C
P_i = Initial test pressure = _____ psig
P_c = Initial Pressure in psig corrected for temperature (T_t) at time "t"
t = Time in minutes from initiation of test
T_t = Temperature in °C at time 't'
P_t = Test pressure in psig at time 't'

$$P_c = \frac{(P_i + 14.7)(T_t + 273)}{(T_i + 273)} - 14.7$$

$$\text{Percent Pressure Drop} = \frac{P_c - P_t}{P_c} \times 100$$

Time (min)	T_t Temp Reading (°C)	P_t Gauge Pressure (psig)	P_c Corrected Pressure (psig)	Pressure Drop (%)
0				
20				
30				
40				
50				
60				

Pass/Fail: _____ Retest (yes/no) _____

Description/Nature of leaks repair of retest segment:

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout Procedures.

B. Final Cleaning.

C. Adjusting.

D. Project Record Documents.

E. Operation and Maintenance Data.

F. Warranties and Bonds.

G. Spare Parts and Maintenance Materials.

1.2 RELATED SECTIONS

A. Section 01650 – Startup and Demonstration.

B. Section 01730 – Installation, Operation, and Maintenance Instructions.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for OWNER's inspection.

B. Provide submittals to OWNER that are required by governing or other authorities and as required by specific Specification Sections.

C. Submit final Application for Payment identifying total adjusted contract sum, previous payments, and sum remaining due.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition.

D. Replace filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems that were impacted by the Project.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the record documents described in Section 01720 and this Section. Where requirements of this Section differ from the specific Specification section for the material or product, the specific Specification section shall govern. The record documents are listed below:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications – Legibly mark and record at each Product section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

E. Record Documents and Shop Drawings – Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish main floor datum, where applicable.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
   4. Field changes of dimension and detail.
   5. Details not on original Drawings.

F. Submit record documents to OWNER with final Application for Payment. Failure to maintain up-to-date status to the satisfaction of the OWNER could result in corresponding amounts of payment to be withheld until Record Documents are satisfactorily updated and complete.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit 2 sets of Operation and Maintenance (O&M) data for each piece of equipment (described in Section 01730 and this section) prior to final inspection, bound in 8½-inch x 11-inch text pages, three-D side ring binders with durable plastic covers. O&M data for equipment shall include, but not be limited to, the following:

1. All parts associated with landfill gas wellhead assemblies, vaults, and control valves.
2. All motorized equipment, e.g., condensate pumps, facility controls, Blower and Aftercooler skid equipment.
3. All appurtenances associated with the landfill gas piping, e.g., control valves, check valves, etc.
4. All associated parts with the building, e.g., emergency lighting, door equipment, panic hardware, heating units, lighting, venting, etc.

B. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents – Prepare a Table of Contents for each volume (e.g., VOL I, VOL II, etc.), with each Product or system description identified, type on 24-pound white paper.

E. Part 1 – Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.

F. Part 2 – Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
1. Significant design criteria.
2. List of equipment.
3. Parts list for each component.
4. Operating instructions.
5. Maintenance instructions for equipment and systems.
6. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

G. Part 3 – Project documents and certificates, including the following:
1. Shop drawings and product data.
2. Certificates.
3. Photocopies of warranties and bonds.

H. Submit one (1) copy of completed volumes in final form 15 days following the installation of all major components of the project (central blower system, 36-inch and 30-inch discharge piping, 30"x20" tee, NFF improvements etc.). This copy will be reviewed by OWNER and returned 5 days prior to final completion, with OWNER comments. Revise content of documents as required prior to final completion.

I. Submit final volumes (3 sets) revised, within 10 days after final inspection.

1.8 WARRANTIES

A. Provide duplicate notarized copies.

B. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

C. Provide Table of Contents and assemble in three-D side ring binder with durable plastic cover.

D. Submit 15 days prior to completion of all major component of the project (central blower system, 36-inch and 30-inch discharge piping, 30"x20" tee, NFF improvements etc.).

E. For items of work delayed beyond date in Item D, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.9 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver to Project site; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01730

INSTALLATION, OPERATION, AND MAINTENANCE INSTRUCTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation and submission of installation, operation and maintenance (O&M) instructions for mechanical and electrical equipment furnished by the CONTRACTOR.

B. The mechanical and electrical equipment are specified in the various Sections of the Specifications.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01340 – Shop Drawings.

C. Section 01700 – Contract Closeout.

D. Section 01720 – Project Record Documents.

E. Section 11187 – Landfill Gas Blower and Aftercooler System.

1.3 DESCRIPTION

A. The O&M instructions for equipment purchased and/or installed as part of this project shall incorporate the requirements specified herein. The CONTRACTOR shall integrate instructions from SUBCONTRACTORS with his submittal.

B. The CONTRACTOR shall submit to the OWNER for review, three (3) sets of O&M instructions not later than 15 days before scheduled shipment of the equipment.

C. The OWNER will review and return O&M instructions as provided below within 10 working days after receipt thereof, or within 10 days after receipt of all related information necessary for such review, whichever is later.

D. One set of O&M instructions will be returned, marked according to the guidelines of Section 01340 and as summarized below:
1. No Exceptions Noted.
2. Make Corrections Noted.
3. Revise and resubmit.
4. Rejected or Disapproved.
5. Submit Specified Item.

E. Defects discovered on review will be indicated on the O&M instructions or otherwise communicated to the CONTRACTOR in writing on return of the O&M instructions.

F. Within 15 days after receipt of O&M instructions, the CONTRACTOR shall revise the instructions in accordance with the directions for revision and shall resubmit three (3) sets of the revised O&M instructions.

G. If subsequent modifications to the equipment require revised operation and maintenance procedures, the

CONTRACTOR shall revise the O&M instructions to show the equipment as installed. Such revisions shall be by issue of replacement pages to the final O&M instructions, or by reissue of the O&M instructions at the CONTRACTOR's option. The revisions to the O&M instructions shall be submitted not later than 30 days following revision of the equipment.

1.4 CONTENTS

A. As specified in the following paragraphs, the instructions shall consist of title page, contents page, frontispiece, and information covering description, installation, operation, preventive maintenance, corrective maintenance, overhaul, parts list and list of recommended spare parts, and an appendix.

B. The title page shall include the name and function of the equipment, manufacturer's identification number, the OWNER's specification number and title, and the address and telephone number of the manufacturer or his representative, and person to contact for service, operation and maintenance.

C. The contents shall list all sections and subsection titles of the instructions with reference to the page on which each starts and a list of included drawings.

D. The frontispiece shall be a recognition illustration of the equipment described in the instructions.

E. The descriptive information shall consist of drawings and diagrams, and a physical and a functional description of the equipment including major assemblies and subassemblies.

F. The installation information shall cover pre-installation inspection, installation, calibration, and preparation for operation, both for initial installation and for installation after overhaul.

G. The operation information shall include step-by-step procedures for starting, restarting, operating, shutdown, and emergency requirements. The information shall also include performance specifications and operating limitations.

H. The maintenance information shall include step-by-step procedures for inspection, operation checks, cleaning, lubrication, adjustments, repair, overhaul, disassembly, and reassembly of the equipment for proper operation of the equipment. A list of special tools that are required for maintenance shall be included with the maintenance information.

I. The complete parts list and a list of recommended spare parts shall provide all necessary information, including part number and catalog item numbers if applicable, for identifying parts. Parts or assemblies obtained from another manufacturer shall be identified by the name of that manufacturer and his identifying part number. The size, capacity, or other characteristics of the part shall be supplied if required for identification.

J. The appendix shall include safety precautions, a glossary and, if available at time of submittal, copies of test reports, and other relevant material.

K. All information on material or equipment not used in the work shall be deleted from the O&M Manual.

L. Three sets of the O&M instructions in final form shall be suitable for scanning to PDF and saving on CD.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

DIVISION 2

SITE WORK

SECTION 02221

EXCAVATING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Preparation for excavation.

B. Performing excavations to prepare rough subgrade for the equipment and control panel concrete pads.

C. Excavation to bury new LFG header pipe in below-grade locations and to place condensate sumps to burial depth, including associated LFG header piping adjacent to sump locations.

D. Refuse excavation, where applicable on Construction Drawings.

1.2 RELATED SECTIONS

A. Section 02225 – Trenching and Backfilling.

1.3 FIELD MEASUREMENTS

A. Verify construction staking for the work is as designed.

1.4 SUBSURFACE CONDITIONS

A. A limited description of the subsurface conditions in the vicinity of the project site can be provided upon request.

PART 2 PRODUCTS

2.1 AREAS REQUIRING EXCAVATION

A. Equipment concrete foundations.

B. Trenching for LFG collection piping, condensate lines, air lines, electrical and control wiring, and other miscellaneous components as shown on the Construction Drawings.

C. Condensate sumps. All Condensate Sump locations as shown on the Construction Drawings.

PART 3 EXECUTION

3.1 GENERAL

A. Excavate as necessary to construct improvements in accordance with lines, grades, and dimensions shown and as necessary to accomplish this work. Excavate to tolerances provided in the following sections.

B. Do not over-excavate without written authorization of the OWNER.

3.2 PREPARATION

A. Locate and protect all existing groundwater monitoring systems, landfill gas monitoring systems, and leachate collection and control systems including buried force mains and electrical supply lines.

B. Perform construction staking to identify required excavation lines, grades and slopes and to provide construction control points.

C. Locate, identify, and protect utilities and landfill gas collection and control system components (i.e., leachate pumping facilities) from damage.

D. Notify utility company to locate utilities, if applicable. Subsurface utilities are located within and adjacent to the North City Compressor Station (NCCS), North Flare facility (NFF) and the 30”x20” tee intersection. Electrical and fiber optic connection will be required within and near these areas. CONTRACTOR is responsible to locate and protect existing subsurface utilities. Any damage to such utilities by the CONTRACTOR shall be replaced at their expense.

E. Provide for implementation and management of all SWPPP mandated BMPs.

F. Protect benchmarks, existing structures and fences from excavation equipment and vehicular traffic.

3.3 EXCAVATION

A. Excavate as necessary to construct improvements in accordance with the lines, grades, elevations and slopes indicated on Drawings.

B. Stockpile suitable excavated materials for possible use as trench backfill materials, or dispose in area(s) designated by the OWNER.

C. Tolerances.
1. Line: plus or minus 1.0 feet.
2. Grade: plus or minus 0.5 feet with an average of 0.0 feet.

3.4 REFUSE EXCAVATION

A. Where encountered, excavate existing waste to lines grades and dimensions indicated on the drawings and as needed to complete landfill gas collection and control system installation.

B. Load, haul and place excavated refuse in the active working face of the landfill or to an alternate location determined by the OWNER.

C. Coordinate haul of refuse to the active working face with the OWNER.

3.5 FIELD QUALITY CONTROL

A. Comply with Sections 01400 and 01410.

B. Provide for visual inspection of bearing surfaces.

END OF SECTION

SECTION 02225

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating trenches for utilities including:
   1. Landfill Gas Piping, which includes LFG collection pipe, condensate air supply and force main piping, buried electrical and instrumentation conduit, and all other piping associated with the landfill gas collection and control system (GCCS) as shown on the Construction Drawings.

B. Compacted fill from top of utility bedding to subgrade.

C. Backfilling and compaction.

1.2 RELATED SECTIONS

A. Section 02221 – Excavating.

B. Section 11310 – Condensate Sump Pumps and Pump Controls.

C. Section 15100 – Landfill Gas Piping.

D. Division 16 – Electrical.

1.3 REFERENCES

A. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

C. ASTM D2216 - Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

D. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

E. ASTM D2937 - Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method.

F. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

G. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

H. Unified Soil Classification System.

1.4 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.5 FIELD MEASUREMENTS

A. Verify that survey bench marks, control points, and intended elevations for the Work are as indicated on the Drawings.

1.6 COORDINATION

A. If applicable, verify work associated with lower elevation utilities is complete before placing higher elevation utilities. Below grade Utilities shall be constructed per City Standard Design requirements and per NEC or CEC, unless otherwise shown on the Construction Drawings.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Soil Pipe Bedding: Consists of excavated onsite sandy-soil material approved by the OWNER consisting of material free of organic matter, rock greater than 1-inch in diameter, refuse and rubble.

B. Aggregate Pipe Bedding: Use material approved by the OWNER which meets the following gradation.

U.S. Sieve Size	Percent Passing
¾-inch	100
½-inch	50-100
#40	15-40
#200	0 –10

C. Trench Backfill: Consists of excavated onsite soil material approved by the OWNER that is free of refuse and other organic matter, rubble(waste or irregular fragments), rocks greater than 2 inches in diameter.

PART 3 EXECUTION

3.1 PREPARATION

A. Locate and protect all groundwater monitoring systems, landfill gas monitoring systems, and leachate collection and control systems including buried force mains and electrical supply lines.

B. Perform construction staking to identify required excavation lines, grades and slopes and to provide construction control points.

C. Locate, identify, and protect utilities and LFG gas collection and control system components (i.e., leachate pumping facilities) from damage.

D. Notify utility company to locate utilities. The Project Site will require the CONTRACTOR to procure a private utility locator to determine locations of subsurface utilities in any area of the Contract Work. A High Pressure gas main and high voltage electrical conduits are located within the main access road locations where the LFG main Header will be constructed for the Work. As such, the CONTRACTOR shall exercise extreme caution when constructing this Work Element. Any damage to such utility shall be borne by the CONTRACTOR.

E. Provide for dust control.

F. Protect benchmarks, existing structures and fences from excavation equipment and vehicular traffic.

G. Excavations greater than 20 feet in depth shall be designed by a California Registered Professional Engineer.

3.2 EXCAVATING

A. Excavate soil and/or waste required for all Work.

B. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

C. Do not interfere with bearing splay of foundations.

D. Hand trim excavation for all equipment foundations.

E. Remove loose soil and rock.

F. Remove lumped subsoil, boulders, and rock greater than 1-inch in diameter.

G. Correct over-excavated in accordance with Paragraph 3.03 of this Section.

H. Shoring, Bracing and other methods may be required for road crossings near Tee intersection. CONTRACTOR shall take necessary safety precautions to perform the task.

3.3 BACKFILLING

A. Backfill trenches to contours and elevations shown on the Construction Drawings or existing conditions as applicable.

B. Systematically backfill in uniform lifts using suitable material. Depth of lift shall be such that its required compaction can be achieved in a reasonable period of time. Moisture content of backfill material shall be within 2% of optimum moisture content as determined by ASTM. Do not backfill over porous, wet, or spongy subgrade surfaces.

C. Place geotextile separator where indicated on the Construction Drawings.

D. Bedding Material: Place and compact bedding materials in equal continuous layers not exceeding 6 inches compacted depth. Compact each lift to a minimum of 90 percent relative compaction as determined by ASTM D1557.

E. Trench Backfill: Place and compact trench backfill in equal continuous layers not exceeding 8 inches compacted depth. Compact each lift to a minimum of 90 percent relative compaction as determined by ASTM D1557.

F. Employ a placement method that does not disturb or damage utilities in trench.

G. Maintain optimum moisture content of fill materials to attain required compaction density.

H. Remove surplus fill materials from site.

I. Preparation of trench bottom: Set structure directly on a 12-inch minimum thick layer of compacted aggregate base. Mounds or bridging will not be accepted. Provide adequate room for proper connections and maintain correct grade and alignment. Do not lay in a wet trench. If material in bottom of excavation is unsuitable for supporting the structure, excavate below subgrade as directed by OWNER and backfill to required grade with aggregate base. Backfill around structures with aggregate base material.

J. Lowering structures into trench: Provide proper implements, tools, and equipment for the safe and efficient handling of materials and execution of the work. Carefully lower all structures, fittings, valves, and accessories into the trench using suitable equipment in such manner as to prevent damage.

K. Prevent entrance of trench water, rodents, or foreign material into the structure. Remove water and place adequate backfill to prevent floating. Remove and re-install structures which have floated.

3.4 TOLERANCES

3.5 FIELD QUALITY ASSURANCE

A. Top Surface of Backfilling: Plus or minus 1 inch from required elevations.

B. The OWNER will determine optimum moisture content, maximum density, and plasticity index for engineered fill materials in accordance with ASTM D1557 and ASTM D4318.

C. In-place density and moisture content will be determined by one or more of the following methods: ASTM D2937, ASTM D2922, ASTM D1556, ASTM D2216, or ASTM D3017.

D. Cooperate fully with the OWNER in their performance of sampling and testing and in-place density and moisture testing.

E. Protect finished Work.

F. Reshape and re-compact fills subjected to vehicular traffic during construction. During Construction, trenching across main or otherwise commonly used haul and access roads shall be protected with metal plates per Caltrans Construction Standards during trench excavation so that vehicular traffic may safely pass over the trench area. CONTRACTOR shall coordinate main road trenching with the OWNER prior to constructing this Work element.

END OF SECTION

SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Excavation for post bases.

C. Manual gates and related hardware.

1.2 REFERENCES

A. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

B. ASTM A392 – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.

C. ASTM A1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High- Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

D. ASTM B6 – Standard Specification for Zinc.

E. ASTM F567 – Standard Practice for Installation of Chain-Link Fence.

F. ASTM F1043 – Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework.

G. ASTM F1184 – Standard Specification for Industrial and Commercial Horizontal Slide Gates.

H. Chain Link Fence Manufacturers Institute (CLFMI) - Product Manual.

1.3 SYSTEM DESCRIPTION

A. Fence Height: 8 feet.

B. Line Post Spacing: At intervals not exceeding 5 feet.

1.4 SUBMITTALS FOR REVIEW

A. Section 01300 - Submittals: Procedures for submittals.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

1.5 SUBMITTALS FOR INFORMATION

A. Manufacturer’s Installation Instructions: Indicate installation requirements.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM F567.

1.7 QUALIFICATIONS

A. Contractor may subcontract a fencing contractor to perform this Work. Fencing Contractor or CONTRACTOR shall furnish information for materials used for the Work, including but not limited to, plans, line post dimension and spacing, mesh, screening fabric, and other fencing materials as shown on the Construction Drawings, for review and approval by the OWNER, prior to starting the Work.

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. Materials and Components: Match style, finish, and color (if applicable) of each fence component with that of other adjacent fence components installed adjacent to the new landfill gas Blower/Aftercooler compound area. Materials used for Fence shall be new materials and of minimum dimension, gauge, etc., as shown on the Construction Drawings and/or approved by the OWNER, should they differ from that shown on the Construction Drawings and specified in these Technical Specifications.

2.2 FENCE FABRIC

A. Galvanized fabric conforming to ASTM A392, Class 1; galvanized after fabrication (weaving).

B. Zinc Coating shall conform to the grades specified in ASTM B6.

C. Height: As shown on Construction Drawings.

D. Wire Gauge: No. 6, unless shown otherwise on the Construction Drawings.

E. Pattern: 2-inch diamond-mesh.

F. Diamond Count: Manufacturer's standard and consistent for fabric furnished of same height.

G. Wires of Twisted Selvages:
   1. Twisted in a closed helix three full turns.
   2. Cut at an angle to provide sharp barbs that extend minimum ¼ inch beyond twist.

2.3 POSTS

A. General:
   1. Strength and Stiffness Requirements: Match existing post types.
   2. Steel Pipe: ASTM A153, Schedule 40.
   3. Roll-Formed Steel Shapes: Roll-formed from ASTM A1011 Grade 45, steel.
   4. Lengths: Manufacturer's standard with allowance for embedment below finished grade of 4 feet.
   5. Protective Coatings:
      a. Zinc Coating: ASTM F1043, Type A external and internal coating.

B. Line Posts:
   1. Steel Pipe:

a. Outside Diameter: 2.375-inch.
b. Weight: 3.65 pounds per foot.

2. Steel H-Section:
a. Outside Dimensions: 2.25-inch by 1.95-inch.
b. Weight: 4.10 pounds per foot.

C. End, Corner, Angle, and Pull Posts:
1. Steel Pipe:
a. Outside Diameter. 2.875-inch.
b. Weight: 5.79 pounds per foot.

D. Posts for Removable Fence Panels: As specified for end, corner, angle, and pull posts.

E. Posts for Swing Gates.
1. Steel Pipe:
a. Outside Diameter. 2.875-inch.
b. Weight: 5.79 pounds per foot.

2.4 TOP RAILS AND BRACE RAILS

A. Galvanized steel pipe.

B. Protective Coatings: As specified for posts.

C. Strength and Stiffness Requirements: New fence shall meet specified strength and stiffness for materials shown in this Section.

D. Steel Pipe:
1. ASTM A53, Schedule 40.
2. Nominal Diameter: 1-1/4 inch.
3. Weight: 1.806 pounds per foot.

2.5 FENCE FITTINGS

A. General: Similar to existing fittings.

B. Post and Line Caps: Designed to accommodate passage of top rail through cap, where top rail is required.

C. Tension and Brace Bands: Match existing.

D. Tension Bars:
1. One-piece, 3/16 x 3/4 inch.
2. Equal in length to full height of fabric minus 1 inch.

2.6 LINETOP FITTING

A. H-H Eyetop with fabricated extension to handle five wires.

B. Guard Wires: Five strands of 9-gauge wire for 96-inch high fence.

2.7 TENSION WIRE

A. Aluminum-coated steel marcelled tension wire not less than 9-gauge plus or minus 0.005 inch in diameter.

2.8 GATES

A. General:
1. Gate Operation: Opened and closed easily by one person.
2. Welded Steel Joints: Paint with zinc-based paint.
3. Chain Link Fabric: Attached securely to gate frame at intervals not exceeding 15 inches.

B. Swing Gates:
1. Hinges:
   a. Furnished with large bearing surfaces for clamping in position.
   b. Designed to swing either 180 degrees outward, 180 degrees inward, or 90 degrees in or out, as shown on the Construction Drawings, and not twist or turn under action of gate.
2. Latches: Plunger bar arranged to engage stop, except single gates of openings less than 10 feet wide may each have forked latch.
3. Gate Stops: Mushroom type or flush plate with anchors, suitable for setting in concrete. No stop is required for single gates.
4. Locking Device and Padlock Eyes: Integral part of latch, requiring one padlock for locking both gate leaves of double gates.
5. Hold-Open Keepers: Designed to automatically engage gate leaf and hold it in open position until manually released.
6. Support wheel: Furnish and install support wheel for gates over 8' wide per manufacturer.

C. Rolling Gates (as applicable):
1. Height: 96 inches at location shown on Drawings unless otherwise shown.
2. Track Rollers: Malleable iron or heavy pressed steel with provisions for grease lubrication.
3. Ground Rollers: Malleable iron or heavy pressed steel with provision for grease lubrications.
4. Support Posts: Spaced on maximum 7-foot centers.
5. Frames: ASTM F1184, Type I.
6. Gate Accessories: ASTM F1184.

2.9 CONCRETE

A. Provide concrete with a 28-day compressive strength of 3,500 psi, and the provisions under Section 03300.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install chain-link fence and gates in accordance with the fence manufacturer's recommendations.

B. Place fabric on outside of posts.

C. Set intermediate, terminal, gate, and posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: 2 feet.

E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: 2 feet.

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

G. Install center and bottom brace rail on corner gate leaves.

H. Do not stretch fabric until concrete foundation has cured 7 days.

I. Stretch fabric between terminal posts or at intervals of 50 feet maximum, whichever is less.

J. Position bottom of fabric 2 inches above finished grade.

K. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

L. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

M. Install bottom tension wire stretched taut between terminal posts.

N. Install gate with fabric to match fence. Install three hinges per leaf.

O. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

P. Provide support wheel to carry the vertical load of gate during all times of operation per manufacturer.

3.2 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/2 inch.

B. Maximum Offset From True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

END OF SECTION

DIVISION 3

CONCRETE

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars, wire fabric and accessories for cast-in place concrete.

1.2 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete.

B. Section 03345 – Concrete Finishes.

1.3 REFERENCES

A. ACI 301 – Structural Concrete for Buildings.

B. ACI 318-99 – Building Code Requirements for Reinforced Concrete.

C. ACI SP 66 – American Concrete Institute – Detailing Manual.

D. ANSI/ASTM A82 – Cold Drawing Steel Wire for Concrete Reinforcement.

E. ACI-315 Typ. Bar Bend.

F. ASTM A615 – Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

G. Tying wire shall conform to ASTM A112 except that galvanizing may be omitted.

H. AWS D12.1 – Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

I. CRSI – Concrete Reinforcing Steel Institute Manual of Practice.

J. CRSI 63 – Recommended Practice for Placing Reinforcing Bars.

K. CRSI 65 – Recommended Practice for Placing Bar Supports, Specifications and Nomenclature.

1.4 SHOP DRAWINGS

A. Submit shop drawings and schedules of all reinforcement required.

B. Indicate location, number required, size, length, and bending details of concrete reinforcement. Indicate concrete grade beams and piers shown in elevation to a scale not less than 1/2” = 1’0” with all cut reinforcement and additional reinforcement at openings clearly indicated. Indicate and label bar supports. Do not place reinforcement before shop drawings are approved.

C. Perform fabrication of reinforcement per approved shop drawings.

D. Perform detailing in accordance with ACI 315, and CRSI Manual of Standard Practice.

1.5 PERMITS

A. Contractor shall procure and pay for any structural, grading, building, stormwater or any other permits required for the execution of the scope of work.

1.6 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 MATERIALS

B. Unless otherwise specified or required, the design, materials, workmanship, and erection must conform to requirements of the latest local Building Code and the latest ACI 318-99 Code. In case of conflict, the more stringent Building Code governs.

C. Provide concrete reinforcement bars that are deformed steel bars of the sizes and shapes indicated on the Construction Structural Drawings. Provide steel that is newly-rolled stock of domestic manufacture, substantially free from mill scale, rust, dirt, grease, or other foreign matter.

D. Provide bars conforming with ASTM A615, Grade 60.

E. Rail-steel bars are not allowed in the work.

F. Accurately fabricate reinforcement to the dimensions indicated on the Construction Structural Drawings. Exercise particular care shall be exercised not to have stirrups oversize in order to maintain proper coverage of concrete. Stirrups and tie bars shall be bent around a revolving collar having a diameter not less then two times the minimum thickness of the bar. Bends for other bars will be made around a pin having a diameter not less than six times the minimum thickness except for bars larger than No. 8, in which case the bends shall be made around a pin of 3-bar diameters, unless otherwise shown on the Contract Structural Drawings. All bars shall be bent cold. Bars reduced in section or with kinks or bends not shown on the Construction Drawings will not be accepted.

G. Bars shall not be straightened or rebent in a manner that will injure the material. Heating of reinforcement bars will not be permitted.

H. Metal accessories for setting and fastening of reinforcement shall be furnished and installed in accordance with the general requirements of the ACI Specifications.

2.2 HANDLING MATERIALS

A. Ship reinforcement with bars of the same size and shape fastened in bundles with metal identification tags giving size and mark securely wired on. Label the identification tags with the same designation as shown on submitted bar schedules and Shop Drawings.

B. Store bars a minimum of 6 inches off the ground. Protect from moisture and be kept free from dirt, oil or injurious contaminants.

PART 3 EXECUTION

3.1 INSTALLATION

A. Do not weld reinforcing bars during fabrication or erection without prior written approval from the OWNER. Immediately remove bars that have been welded, including tack welds, without such approval.

B. Splice bars to the length indicated on the Construction Structural drawings. Stagger all bar splices unless otherwise indicated on the Construction Drawings. Splice bars in slabs, piers and cradles as indicated on the Construction Drawings. When splicing bars of different diameters, base the length of lap on the larger bar.

C. Provide ACI standard hooks. Closed stirrups may be fabricated in two pieces if they are adequately lapped when installed. Unless noted or shown otherwise, reinforcement, bar for bar, in size and location and with the proper embedment and splice lengths.

D. Reinforcement which is cut for openings in slabs must be supplemented by additional reinforcement unless noted or shown otherwise on the Construction Drawings. For each given face of concrete and direction of reinforcement, additional reinforcement must be at least equal in quantity and size to the cut reinforcement. Place half of the additional reinforcements on each side of the opening. Place two No. 5 bars, 3 feet long, diagonally across each intersection of additional reinforcement unless indicated otherwise on the Construction Structural Drawings.

E. Thoroughly clean loose mill and rust, scale, dirt, oil and other coatings including ice that reduce or destroy bond from reinforcement before placing in position. Where there is a delay in depositing concrete after reinforcement reinspect and clean bars where necessary.

F. Accurately position reinforcement as indicated on the Construction Structural Drawings, and secure against displacement by using zinc-coated annealed iron wire tires of not less than No. 16 gauge, or suitable clips at intersections. Support by concrete or metal supports, spacer or metal hangers.

G. Furnish and install all accessories such as chairs, chair bars, and the like as an integral part of the reinforcement and in sufficient quantity to satisfactorily position all steel. Provide plastic coated accessories where surfaces are exposed.

H. Unless indicated otherwise on the Construction Structural Drawings, provide concrete cover for reinforcement that is 2 inches clear for all members. Provide 3 inches clear cover at faces of concrete deposited directly against the ground. Clear distances apply to stirrups in beams and ties in columns. Provide minimum clear distance between adjacent bars of 2 inches horizontally and 1-inch vertically.

I. Firmly position reinforcement from the forms at all points, by means of standard construction practices subject to OWNER's approval.

J. Do not cover reinforcing steel with concrete until the amount and position of the reinforcement has been checked by the OWNER and his permission to proceed with the concreting has been given. Notify the OWNER at least 3 working days in advance of time concrete is to be poured so that OWNER will have adequate notice to provide Construction Oversight.

K. Install reinforcing continuous through construction joints, or as indicated on Construction Drawings.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cast-in-place concrete for building grade beams, walls, foundations, slabs, pits, pavements on grade, curbs, and drainage inlet structure.

B. Control and expansion, and contraction joint devices associated with concrete work, including joint sealants.

1.2 RELATED SECTIONS

A. Section 01700 – Contract Closeout.

B. Section 03200 – Concrete Reinforcement.

C. Section 03345 – Concrete Finishes.

1.3 REFERENCES

A. ACI 301 – Specifications for Structural Concrete.

B. ACI 305 – Hot Weather Concreting.

C. ACI 306R – Cold Weather Concreting.

D. ACI 360 – Design of Slabs on Grade.

E. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.

F. ASTM C33 – Concrete Aggregates.

G. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

H. ASTM C94 – Standard Specification for Ready-Mixed Concrete.

I. ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).

J. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete.

K. ASTM C150 – Standard Specification for Portland Cement.

L. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

M. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

N. ASTM C289 – Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

O. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

P. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.

Q. ASTM D1751 – Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-Extruding and Resilient Bituminous Types).

R. Submit under provisions of Section 01300.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

B. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.5 QUALITY CONTROL

A. Provide concrete conforming to all requirements of ACI 301 except as modified by the requirements below. Keep a copy of ACI 301 at the Project Site.

1.6 QUALITY ASSURANCE

A. Truck-mix ready-mixed concrete at the site.

B. Provide equipment for measuring and controlling the quantities of materials that is of approved design and tested before use.

C. Provide equipment for measuring the amount of water used in the concrete mix that is readily adjustable and capable of measuring water in variable amounts within a tolerance of 1 percent.

1.7 JOB CONDITIONS

A. Perform cold weather concreting in accordance with the requirements of "Recommended Practice for Cold Weather Concreting (ACI 306-Latest Revision)." These requirements are generally applicable between the dates of the earliest recorded first frost and the latest recorded last frost for the region. Do not place concrete between these dates unless preparations satisfactory to the OWNER have been made. All cold weather methods and materials are subject to OWNER's approval.

B. Perform hot weather concreting in accordance with "Recommended Practice for Hot Weather Concreting (ACI 305-Latest Revision)." All hot weather methods and materials are subject to OWNER's approval.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aggregates.
   1. Coarse and fine aggregates: natural origin conforming to ASTM C33. Do not use aggregates which are deleteriously reactive with the alkalis in cement as defined by ASTM C289.

B. Cement.
   1. Portland cement: approved domestic brand conforming to ASTM C150. Use Type I or Type II cement. Use one plant. Store cement well off the ground in a dry weatherproof structure.

C. Water.
   1. Water: potable, except that non-potable water may be used if mortar cubes made with the water in question have 7- and 28-day strengths equal to at least 90 percent of the strength of similar specimens made with potable water, when tested in accordance with ASTM C109.

D. Admixtures.
   1. Air entraining admixture: conform to ACI 301 and 360. As an alternative, air entraining Portland cement may be used.
   2. Densifying admixture: non-air entraining, normal setting type conforming to ASTM C494, Type A. Approved mixture: Plastocrete as manufactured by Sika Chemical Corp. or approved equal. Use densifying admixture per manufacturer's printed instructions.
   3. No admixture containing calcium chloride will be acceptable.

E. Concrete.

   1. Use normal weight concrete mix weighing approximately 145 pounds per cubic foot prepared with Portland cement, fine and coarse aggregate, water and densifying admixture. Concrete exposed to weather after completion of the project, must also contain air-entraining admixture.
   2. Constituents of the mix used and proportions thereof must be those of a design mix approved by the OWNER. Proportion the design mix to meet requirements as shown on Construction Drawing Sheet S1, Concrete Note 1.
   3. Base water content of each design mix on a curve showing the relationship between water content and 7-28-day compressive strengths of concrete made with the proposed design mix. Determine curves by four or more points, each representing an average value of at least 3 test specimens at each age, and with a range of values sufficient to yield the desired data, including all the specified compressive strengths without extrapolation. The exact water content of the concrete to be used, as determined from the curve, must correspond to a strength stated above.
   4. Provide concrete deposited in hot weather with a placing temperature which will not cause difficulty from loss of slump, flash set, or cold joints and in no event be greater than 80°F at the time of placing.
   5. In cold weather, temperature of dry ingredients of the mix must not exceed 80°F, and that of added water must not exceed 100°F. Temperature of the mix must not exceed 80°F. The temperature of the concrete placed must not be lower than 50°F.
   6. Truck-mix all concrete at the site in accordance with ASTM C94 unless approved otherwise in writing by the OWNER. Mix concrete batches for a minimum of 3 minutes. Place concrete not more than 90 minutes after water is first added to the dry ingredients. Provide the truck mixers of the revolving drum type which will thoroughly mix the concrete and discharge the same without separation. Mix each batch by revolving the drum not more than 125 revolutions and not less than 50 revolutions at a rate specified by the equipment manufacturer.

F. Waterstops:
   1. PVC dumbbell type, style 741, manufactured by Greenstreak Construction Products, or equal.
   2. Waterstop material: not weighing less than 47 pounds per 100 feet. Head pressure equal to 65 feet.
   3. Intersections and splices: butt welded.

G. Joint Sealer.
   1. Sikaflex A-A, manufactured by Sika Chemical Corporation or approved equal.

H. Expansion Joint Filler.
   1. Preformed non-extruding type conforming to ASTM D1751. Attach filler to the concrete on one

side of the joint with galvanized nails.

I. Liquid Membrane Curing Compound.
   1. Conforming to ASTM C309, such as Rez-Seal as manufactured by Euclid Chemical Company or approved equal. Provide compound that does not interfere with the application of paint dry shake hardener or other subsequent finish.

PART 3 EXECUTION

3.1 MEASURING MATERIALS

A. Measure materials by weight except as otherwise specified. Provide an apparatus for weighing the aggregates and cement suitably designed and constructed for this purpose. Provide scales certified by the local Sealer of Weights and Measures within 1 year of use. Weigh each size of aggregate and cement separately. Provide weighing devices with accuracy such that successive quantities can be measured to within 1 percent of the desired amount. Do not weigh cement in standard packages (sacks). Weigh bulk cement and fractional packages.

B. Measure water by volume or by weight. Provide water-measuring device capable of control to ½ percent accuracy. Dispense admixtures either manually with use of calibrated containers or measuring tanks, or by means of an approved automatic dispenser designed by the manufacturer of the specific admixture.

3.2 PREPARATION

A. Joints in Concrete.
   1. Make construction and contraction joints only where shown on the drawings or where permitted by the OWNER. Do not place contraction joints in walls, slabs, and pavement spaced more than 20 feet apart. Make joints in accordance with the details indicated on the drawings. Provide all joints subject to hydrostatic pressure with continuous waterstops. No reinforcement, concrete, pipe, conduit or other rigid material can run continuously through an expansion joint.
   2. Make construction joints in new concrete at the locations indicated on the drawings and at the locations established by the CONTRACTOR with the approval of OWNER. Allow at least 3 days lapse before casting units upon or adjacent to construction joints in walls.
   3. Clean surfaces of set concrete of all latent foreign matter and loose particles before depositing new concrete. Thoroughly retightened forms against adjacent previously placed concrete.

B. Built-in Items.
   1. Secure in place any specified built-in items such as pipe, conduit, sleeves, manhole steps, stair nosing, anchor bolts, dovetail slots, and other embedded items before commencing concrete placement. Provide two coats of zinc chromate paint over all embedded aluminum parts. Do not route conduits within concrete enclosing water containment areas.
   2. Waterstops: Provide virgin polyvinyl chloride (PVC) as indicated on the drawings or specified herein. Tie PVC waterstops to reinforcement so that they are securely and rigidly supported in the proper position during the placement of concrete. Fabricate PVC waterstop intersections such as tees, crosses, and ells at the factory or bench fabricate in the field.

C. Weather Conditions.
   1. Place concrete under suitable weather conditions. Do not place concrete when, in the opinion of the OWNER, weather conditions are not suitable for the proper placing, finishing, or curing of the concrete. Unless otherwise approved by the OWNER, place concrete during dry weather. In the event of sudden rainstorms, protect freshly placed concrete.
   2. Have on hand all materials necessary to protect the concrete in the event of adverse weather.

D. Formwork.
   1. Provide forms of plywood, plywood faced, or metal, conforming to the shape, lines and dimensions of the concrete as indicated on the Construction Drawings, and substantially and sufficiently tight to prevent leakage of mortar. Perform design and engineering of the formwork as

well as its construction. Coat inside of forms with non-staining mineral oil or other approved material to prevent adhesion of concrete to the forms.

2. Construct edges and corners in the finished work that are straight and true. Provide 1-inch chamfer on external corners unless noted otherwise noted on the Construction Drawings. For all faces which are exposed in the finished work, provide smooth forms built and treated so that when removed the concrete will be left with smooth, presentable surfaces, free from offsets, ridges, discoloration, or other unsightly defects. Remove deformed or otherwise defective forms. Provide form ties of bolt and rod design such that the end of the internal member will be recessed by a removable cone. Provide form ties with waterstops when used in concrete separating tanks from interior occupied areas.
3. Do not place concrete until all forms, bracing and reinforcement are in final secure position. Complete and inspect formwork prior to the placing concrete. Provide temporary openings near the base of wall forms and at other points where necessary to facilitate cleaning, inspection and placement of concrete.
4. Immediately before placing concrete, thoroughly clean and wet the space to be occupied by concrete such that it is free from all dirt, chips, and foreign material.
5. Before form material is reused, clean all surfaces in contact with concrete. Repair damaged places, remove nails and all protrusions.

3.3 INSTALLATION

A. Placement of Concrete:

1. Concrete may require special inspection per permit conditions or Construction Drawings. CONTRACTOR shall accommodate for/schedule inspections as necessary. Cost for inspection and any testing such as compressive strength testing shall be included in bid price for concrete pads.
2. Give OWNER at least 3 working days' notice before concrete is placed. Do not place at night. Take every precaution to make all concrete solid, compact, watertight and smooth, to prevent the formation of laitance and to avoid cold joints. Place all concrete for foundation and pavement on undisturbed soil or on concrete fill which is placed on undisturbed soil unless indicated otherwise on the Drawings.
3. Do not place concrete until reinforcing steel, pipes, conduits, sleeves, weep holes, hangers, anchors, waterstops, and other work required to be built into concrete have been installed. Remove water and foreign matter from forms and excavation. All soil bottom for slabs, footings, and pavement must be approved by the special inspection and OWNER before placing forms and concrete.
4. Transport concrete from mixer to place of final deposit as rapidly and as practicable by methods which prevent separation of ingredients and displacement of reinforcement, and which avoid rehandling. Deposit no partially hardened concrete.
5. Direct concrete placement to prevent cold joints resulting from placing concrete upon previously placed concrete which has reached its initial set. Direct each concrete pour to avoid cold joints by using an appropriate pouring sequence to prevent revibration of the previously placed concrete with the fresh concrete to form a monolithic mass free of cold joints.
6. Thoroughly cleaned surfaces of construction joints for concrete already placed, including vertical and inclined surfaces. Remove foreign materials and laitance, and weak concrete and roughened with suitable toils to expose a fresh face. At least 2 hours before and again shortly before the new concrete is deposited, saturate the joints with water. After glistening water disappears, give joints a thorough coating of neat cement slurry mixed to the consistency of very heavy paste. Install at least a 1/8-inch coating, and scrub-in by means of stiff bristle brush whenever possible. Deposit new concrete before the neat cement dries.
7. Distribute concrete only by approved methods. Design chutes with proper slopes and supports to permit efficient handling of the concrete without requiring an increase in the water content of the mix. If open troughs and chutes are permitted they must be of metal or metal-lined. Do not permit concrete to free fall more than 4 feet. Use "Elephant trunks" or pour pockets to prevent excessive free fall and splashing on forms and reinforcement.
8. Thoroughly compact concrete during and immediately after depositing by means of suitable tools. Use internal type mechanical vibrators to produce required quality of finish. Perform vibration by experienced operators under close supervision and carry on long enough to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents. Supplement vibrators by proper wooden spade puddling adjacent to forms to remove bubbles and honeycomb.

This is essential for the top lifts of walls. Provide vibrators with at least 10,000 rpm travel and of adequate capacity. Use at least one vibrator for every 10 cy of concrete placed per hour. In addition, keep one spare vibrator in operating condition on site.

9. Well-tamp concrete slabs on the ground and concrete pavement. Place wet, tamp, and roll foundation material until thoroughly compacted prior to placing concrete.
10. Allow 2 hours to elapse after depositing concrete in piers, walls, and columns before depositing concrete in beams or slabs.
11. Maintain placed concrete at a temperature between 50°F and 70°f for a temperature protection period of at least 7 days. C Allow concrete which has been moist cured to dry for at least 24 hours before the end of the temperature protection period. Make provisions to ensure that the ambient temperature will not fall more than 30°F in the 24 hours following the temperature protection period.

B. Curing.
1. Keep exposed surfaces of all concrete structures and pavement constantly moist by covering with moist burlap, applying a curing compound, or by such other means as may be approved, for a period of not less than 7 days.
2. Protect reinforcement, keyways, surfaces of construction and expansion joints and other surfaces on which curing compounds would have an effect deleterious to further construction or finishing operations, from the application of curing compounds.
3. Minimize temperature rise on surfaces exposed to the sun during warm weather by use of white reflective curing compound. Apply manufactured curing materials in accordance with the manufacturer's instructions.

C. Removing Forms.
1. Remove forms to ensure the complete safety of all structures and pavement. In no case remove supporting forms or shoring until the members and pavement have acquired sufficient strength to support safely their weight and the load thereon. Use results of suitable control tests as evidence that the concrete has attained such sufficient strength. Removal of forms is subject to OWNER's approval.

D. Placing Equipment
1. Contractor shall place equipment on slab only after necessary period of time as passed per Structural Engineer or OWNER.

3.4 FIELD QUALITY ASSURANCE

A. OWNER to employ the services of a testing laboratory to perform concrete inspection. The OWNER may designate this testing laboratory as their representative, in which case the CONTRACTOR must regard the directives of the testing laboratory as if given by the OWNER. Provide OWNER at least 3 working days' notice before placing concrete.

B. Special Inspector will take sets of four field control cylinder specimens per IBC Section 1905 during progress of the work, in conformity with ASTM C31. Specimens may be taken at the rate of one set per 50 cubic yards, and in general not less than one set of specimens will be taken on any one day. When the average 28-day strength of control cylinders in any set falls below the required strength or below proportional minimum 7-day strengths, where proper relation between 7- and 28-day strengths have been established by tests, then change proportions, water content, or temperature conditions to secure the required strength.

C. Allow free access to the work for selection of samples, and provide heated moist storage facilities for specimens. Protect the specimens against injury or loss.

D. Special Inspector will perform slump tests in the field and provide assistance as necessary.

E. Remove and replace concrete and concrete work which does not meet requirements of this Technical Specification or which does not represent good workmanship,

F. Repair or replace concrete that is damaged during the course of the work.

END OF SECTION

SECTION 03345

CONCRETE FINISHES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Finishes for new cast-in place concrete surfaces such as floors, walls, and as indicated on the Construction Drawings.

1.2 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete.

PART 2 PRODUCTS

3.1 MATERIALS

A. Not used.

PART 3 EXECUTION

3.1 REQUIRED FINISHES

A. Unless noted otherwise, apply the following finishes:
1. Exterior, below grade, formed: Chipped of extrusions only and patched.
2. Exterior, below grade, horizontal: Wood floated.
3. Exposed exterior walls and other vertical surfaces: Cork floated finish.
4. Interior exposed slabs: Steel trowel finish.
5. Horizontal exposed surfaces and exterior slabs: Troweled.

3.2 WOOD FLOATING

A. After placing concrete, strike concrete slabs and the tops of walls to design grade by moving a straight-edged template back and forth across the placed surface in a sawing motion. Shortly after the striking operation, while the surface is still plastic, float surface with a wood float to bring surface to the true design grade. After the surface has reached a partial hardness stage, it may have to be refloated with a wood float to secure a proper surface. For float finish, no further work is required.

3.3 STEEL TROWELING

A. For steel trowel finishes, allow concrete to harden further after floating until no water or fine material is brought to the surface. Troweling may be done either by hand or machine with smooth steel trowels. Trowel slabs on grade 6 inches thick and greater by machine with smooth steel trowels. Repeat the process as necessary to produce a smooth dense finish. After initial troweling, if a broom finish is required, score the surface with a stiff bristled brush.

3.4 FORMED SURFACES

A. Immediately after forms are removed, chip off all extrusions and patch all tie rod holes with 1:2 cement mortar. Rub all surfaces receiving rubbed finishes with carborundum stones. During the rubbing, constantly apply water to the concrete. Continue rubbing until the surface is brought to a smooth even texture. Fill all bug holes on exposed surfaces.

3.5 CORK-FLOATED FINISH

A. Remove forms at an early stage, within 2 to 3 days of placement where possible. Remove ties.

B. Remove all burrs and fins.

C. Mix 1 part Portland cement and 1 part fine sand with sufficient water to produce a stiff mortar. Dampen wall surface, apply mortar with firm rubber float or with trowel, filling all surface voids.

D. Compress mortar into voids using a slow-speed grinder or stone. If mortar surface dries too rapidly to permit proper compaction and finishing, apply a small amount of water with a fog sprayer.

E. Produce the final texture with a cork float using a swirling motion.

3.6 DEFECTS

A. If concrete surfaces have voids, or are unduly rough or are in any way defective, cut out such concrete and replace. No thin patches or plastering will be accepted.

B. Remove any defective concrete, which in the opinion of the OWNER, cannot be properly repaired as described above,

C. Remove rust stains from all exposed concrete.

D. Protect finished concrete floors and other surfaces from damage and defacement until the work is accepted.

END OF SECTION

DIVISION 9

FINISHES

SECTION 09900

PAINTING

PART 1 GENERAL

1.1 SCOPE OF WORK

A. All labor, materials, equipment, appliances, tools, scaffolding, ladders, planks, drop cloths, and services required to furnish, deliver and supply all painting and finishing and related work, complete, will be included in accordance with the drawings and/or as specified herein. In general, the work shall include, but not be limited to, the following:
   1. All exterior painted surface areas of the landfill gas blower skid equipment, and its appurtenances, marred during shipment, offloading and installation.
   2. All exterior painted surface areas of the aftercooler skid equipment, and its appurtenances, marred during shipment, offloading and installation.
   3. Any other surfaces specified to be painted.
   4. Patch and paint all other areas damaged by the CONTRACTOR during construction with the equipment vendor approved paint materials.

1.2 REFERENCES

A. Society of Protective Coatings (SSPC) Industry Standards (most current edition); Pittsburg, PA, Toll Free – (877) 281.7772, Website: www.sspc.org.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

A. Paint materials shall be suitable for the purpose intended as specified by the specific equipment manufacturer or supplier as to the brand, type, specifications and color, or approved equal. All paint materials shall be pre-approved by the OWNER, and delivered to the site in original containers with seals unbroken and duly labeled by manufacturer. The containers shall be opened and used only after approval, and without thinning except as directed by the supplier, and/or OWNER.

B. CONTRACTOR shall coordinate with the equipment manufacturer for any repainting work as to the item of equipment to be painted and to obtain recommendations for the paint material to be applied.

2.2 PREPARATION OF SURFACES

A. General.
   1. All surfaces which are to be painted or finished under this Section of the Technical Specifications shall be perfectly clean, smooth and free from dust, and thoroughly dry.
   2. The CONTRACTOR shall be wholly responsible for the quality of his work, and is not to commence any part of it until surface is in proper condition.
   3. If the CONTRACTOR considers any surface unsuitable for proper painting, the OWNER shall be immediately notified of this fact in writing. No paint shall be applied to any surface until corrective measures have been taken, or the OWNER has authorized the CONTRACTOR to proceed.
   4. The final prime coat(s) should be applied soon after surface preparation has been completed, to prevent possible contamination of the subsurface.

B. Metal.
   1. All surfaces must be free of residual deposits of grease and oil, and shall be cleaned in accordance with SSPC-SP1-63, "Solvent Cleaning".
   2. Surfaces that exhibit rust formation, mill scale, etc., must be cleaned in accordance with SSPC-SP2-63, "Hand Tool Cleaning", or SSPC-SP3-63, "Power Tool Cleaning". Particular care is to be exercised to remove welding flux, slag and fume deposit as is possible by blast cleaning, washing with water, phosphate rinsing or power tool cleaning. Weld spatters and burrs must be removed. Primer coats should be applied without delay, before rust reappears.
   3. All new surfaces must be aggressively cleaned with a grease-cutting solvent such as mineral spirits, to remove fabricating oils.
   4. Abraded areas that have begun to rust must be sanded clean and spot-primed without delay, with Rust Inhibitive Paint.
   5. Surfaces specified for painting require no special preparation other than solvent cleaning. All mortar spatters and other foreign material must be removed by appropriate means.

PART 3 EXECUTION

3.1 WORKMANSHIP

A. Guard against fire. Store only small amounts of inflammable material in building or CONTRACTOR or OWNER approved storage areas. Remove rags and debris daily. Drop cloths shall be used for protection of all surfaces, and hardware must be wrapped and taped for protection. Clean hardware and all other surfaces as required at completion of work, to satisfaction of the OWNER.

B. Finish work to be free from brush marks, streaks, sags, unfinished patches or other blemishes.

C. Work must be acceptable to OWNER.

D. All materials shall be applied uniformly. If any reduction of the coating's viscosity is necessary, it shall be done in accordance with the manufacturer's label directions.

E. A minimum interior temperature of 65°F shall be maintained during the actual application and drying of the paint, and until occupancy of the building occurs. Adequate ventilation shall be maintained at all times to control excessive humidity which will adversely affect the curing of coatings. The CONTRACTOR is solely responsible for maintaining suitable temperatures and ventilation.

F. Before painting begins, all other crafts shall have completed their work, and shall have removed all dirt and debris resulting therefrom. The rooms or areas are to be left in broom clean condition.

G. No exterior painting shall be undertaken if air or surface temperature is below 50°F, nor immediately following rain or until frost, dew or condensation has evaporated. Surfaces should always be tested with moisture meter before proceeding.

3.2 INSPECTION

A. Any work not conforming to the Technical Specifications or does not meet with the approval of the OWNER, shall be removed or corrected and/or repainted by the CONTRACTOR at no additional cost to the OWNER until approved by the OWNER.

3.3 REMOVAL

A. Upon completion of a room or area, it shall be left in a clean and orderly condition, and all paint spatters, contaminated rags, and trash shall be removed.

B. Upon completion of the job, the CONTRACTOR is to remove all surplus materials, scaffolds, etc., from the premises that relate to their trade. They shall clean all window glass free of excess paint and spatters, and remove paint that has been misplaced on other surfaces.

END OF SECTION

DIVISION 11

EQUIPMENT

SECTION 11180

LANDFILL GAS EXTRACTION WELLS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work described in this section consists of furnishing all labor, materials, equipment, and appurtenances necessary to drill, install, test, and make ready landfill gas (LFG) extraction wells, including multifunctional wellhead assemblies, valves, flexible connectors, at the locations shown on the Construction Drawings and specified herein.

B. The well screens, seals, gravel, and soil backfill packs shall be set at depths shown on the Construction Drawings or as designated in the field by the OWNER or ENGINEER. It is expected that combustible gas will be venting from boreholes drilled to install extraction wells. The CONTRACTOR's bid price shall include provision for all equipment and procedures necessary to safely install wells under such conditions.

C. Related Work Described Elsewhere:

1. Section 02221 – Excavation.

2. Section 02225 – Trenching and Backfilling.

3. Section 15100 – Landfill Gas Piping.

4. Section 15200 – Valves and Appurtenances.

D. All work shall be performed by qualified workmen in accordance with the best standards and practices of the trade.

E. The CONTRACTOR, at all times, shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. Upon completion of the work, CONTRACTOR shall remove all their waste materials and rubbish from the site, as well as all their tools, construction equipment, machinery, and surplus materials, and shall leave the work "Broom Clean."

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300 - Submittals. In general, the following data or Shop Drawings shall be submitted to the Engineer for approval two weeks prior to construction:

1. Solid and slotted HDPE pipes.

2. Sieve analysis for gravel.

3. Bentonite data.

4. Multifunctional wellhead assembly.

1.3 SAFETY REQUIREMENTS

A. The CONTRACTOR shall be required to comply with the safety requirements as specified in Section 01030 - Special Provisions.

PART 2 PRODUCTS

2.1 PIPE AND FITTINGS

A. All HDPE pipe and fittings shall conform to the requirements of Section 15100 – Landfill Gas Piping.

2.2 GRAVEL

A. Gravel used for backfilling annular space around the slotted well casing (LFG extraction well) shall be non-calcareous, clean, washed, and well graded in size 1-inch to 3-inch. The gravel shall be composed of clean, hard, and durable fragments or particles, free from dirt, vegetation, or other objectionable matter, and free from an excess of soft, thin elongated, laminated or disintegrated pieces.

2.3 BENTONITE

A. The bentonite material shall be granular bentonite and shall be Benseal as manufactured by Baroid Drilling Fluids, Inc. of Houston, Texas, Crumbles 8 Mesh as manufactured by Colloid Environmental Technologies Company (CETCO), Enviroplug No. 8 as manufactured by Wyoben, or approved equal.

2.4 VALVES

A. PVC cock valves and gate valves shall conform to the requirements of Section 15200 – Valves and Appurtenances.

2.5 FLEXIBLE CONNECTORS

A. A flexible connector shall be used to connect the wellhead to the wellhead lateral or LFG lateral.

B. The connector shall be of size shown on the Construction Drawings, and shall be ultraviolet (UV) resistant reinforced PVC hose shall be Solarguard flexible connector manufactured by QED or approved equal. The connector shall also include banding clamps and coils kit as manufactured by QED or approved equal.

C. Flex connector shall be capable of withstanding a vacuum of 29.8 inches of mercury, a pressure of 5 psi, have an operating range of -65 to 325^0 F, and provide 50 percent contraction and 20 percent extension. The connector bend radius shall be, at minimum, 1.5 times the diameter of the hose.

2.6 WELLHEADS

A. LFG extraction wells shall be equipped with a 2” diameter fine control valve type multifunctional wellhead manufactured by QED, or approved equal with that is equipped with a 2” orifice plate assembly kit, as shown on the Construction Drawings.

B. The multifunctional wellheads shall be suitable for measuring LFG flow up to 75 scfm and shall incorporate built-in features, and comprise of the following components:

a. Wellhead assemblies shall be provided by CONTRACTOR and include a removable quick change orifice plate system, including 6 orifice plates that meet ASME MFC-3M-2004 Design Criteria. Well-heads shall include 0.40", 0.50”, 0.75”, 1.00”, 1.25” and 1.40” orifice plates.

b. 2" diameter fine-tune control valve (QED Model CV 2000).

c. Wellhead shall be constructed of SCH 80 PVC throughout.

d. Brass Hose barb kit, QED Model 40629, that includes (4) 1/4" hose barbs x 1/4" MPT fittings for gas, temperature, and pressure readings. Temperature barb to include 2-1/2" extension nipple.

e. Flex connection tubing shall be Solargard w/ 2.38" ID with yellow tint and UV inhibitors and include banding kit, QED Model 40979.

f. Gas Header adapter kit shall be QED Model 40676, and include 4"x2" flexible coupling and 2"x12" PVC pipe stub.

g. The wellhead shall be constructed as shown on the Construction Drawings.

2.7 NUTS AND BOLTS

A. For above- and below-ground installation, bolts shall conform to the requirements of ASTM A307. Unless stated otherwise, all bolts shall be carbon steel, Grade B, heavy hex, hot dip zinc-coated in accordance with the requirements of Class C of ASTM A153. Nuts shall conform to the requirements of ASTM A563. Nuts shall be Grade A, heavy hex, hot dip zinc-coated in accordance with Class C of ASTM A153. Washers shall be Grade A, hot dip zinc-coated in accordance with Class C of ASTM A153.

PART 3 EXECUTION

3.1 WELL INSTALLATION

A. General:

1. Materials delivery, storage, and handling:

a. All HDPE blank casing and slotted casing supplied under this Contract shall be shipped, stored, and handled in accordance with the recommendations of the manufacturer.

2. Material Inspection:

a. Prior to well installation, all pipes, fittings, slotted casings, valves, gravel, and bentonite shall be inspected by the CONTRACTOR in the presence of the OWNER for conformance with the standards and specifications.

b. All materials not meeting the requirements of the applicable specifications shall be rejected.

B. Borehole Drilling:

1. Prior to drilling, the CONTRACTOR shall survey and stake the locations of the extraction wells as shown on the Drawings and have them approved by the OWNER. Survey information will include horizontal and vertical coordinates. Some wells may be relocated to suit the field conditions.

2. CONTRACTOR shall coordinate the start of drilling with the OWNER.

3. Provide at all times a thoroughly experienced, competent driller during all operations at the drill site. The driller shall be pre-qualified by the OWNER. The CONTRACTOR shall submit to the OWNER driller's qualifications as part of bid submittal.

4. Boreholes shall be of diameter as shown on the Construction Drawings.

5. Drilling shall continue in each borehole to the depths as indicated on the Construction Drawings. The CONTRACTOR will be paid for over-drilling beyond the depths shown on the Construction drawings if and only if authorized in writing by the OWNER.

6. In the event that a borehole must be abandoned, the CONTRACTOR shall plug and abandon the hole from the bottom to within 5 feet of the surface using a mixture of bentonite powder and soil (5 pounds of bentonite per cubic foot of soil) and from 5 feet to the surface using a cement grout or graded bentonite plugging material, in a manner approved by the OWNER. The OWNER will determine the need for abandonment. The CONTRACTOR will be paid for the time and materials expended in plugging the abandoned borehole at the price quoted in his bid, provided that the abandonment is not due to the CONTRACTOR's negligence, carelessness, or defective equipment.

7. On completion of the drilling operation and before commencement of well casing installation, the CONTRACTOR must place a steel safety grate over the borehole as shown on the Construction Drawings. The platform shall be of sufficient size and structural strength to support expected loads during well installation. The safety grate size shall be such that all the edges rest on the undisturbed ground at least 3 feet from the edge of the borehole, which will give workers sufficient time to get away from the borehole in the event of a well-bore cave-in.

8. The CQA staff conducting drilling inspection shall prepare a log for each extraction well during drilling. Well logs shall include the names of the person(s) logging the hole and an as-built description, including a well detail which indicates well depth, extent and type of filter pack, location and depths of bentonite and soil plugs, interval of perforations, existing grade elevation, etc.

9. Drilling shall only commence once the location and elevations of any well location have been verified by the CQA, driller, and CONTRACTOR that they are accurate-No exceptions. Adjustments to drilling depth may be required if findings indicate otherwise and will require review and approval by the OWNER.

C. Casing Placement:

1. The blank and slotted casing shall be installed straight and plumb in the center of the borehole at the depths shown on the Construction Drawings. During installation, a cap shall be placed over the top of the casing to prevent introduction of dirt, debris, and prevent LFG venting prior to installation of wellhead assemblies. If the pipe is installed out of plumb, the CONTRACTOR shall correct the alignment at his own expense.

D. Gravel Placement:

1. The annular space surrounding the slotted well casing shall be filled with specified filter pack of clean gravel backfill to an elevation, above the top of the slotted casing, as indicated on the Construction Drawings.

E. Soil Placement:

1. Soil backfill shall be placed at the designated locations along the bore-hole, of thickness as shown on the Construction Drawings.

F. Bentonite Plug Placement:

1. Bentonite plugs shall be placed from the bottom to the top of the plug level and shall be of thickness as shown as shown on the Construction Drawings.

2. Consistency, method of mixing and placement of the bentonite plug shall be submitted to the OWNER for his review and approval prior to placing of the bentonite plug. The CONTRACTOR will not be allowed to install the bentonite plug prior to written approval of the consistency, method of mixing, and placement of the plug. No method will be permitted that does not force bentonite plug from the bottom of the plug to the top. The CONTRACTOR shall contact the manufacturer for his recommendations regarding method of mixing and placement of bentonite plug. The following is one of the methods that CONTRACTOR may adopt for bentonite plug placement:

a. After placing the gravel in the borehole to an elevation of 2 feet above the slotted casing, the CONTRACTOR shall place on top of gravel layer, a soil plug of the thickness shown on the Construction drawings. Prior to placement of the bentonite plug, the CONTRACTOR shall thoroughly wet the soil plug. He shall then pour Benseal bentonite and water simultaneously (through a tremie pipe lowered to the bottom elevation of the plug and pulled slowly upwards as bentonite is being poured in the borehole) into the hole in a systematic way to achieve a uniform plug. A minimum of two, 50-lb bags of Benseal will be required to construct one foot thick bentonite plug in a borehole of 18-inch diameter (CONTRACTOR to adjust quantities for larger boreholes). The amount of water necessary to be poured into the borehole will be as recommended by the bentonite manufacturer or by predetermining through experimenting with a small quantity of bentonite the actual amount of water required to achieve a good thick mud consistency mixture. When the bentonite plug has reached the specified thickness, more water shall be poured on top of the plug and adequate hydration time will be allowed before any backfilling operation commences. A minimum hydration time for bentonite seal shall be 20 minutes or as recommended by the manufacturer.

G. No backfilling operations shall be permitted until the bentonite has hydrated. Hydration time for bentonite plug is a minimum 20 minutes or as recommended by the manufacturer.

H. Wellhead (Multifunctional):

1. The CONTRACTOR shall install wellheads as shown on the Construction Drawings and specified herein.

2. The wellhead shall be lifted and handled according to the written procedures supplied by the manufacturer.

3. The wellhead shall be installed such that the measurement tube assembly is concentric with the LFG extraction well casing.

4. The orientation of the lateral connection and valve shall be in the direction shown on the Construction Drawings or as approved by the OWNER.

5. All joints and fittings in the wellhead assembly shall be made airtight.

6. CONTRACTOR shall repair any damage to wellheads as a result of construction operations, at CONTRACTOR's sole expense.

3.2 DISPOSAL OF CUTTINGS

A. The CONTRACTOR will disposed cuttings from the boreholes and other generated refuse at the working face of the site.

3.3 CONTROL OF BOREHOLE EMISSION

A. It is expected that combustible gas containing trace toxic constituents will vent from boreholes. It shall be CONTRACTOR's sole responsibility to control emissions in such a manner as to safely construct the wells, prevent violation of all applicable air quality regulations, and prevent worker exposure.

END OF SECTION

SECTION 11187

LANDFILL GAS BLOWER/AFTERCOOLER SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Work Included:

1. The work described in this section consists of furnishing all labor, materials, equipment, and incidentals necessary to furnish, field test and successfully initiate the operation of the Landfill Gas Blower and Aftercooler System at the Miramar Landfill, 5180 Convoy Street, San Diego, California, 92122 as shown on the Construction Drawings and as specified herein, including all appurtenances to provide a complete system ready for operation.

2. The Landfill Gas Blower and Aftercooler System shall include the following three sub systems:

   a. Gas Handling System (Blower Skid-vacuum side).
   b. Interconnecting and Delivery Piping System.
   c. Aftercooler System (Aftercooler Skid-pressure side).

3. All equipment and accessories shall have manufacturer's Shop Drawings approved by the OWNER prior to shipment and shall be tested in conformance with these Specifications prior to acceptance and final payment by the OWNER.

4. The CONTRACTOR shall be responsible for furnishing all equipment and accessories as described in these Specifications and/or as noted on the Contract Drawings and as required for satisfactory operation of the system. The CONTRACTOR shall assume complete system responsibility, including warranty, for all equipment procured by an approved system manufacturer. The warranty does not extend to existing equipment, only the control interface of such.

5. The CONTRACTOR shall be responsible for all electrical wiring, fiber optic connections, and operation and control of all equipment related to the Landfill Gas Blower Aftercooler System.

6. Parts of equipment shall be amply proportioned for all stresses, which may occur during operation, and for any additional stresses, which may occur during fabrication, transportation, handling, and erection.

7. If necessary, modifications shall be made in the manufacturer's standard product to make it conform to the specific requirements of the Technical Specifications and to requirements contained in regulations issued by public agencies. Such modifications shall be noted in Shop Drawing submittals.

8. Equipment shall include all production line improvements made to the delivery or Contract date. All equipment shall comply with applicable requirements of the standards of ASME, AGA, NFPA, and the Underwriters' Laboratories panels shall bear U.L. labels, as of the bid submittal date. Equipment shall not have been in service, except for shop tests, at any time prior to delivery. The equipment shall be furnished factory-assembled to the extent possible and ready for installation by the CONTRACTOR.

9. A brass or stainless steel nameplate shall be attached to each piece of equipment in a conspicuous place. The following information shall be plainly marked on the nameplate: name and address of

the manufacturer, serial number, model number, and any other information necessary for complete identification.

10. Identification tags shall also be placed on all valves, sensors, gauges and other ancillary devices upon completion of equipment installation and reflected in AS-built Drawings for the complete system and other ancillary valves and other installed under the Contract Work.

1.2 SUBMITTALS

A. Submittals shall be made in accordance with Section 01300 - Submittals. In addition, the following specific information shall be provided:

1. Materials and Shop Drawings. Submittals shall include at least the following:

a. Certified Shop Drawings showing all-important details of construction, anchor plates for anchoring the skids to the concrete slab, dimensions, and weight. The equipment manufacturer shall be responsible for the design of the anchor plates. Ancillary anchors shall be of size and dimension shown on the Structural Drawings included in the Contract Drawings.
b. Descriptive literature, bulletins, and/or catalogs of the equipment.
c. A complete total bill of materials for all equipment.
d. A list of manufacturer's recommended spare parts.
e. The total weight of the equipment including the weight of the single largest item.
f. Complete performance data that will indicate full compliance with the Specifications; performance curves; calculations showing the equipment gas-flow and motor corrections required for operation at job-site elevation as specified under Design Criteria.
g. Complete control panel diagrams and elevations showing all components, wires, connections, and numbered terminals.
h. Complete electrical interconnect diagram showing all wires and terminals between the control panel and external devices.
i. All exceptions to the applicable requirements and Specifications provided in these Contract Documents.

B. Complete assembly, foundation and installation drawings, complete wiring diagrams, control panel layout and control schematics, together with detailed specifications, and data covering actual materials used, parts, devices, and other accessories shall be submitted.

C. Three (3) Operation and Maintenance (O&M) Manuals shall be furnished in accordance with Section 01300 and the General Conditions for the Blower/Aftercooler system (a.k.a the Landfill Gas Blower System (LGB) or Central Blower Station System (CBS). The manual shall be prepared specifically for this installation and shall include all required catalog cuts, drawings, equipment list, descriptions, and information necessary to instruct operating and maintenance personnel who is unfamiliar with such equipment.

D. A factory representative, with a full knowledge of proper operation and maintenance, shall be provided for a minimum of five (5) 8-hour days to instruct representatives of the OWNER on proper operation and maintenance of the Blower/Aftercooler System. If there are difficulties in operation of the equipment due to manufacturer's design or fabrication, additional service shall be provided by the manufacturer at no additional cost to the OWNER.

1.3 QUALIFICATIONS

A. The Landfill Gas Blower/Aftercooler System, including all ancillary equipment, shall be furnished by a manufacturer who is fully experienced, reputable, and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed and fabricated in accordance with the best practices and

methods.

B. System equipment shown on the Construction (Contract) Drawings is a product of Perennial Energy, Inc. The Landfill Gas Blower and Aftercooler Systems shall be manufactured by Perennial Energy, Inc. of West Plains, Missouri, or approved equal.

1.4 DESIGN CRITERIA

A. Landfill Gas Blowers:

1. All equipment specified herein is intended to be standard equipment for use in a landfill gas handling system.

2. Blowers shall be designed for continuous operation in an outdoor environment and shall conform to the following requirement measured at Standard 14.7 psia and 68 degrees F condition:

- Number required	3
- Rated capacity each, cfm	3358
- Rated capacity (total-3 Blowers)	10,075
- Minimum capacity each, cfm	0 (w/ Recirculation)
- Site elevation, feet above MSL	415
- Gas composition:	
Methane	20 percent - 50 percent
Carbon Dioxide	25 percent - 50 percent
Traces gases, ppm	0 – 70
- Actual landfill gas pressure:	
Inlet, inches of water (vacuum)	85
Outlet, psig (At discharge of Outlet knockout of Aftercooler Skid)	5.8
- Landfill gas inlet temperature:	
Maximum, degrees F	100
Minimum, degrees F	60
- Shaft speed, rpm (Nominal)	3,600
- Nominal motor efficiency, percent	91
- Minimum motor power factor, percent	87
- Motor insulation:	Class F
- Motor service factor (Min)	1.15
- Motor horsepower	300
- Noise at 3 feet from unit	85 dbA
- LFG moisture content (Inlet)	100% Saturated

3. When volumetric capacity is reduced to the specified minimum, the blower under the specified inlet conditions shall not surge or overload the motor(s).

4. The blowers recommended will be based upon data previously established by tests in accordance with the ASME Power Test Code for Centrifugal Blowers.

B. Aftercooler System:

1. The landfill gas Aftercooler System shall be designed to operate continuously at the following service:

- Number required	1

- Landfill gas flow rate, scfm	10,075
- Fans, HP/each (2 Required)	30
- Btu loading, mm Btu/hour	2.25
- Inlet temperature, degrees F	270
- LFG moisture content (Inlet of Blower System)	100 % Saturated
- Barometric pressure, psia	14.5
- Landfill gas composition range:	
Methane	20 percent to 50 percent
Carbon Dioxide	25 percent to 50 percent
Trace Gases, ppm	0 to 70
- Site elevation	415 feet above MSL

2. The equipment manufacturer shall guarantee the following performance requirements:

   a. The above composition percentages shall be considered approximate due to the complexity of the gas generation and collection process. The Aftercooler System shall be complete with adjustment features

   b. One (1) thermocouple shall be used to measure temperature from the aftercooler discharge. A forced ambient air cooled heat exchanger shall be employed to cool the 10,075 SCFM of compressed landfill gas from the blower discharge temperature, down to 120 deg. F in 100 deg F ambient condition for preparation of the landfill gas for delivery to the Outlet Demister Filter.

   c. All wetted parts in connection with landfill gas shall be stainless steel, and the tube and header assembly shall be rated for the system pressures specified herein. The tube bundle shall be supplied with manual air shutters that can be closed to prevent overcooling in low ambient temperature conditions. The fan(s) shall be driven with an inverter duty motor(s) and VFD combination that is controlled from the PLC by a PID temperature control loop. The discharge temperature setpoint shall be operator adjustable at the Touchscreen of the Master PLC.

1.5 APPLICABLE CODES AND STANDARDS

A. All equipment shall be manufactured in accordance with codes and guidelines as specifically detailed herein and in accordance with applicable portions of the following (latest edition):

1. Local Laws and Ordinances.
2. State and Federal Laws.
3. National Electrical Code.
4. National Electrical Manufacturers Association (NEMA).
5. Underwriters Laboratories (UL).
6. Uniform Building Code (UBC).
7. American National Standards Institute (ANSI).
8. American Society of Mechanical Engineers (ASME).
9. Institute of Electrical and Electronic Engineers (IEEE).

10. Instrument Society of America (ISA).

11. Industrial Risk Insurance (IRI).

12. Factory Mutual (FM).

13. National Fire Protection Agency (NFPA).

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

B. The equipment shall be delivered on site as fully assembled as transportation will allow. Factory-assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the OWNER.

C. Finished surfaces of all exposed openings shall be protected by wooden blanks, strongly built, and securely bolted thereto.

D. Each box or package shall be properly marked to show its net weight in addition to its contents.

1.7 WARRANTY AND GUARANTEES

A. The equipment manufacturer shall warrant the units being supplied to the OWNER against defects in workmanship and material for a period of one (1) year from the date of equipment acceptance by the OWNER. In the event that the equipment fails to perform as specified, the equipment manufacturer shall promptly repair or replace the defective equipment without any additional cost to the OWNER (including handling and shipment costs).

PART 2 PRODUCTS

2.1 GENERAL

A. All equipment shall be designed and proportioned to have liberal strength, stability, and stiffness and shall be especially adapted for the intended service. Ample room and facilities shall be provided for inspection, repairs, and adjustments.

B. These Technical Specifications are intended to give a general description of what is required, but do not cover all requirements of the equipment as offered. They are, however, intended to cover the furnishing, delivery, and field testing of all materials, equipment, and apparatus as required. Any additional auxiliary equipment necessary for proper operation of the proposed Landfill Gas Flaring System not mentioned in these Specifications or shown on the Drawings shall be furnished and installed.

C. At all levels of performance of each gas system, the sound pressure shall not exceed 85 dbA over a frequency range of 37.8 and 9,600 cycles per second. Measurement shall be made a distance of 3 feet from the outer face of the equipment. The equipment manufacturer shall certify that the equipment furnished for this project does not exceed the specified sound pressure. This written certification shall be submitted with the Shop Drawings.

2.2 GAS HANDLING SYSTEMS

A. Blower and Motor Assemblies:

1. Blower. The blower unit shall be the multistage centrifugal type. Impellers shall be mounted on one shaft supported on each end by bearings mounted in the outboard bearing housings. The blower shall be built from parts cast in patterns from which previous units have been built and tested. Blowers shall comply with the design criteria as specified in Paragraph 1.04A of Part 1 - General of this Section. The blower shall be driven directly by the motor through a variable frequency drive (VFD). The VFD furnished for the blowers shall be as manufactured by ABB Inc. of New Berlin, WI, or approved equal.

2. Blower Housings. The housings shall consist of cast iron sections held securely between cast iron inlet and outlets heads with steel tie rods.

    a. No contact shall be made between the shaft rotor and the housing, other than through the bearings. Stuffing boxes shall be used as seals to insure no leakage of gas to the atmosphere or air into the landfill gas.
    b. The inlet and outlet connections shall be drilled and tapped flange pattern per ANSI 1316.1, 125-pound, and shall be an integral part of the heads.

3. Impellers:

    a. The impellers shall be one piece cast aluminum alloy, keyed to the shaft and held by a locknut. Hubs of the impellers shall butt against each other directly or through one-piece metal spacers.
    b. Impellers shall be precisely machine balanced. Vibration shall not exceed 2 mils in the vertical plane measured at the blower bearing housings.

4. Diffusers. Diffuser sections, which receive the gas from the impeller and guide the gas to the next impeller, shall be provided. The diffusing vanes shall be an integral part of the sections.

5. Shaft. Each shaft shall be made of high-grade carbon steel of sufficient diameter to operate below first critical speed.

6. Bearing Housings. Each blower shall be provided with two antifriction bearings. It shall be possible to replace bearings without disconnecting any piping or disassembling the compressor casing. Both inlet and outlet bearings shall be sized for a minimum expected life of 10 years continued operation as defined by ABMA B-10 standards.

7. Casing Drains. Each blower stage shall be provided with 3/8-inch diameter casing drains with manual shut-off valves. A ½-inch condensate drain line shall be provided at each blower for draining condensate from the blower to the moisture separator (see Contract Drawings)

8. Internal Lining. The blower internals shall be furnished with a factory applied Bisonite, Kynar, or phenolic coating minimum 6 mils thick to provide resistance to corrosion by landfill gas. The coating shall be applied to all parts of the blower, which come in contact with the landfill gas stream except for the aluminum impellers.

9. Motor. Each blower shall be direct-coupled to a horizontal 480 volt, 3-phase, 60-hertz motor. The directly coupled motors through the variable frequency drives (VFD) mounted adjacent to the integrated control panel shall drive the blowers. The motor rpm shall be 3,600. The minimum horsepower shall be as specified in Paragraph 1.4A above; however, the blower manufacturer shall be responsible for selecting the proper motor size to suit their equipment. The squirrel-cage induction motor shall be totally enclosed fan cooled (TEFC), and UL-approved. The motor shall

have a cast-iron frame and copper windings. Motor shall be rated at 104 degrees Fahrenheit ambient with not more than 131 degrees Fahrenheit rise. Bearings shall be of the antifriction type with an ABMA L-10 life rating of not less than 25,000 hours.

10. Flexible Couplings and Drives. The blowers shall be connected to the drivers with a suitable flexible coupling. The installing contractor shall check and adjust the alignment of the couplings and drives in accordance with the instructions of the blowers' manufacturer to a tolerance of plus or minus 2 mils. Couplings shall be covered with base-mounted aluminum or non-sparking metallic guard.

11. Bases. Enamel painted rolled steel bed plates of suitable size for mounting blowers and drivers shall be furnished by the blower manufacturer. The blower and motor shall be carefully aligned and then bolted in place. Suitable vibration isolation pads shall be provided under the steel bedplates of the units. If the blower manufacturer intends to use a structural steel frame in lieu of the rolled steel plate for the blower base, it shall be coated with industrial enamel paint.

12. The blower-motor assemblies shall be located, installed, and plumbed on the gas handling skid, with a continuous galvanized ¼-inch thick galvanized steel checker plate, either bolted or welded to the top of the skid.

13. Auxiliary Equipment: The following auxiliary items shall be provided along with the blowers:

    a. A 4-1/2-inch-diameter bellows-type vacuum gauge shall be mounted at the inlet of each blower. The range of the vacuum gauge shall be 0 to 100 inches of water, and the gauge shall read "INCHES OF WATER." Graduations shall be at intervals of 1 inch of water.

    b. A 4-1/2-inch-diameter bellows-type pressure gauge shall be mounted at the outlet of each blower. The range of the pressure gauge shall be 0 to 50 inches of water, and the gauge shall read "INCHES OF WATER." Graduations shall be at intervals of 1 inch of water.

    c. Dial-type temperature gauges shall be provided at the inlet and outlet of each blower. The gauge shall range from 0 to 200 degrees F.

    d. The manufacturer of the blowers shall provide flanged expansion joints concentric reducers, of sizes shown on the Contract Drawings, on the inlet and outlet of each blower. The flanged expansion joints shall be constructed of synthetic rubber with synthetic fiber reinforcement. The flanged expansion joints shall the pressure ratings of +20 psig and -20 inches of mercury. They shall be capable of withstanding the temperatures up to 250F. The split retaining rings shall be made of galvanized steel. The split rings shall conform to the requirements of 125-pound ANSI flanged fittings.

    e. The manufacturer of the blowers shall provide one calibrated ammeter for each blower. The surge range shall be clearly indicated on the ammeter. The volume of gas in standard cubic feet per minute (scfm) shall be expressed as a function of ampere input (i.e., the ammeter shall have two scales: amps and scfm). The point of full load amps shall be clearly indicated on the ammeter.

14. Blower Controls:

    a. Blower-motor starters and controls shall be as provided as shown on the Contract Drawings.

b. Acceptable Manufacturers:

(1) Lone Star Blowers
(2) Gardner Denver Hoffman/Lamson
(3) National Turbine or approved equal

B. Moisture Separator:

1. The moisture separator shall be a pre-fabricated stainless steel Moisture Separator with flanged inlet and outlet, drain connection, level gauge, stainless steel demister element for moisture collection, differential pressure gauge around the demister element, and a flanged top for accessibility and maintenance.

2.3 INTERCONNECTING PIPING SYSTEMS

A. Valves:

1. Resilient Seated Butterfly Valves:

a. All valve shafts shall be connected to operators by use of keys and keyways. The use of compression or friction connection will not be accepted.

b. The butterfly valves, for low-pressure/vacuum landfill gas services, shall have cast-iron wafer or lug style valve body with contoured 316 stainless steel disc, Type 316 stainless steel stem, Acetal stem bushing, and Viton replaceable resilient seat. Valves shall be bubble-tight at 150 psi differential pressure and shall be suitable for installation between ANSI 125-pound flanges.

c. All butterfly valves shall open left or counterclockwise when viewed from the stem. Manual gear-operated valves shall be required for pipe, 8-inch and larger. All operators shall have adjustable mechanical stop limiting devices to prevent overtravel of disc. Should an adjustment of the disc be required to maintain a bubble-tight seal, this adjustment shall be made externally without removing the operator housing cover. The operator shall be designed such that all adjustments can be made under pressure and without the possibility of dirt getting into the operator lubricant. Any adjustments through the lower shaft will not be acceptable. Operator components shall, at the extreme operator positions, withstand without damage a pull of 200 lbs for handwheel or an input torque of 300 ft-lb for operating nuts.

d. Interior of valve body shall be fully isolated from the gas by the replaceable Viton seat/liner.

e. All butterfly valves shall be manufactured by ABZ Valves, DeZurik, Keystone Valves U.S.A., Kennedy Valve Manufacturing Company, or approved equal.

f. All exterior surfaces of butterfly valves shall be clean, dry and free from rust and grease before coating. The exterior ferrous parts of all valves shall be shop primed at the factory with one coat, minimum dry film thickness 1.5 mils, of a primer with rust-inhibitive pigments and synthetic resins. Following installation, above-ground valves shall be finish painted.

2. Check Valves:

a. Check valves shall be of flapper type. The valves shall have cast aluminum lightweight body, 316 stainless steel internals, Viton or Teflon sealing member materials, and 316 stainless steel spring materials. The valves shall be wafer style and match 125-pound ANSI dimensions.

b. Check valves shall be Flexi-Hinge Series 518 wafer style, aluminum body, 316 stainless steel internals, with Viton seat as manufactured by Flexi-Hinge Valve Company of Erie, Pennsylvania, USA Valve or approved equal.

3. Solenoid Valves:

a. Solenoid valves shall be 2-way type for normally closed operation designed for not less than a 150 psi water working pressure. The valves shall have forged brass bodies with NPT threaded ends, Buna N seals/disks, and NEMA 4 solenoid enclosures. The valves shall operate on 120 VAC power, shall have threaded conduit hubs, standby manual operators, and shall not require a minimum operating pressure differential for steady operation. The valves shall be manufactured by Automatic Switch Company (ASCO), Florham Park, New Jersey, or approved equal.

4. Automated Valve: The auto valve shall consist of the following:

a. Butterfly (Isolation) valve; Manufactured by ABZ with ductile iron body, stainless steel disc and stem, and EPDM seat. Contractor to procure model number specified by System Manufacturer.

b. Actuator; Fail-safe type, 115V/AC, spring return electric actuator manufactured by Elomatic, or approved equal, and equipped with 4 SPDT limit switches specified by System Manufacturer.

c. Bracket/Coupling; SR5-15 to 622 butterfly valve.

B. Piping:

1. All piping on the gas handling system skids shall be stainless steel. Stainless steel piping shall be minimum schedule 10, annealed, conforming to the requirements of ASTM A312, Grade TP 304L or as shown on the Construction Drawings. The same specification applies to tees, elbows, wyes, flanges, and other pipe fittings. All flanges shall conform to ANSI 125-pound specifications. All welding of stainless steel piping and appurtenances shall conform to AWS specifications.

2. The gaskets shall be wafer style, 1/16 inch to 1/8 inch in thickness, and shall meet the requirements of ANSI Specification A21.11.

3. Where shown on the Drawings or as required, pipe and fittings shall be drilled and taped to receive drainage or other piping or plugs. All holes shall be drilled accurately at right angles to the axis of any pipe or fitting.

4. All piping and fittings shall be supported in such a manner as to prevent any strain being transmitted between sections and connected equipment and appurtenances. Release of any joint shall result in no transverse piping movement and shall allow easy removal and replacement of any piping component. Not all required supports are shown on the Drawings.

5. Flexible connectors shall be bellows type, Series 2500 as manufactured by Hyspan Precision Products, of Chula Vista, CA. or approved equal.

C. Landfill Gas Flowmeter:

1. An annubar style mass flow metering system shall be provided to monitor landfill gas flow in SCFM. A conditioning/metering section of pipe shall be provided by the system manufacturer to ensure proper velocities allowing for at 10 to 1 turndown, or as specified otherwise by the approved system vendor.

2. The flowmeter shall comply with all applicable U.S. Environmental Protection Agency (EPA) requirements for flowmeters used to comply with the Federal Greenhouse Gas Reporting rules.

3. The landfill gas flowmeter shall provide a 4-20 mA signal of flow of the landfill gas for connection to the remote indicator. The meters shall be factory calibrated for landfill gas (50 percent methane, 50 percent carbon dioxide) for a range of 10,075 to 1,007.5 scfm. The flowmeter shall be provided with a flow rate indicator (scfm), totalizer, and recorder to be located as shown on the Construction Drawings.

4. The recorders shall include a NEMA 4 enclosure, which the CONTRACTOR shall install on the inside Blower/Aftercooler (LGB/CBS) integrated control panel enclosure, as shown on the Contract Drawings.

5. The totalizer panels shall be installed in the Blower/Aftercooler (LGB/CBS) integrated control panel.

   Yokogawa paperless recorder with math pack and compact flash memory card or approved equal. Recorder must provide 6 channels. Recorded items to be specified by the Engineer.

2.4 AUTO DIALER/ALARM SYSTEM

A. Automatic Telephone Dialer:

1. General: The system shall receive input from the various monitored items in the form of a change in the status of a dry contact. Upon such change, the system shall automatically dial up to sixteen pre-selected phone numbers. When answered, the system shall send voice messages reporting the specific alarm condition. The system shall also be capable of reporting the status of all monitored items upon receipt of an inquiry phone call.

2. The system shall make provisions for the following input alarms:

   a. Blower No. 1 failure.
   b. Blower No. 2 failure.
   c. Blower No. 3 failure.
   d. Spare.
   e. Spare.
   f. Spare.

3. The automatic telephone dialer shall be a self-contained, solid state device. The dialer shall continuously monitor the presence of AC power and the status of up to eight independent N.O. or N.C. contact inputs. Each contact input channel shall be keyboard programmable as follows: alarm on open circuit, alarm on closed circuit, or no alarm (status report only on inquiry). Alarm or status shall be reported utilizing a solid state used recorder high fidelity voice. No tape or mechanical voice reproduction devices shall be used. AC power failure or violation of alarm criteria for any input shall cause the unit to go into alarm status and begin dial-outs and optional local announcements. Upon initiating an alarm call-out, the system shall speak only those

channels currently in alarm status. On phone inquiry or during on-site status check, a warning message shall be provided if no dial-out phone numbers are entered, or if the alarm switch is disabled, or if backup battery charge is low, or if AC power is off or has been off since last reset.

4. Phone Link: The dialer shall be FCC approved. It shall operate on a standard dial-up rotary pulse or Touch Tone^{R} telephone line and shall be capable of calling from one to sixteen phone numbers, each up to 60 digits in length and shall be compatible with the RACO Cellularm option for cellular phone connection/dialout functionality. Dedicated or leased phone line shall not be required.

5. Programming Capability: Pre-programmed speech shall provide entry guidance and confirmation of programmable features. Coded programming shall provide direct access to specific programmable items via appropriate function codes. Both front panel and remote programming capability shall be provided for all functions. The user shall be permitted to selectively read channel status and to selectively read and alter any user entered speech messages or parameter programming from any Touch Tone^{R} phone. The following parameters shall be alterable from their default values via keyboard entry at the dialer or remotely from any Touch Tone^{R} phone:

   a. Messages - Alarm and normal messages for each channel shall be user programmable via solid state voice recording. Permanent resident factory recorded messages shall be included to support user programming and to provide default warning messages which will allow the unit to be fully functional even when no user messages have been recorded.
   b. Alarm response delay - Each alarm channel response time shall be individually programmable 0.1 - 999.9 seconds. Default shall be 2.0 seconds. Power out response time shall be separately programmable.
   c. Delay between alarm dial-outs - Shall be programmable 0.1-99.9 minutes. Default shall be 2.0 minutes.
   d. Input alarm criteria - Each digital channel shall be independently keyboard configured for OPEN/CLOSED contact alarm or "NO ALARM." Default shall be open circuit alarm.
   e. Built-in microphone - Shall be programmable ON/OFF.
   f. Phone dialing mode - Shall be able to connect to local cellular network using RACO Cellularm technology.
   g. Phone numbers - Sixteen phone numbers shall be programmable with each phone number up to 60 digits in length. Pauses and DTMF tones shall be provided for pager communication, etc.
   h. Alarm Call Grouping - Shall be programmable to selectively call the appropriate phone number according to current alarm(s).

6. Power and Memory Backup: Normal power shall be 105-135 VAC, 15 Watts maximum. An integral gel cell rechargeable battery shall be furnished with built-in charger of the precision voltage controlled type. A "trickle charger" shall not be supplied. Battery backup times shall be 20 hours. Even if all power is removed, user-entered programming shall be kept intact for up to 10 years from date of shipment.

7. Construction: An enclosure shall be NEMA 4. The autodialer shall be mounted in the Blower/Aftercooler integrated control panel.

   a. A cable connector shall be provided for voice output to a local amplifier.
   b. Gas tube and solid state surge protection shall be integrally incorporated on the circuit board for all inputs including power, phone, and signal lines. Externally mounted protectors shall not be acceptable substitutes.
   c. The dialer shall be suitable for a maximum environmental temperature of 130°F at the enclosure.

8. Automatic dialer - shall be Verbatim Model VSS-8C with Cellularm option, as manufactured by RACO Manufacturing and Engineering Company.

PART 3 EXECUTION

3.1 INSTALLATION

A. The LFG Blower/Aftercooler System shall be installed in strict accordance with the manufacturer's instructions and recommendations in the location shown on the Contract Drawings.

B. Offloading and setting of the gas handling Blower and Aftercooler systems will require the use of a portable crane. The CONTRACTOR shall be aware that the project site location has limited areas, as well as being in close proximity to active site access roads and overhead powerlines. The CONTRACTOR shall be responsible for complying with all applicable safety requirements and regulations when unloading and setting the equipment, including coordinating with the OWNER for any closure and restrictions to site access road usage as specified in Section 01560, Paragraph 1.06. Prior to site delivery, the CONTRACTOR shall verify with the respective manufacturer(s) the weight of all delivered prefabricated, as well individual, system components. The CONTRACTOR, and its SUBCONTRACTORS, shall be responsible for using an appropriate-sized crane that has sufficient lifting capacity for the delivered equipment.

C. Anchor bolts shall be installed accurately with the foundation template, furnished by the equipment manufacturer (as applicable), at the time the concrete is poured. Continuous inspection is required for anchor bolts installation and concrete pour. Anchor bolts shall be as specified in the Construction Structural Drawings

D. The CONTRACTOR shall retain the services of the manufacturer or the manufacturer's designated factory-trained representatives for installation of the Blower/Aftercooler (LGB/CBS) system, including all controls or accessories.

E. Startup and debugging shall be considered completed when the manufacturer and CONTRACTOR have demonstrated that the flaring system is operating optimally and without mechanical/electrical and instrumentation problems. Debugging and startup of the equipment shall not be considered part of the erection or installation and, therefore, all startup and debugging efforts will be provided at no additional cost to the OWNER nor will the time count against the manufacturer or his representative's required number of days. The OWNER shall be the sole judge as to whether the manufacturer and CONTRACTOR have completed startup and debugging.

F. The CONTRACTOR shall submit a certificate from the equipment manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation and care of the system.

3.2 INSPECTION, STARTUP, AND COMPLIANCE TESTING

A. General:

1. A factory representative shall be provided for a minimum of five (5) days and shall have complete knowledge of proper operation and maintenance to inspect the final installation and supervise the test run by the equipment.

2. Experienced factory-trained personnel, tools, and testing equipment shall be provided as required to perform the installation of the equipment furnished by the manufacturer, as well as test, calibrate, and start up the complete System operation and gas flow control as described on the Blower/Aftercooler (LGB/CBS) system operation requirement.

3. Experienced factory-trained PLC personnel and programming devices shall be provided as required to perform the programming or reprogramming to meet the actual System operation and variable flow control during testing and start up as described on the flaring System operation

requirement at all locations where PLCs with Touchscreens are installed under the Contract Work.

4. Field tests shall not be conducted until such time that the entire installation is complete and ready for testing.

B. Field Startup and Testing:

1. Upon completion of all the mechanical and electrical work, the CONTRACTOR shall conduct testing as specified herein to demonstrate that the equipment performs in accordance with all Specifications.

2. The CONTRACTOR shall perform initial testing of the equipment, insuring to himself that the tests listed in the Demonstration Test paragraph below can be satisfactorily completed.

3. The Demonstration Test shall demonstrate that all items of these Specifications have been met by the equipment as installed and shall include, but not limited to, the following tests:

   a. That the LFG Blower/Aftercooler system has been properly installed and all parts are in correct alignment.
   b. That the System satisfactorily operates continuously for 14 days.
   c. That there are no mechanical or electrical defects in any of the parts.
   d. That the controls perform satisfactorily as to automatic starting and stopping, and remote control of blowers and associated equipment.
   e. Alarm call outs.

END OF SECTION

SECTION 11310

CONDENSATE SUMPS AND PUMPING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide sump assemblies, pumps, controls, piping and all needed appurtenances as shown on the Construction Drawings.

B. Provide air compressor and all needed appurtenances as shown on the Construction Drawings.

A. Provide a complete and working condensate collection and sump pumping system.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01340 – Shop Drawings.

C. Section 02221 – Excavating.

D. Section 02225 – Trenching and Backfilling.

E. Section 15100 – Landfill Gas Piping

1.3 SUBMITTALS

A. Submit the following with the Bid:
   1. Submit all technical data with the bid to confirm Vendors equipment will meet the technical specifications.

B. Submit the following after Notice to Proceed and in accordance with the schedule outlined herein or in Section 01300 or 01340:
   1. Complete and submit shop drawings within fifteen (15) days of Contract award. Indicate equipment, dimensions, installation and mounting details, installation instructions, electrical wiring diagrams (as applicable), air and condensate discharge, valves, counters, and other ancillary automatic controls for the sumps and details.
   2. Indicate location of tanks, sumps, piping, and any associated valves or regulators.
   3. Submit pump and air compressor performance curves showing operating points, head vs. capacity, and efficiencies.
   4. Furnish operation and maintenance manuals. Assemble individual pump curves, pump items, pump accessories, bulletins, cuts, parts lists and other documentation into three-ring binders labeled to reference the project. Provide tabular dividers between each item of equipment per Section 01700 – Contract Closeout.

PART 2 PRODUCTS

2.1 CONDENSATE SUMP VESSEL

A. Sumps shall be dual-contained (as applicable) HDPE pipe and fittings shall be in accordance with Section 15100 – Landfill Gas Piping, of these Technical Specifications.

2.2 CONDENSATE SUMP PUMP

A. Provide submersible, pneumatic pumps, QED AP4B, bottom inlet, short, as manufactured by QED Environmental Systems, Ann Arbor, Michigan, or approved equal, with the following performance requirements:
   1. Pump shall be designed to transfer landfill gas condensate.
   2. The minimum flow rate shall be 3 gallons per minute (gpm).
   3. Pump shall overcome a total dynamic head at a minimum flowrate of 180 feet at 125 PSI.
   4. The operating range of the pump shall be 2 gpm to 6 gpm.
   5. Pump discharge shall be one inch NPT.

B. Pump materials of construction shall be as follows:
   1. All metallic pump components in contact with the pumped fluid shall be stainless steel.
   2. Check valve, check valve housing shall be stainless steel.

C. Pump hoses:
   1. Air hose shall be 3/8" ID Goodyear InstaGrip® with working pressure at 300 psi and burst pressure at 1,200 psi.
   2. Air exhaust hose shall be ½" ID Goodyear InstaGrip with working pressure at 300 psi and burst pressure at 1,200 psi.
   3. Fluid discharge hose shall be ¾" ID Goodyear InstaGrip I with working pressure at 300 psi and burst pressure at 1,200 psi.

2.3 AIR COMPRESSOR (NOT IN CONTRACT)

A. Provide air compressor consisting of a single-stage, air-cooled, oil injected rotary screw compressor, full feature Model GX 15–125TAFF, as manufactures by Atlas Copco of Rock Hill, SC, or approved equal. The compressor system shall be furnished complete with following:
   1. Compressor Element: The compressor element shall be a rotary screw design consisting of:
      a. Male rotor with five (5) lobes;
      b. Female rotor with six (6) flutes;
      c. Patented asymmetric rotor design; and
      d. Cycloid profile at the pitch diameter.
      e. Double V-Belt power transmission shall drive the male rotor.
   2. Drive Motor: The drive motor shall be 7.5 hp, horizontal AC squirrel cage induction type consisting of:
      a. Foot mounted;
      b. Service factor: 1.10;
      c. Insulation: Class F, Class B rise;
      d. Enclosure: TEFC;
      e. Motor speed: 3600 RPM;
      f. Voltage 208-230/460V/3 phase/60 hertz; and
      g. Motor construction: Rugged cast frame, cast rotor, non-hygroscopic insulation and corrosion resistant hardware.
   3. Starter Cubicle: The compressor unit shall be equipped with a CSA/UL listed control cubicle, consisting of:
      a. Direct on line motor starter: 208-230/460V/three phase/60 hertz;
      b. Control circuit transformer for 115V AC controls.
   4. Oil System: The oil system shall be of the differential pressure type consisting of:
      a. Approved air/oil separator reservoir tank with inverted spin-on separator element, oil fill tube with pressure relieving plug, minimum pressure/check valve, oil level sight glass, and oil drain valve;

b. Oil filter inverted spin-on type rated at 10 microns; and
c. Aircooled unit with an aluminum oil cooler which is cooled by a dedicated fan with TEFC motor

5. Air System: The air system shall consists of:
   a. Dry type air intake filter rated at 3 microns;
   b. Pneumatically operated air intake valve/unloader assembly;
   c. Minimum pressure/check valve;
   d. Air/oil separator tank with oil separator element; and
   e. Unit shall have a moisture separator/trap including both automatic and manual drain valves.
6. Assembly
   a. The full feature GX 15-125TAFF unit shall include all of the standard equipment mounted on a fully enclosed metal floor/base, made from industrial grade steel that is tank mounted on a 60 gallon ASME tank, with zero air loss automatic drain, Model EWD 50, supplied loose. The compressor unit shall be completely piped and assembled, including the control cubicle (with starter) and aftercooler with separator/trap. It shall also include the necessary sound attenuated panels to yield 64-65 dB (a) noise levels.
7. Integral Refrigerated Dryer: The integral refrigerated dryer shall consist of:
   a. Precooler/reheater;
   b. Refrigerant compressor;
   c. Hot-gas-bypass valve
   d. Pressostat regulator of condenser fan operation
   e. Capillary tube;
   f. Environmentally friendly R134a refrigerant;
   g. Pressure dewpoint gauge; and
   h. Integrated PDX filter (particulate and coalescing (0.1 micron, 0.1 ppm)
8. Electro-Pneumatic Control Panel: The electro-pneumatic control panel consists of the following gauges and indicators for simple efficient operation:
   a. Pressure gauge;
   b. Hour meter;
   c. Start/Stop switch;
   d. Automatic Operation Indicator;
   e. Emergency Stop Button; and
   f. Alarm Indicator.
9. The Contractor shall be required to submit a manufacturer's prorated warranty for 2 years against air compressor failure and free oil analysis for two years.
10. Contractor shall provide a pole barn over the compressor, extending a minimum of 2 feet on all sides. The layout and design shall be submitted to the OWNER for approval.
11. The compressor shall be a stand-alone unit, capable of delivering a minimum airflow of 21 scfm at 145psig.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install all pumps, pump controls, valves, air compressor, and associated piping and appurtenances as shown on the Drawings, in accordance with this section, and the manufacturer's recommendations.

END OF SECTION

DIVISION 15

MECHANICAL

SECTION 15100

LANDFILL GAS PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing all labor, materials, equipment, tools, and appurtenances required to complete the installation of the landfill gas collection piping, condensate air supply and force-main piping, and other associated piping.

B. Fabrication of landfill gas condensate sumps.

1.2 RELATED SECTIONS

A. Section 01190 – Health and Safety.

B. Section 01300 – Submittals.

C. Section 01669 – Testing Piping Systems.

D. Section 02225 – Trenching and Backfilling.

E. Section 11310 – Condensate Sump Pumps and Pump Controls.

F. Section 11187 – Landfill Gas Blower/Aftercooler System

1.3 REFERENCES

A. ASTM International.

B. ASTM A536 – Standard Specification for Ductile Iron Castings.
   1. ASTM D2513 – Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
   2. ASTM D3261 – Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
   3. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
   4. ASTM F1055-98e1 - Electrofusion Type Polyethylene Fittings.

C. American Society of Mechanical Engineers (ASME).
   1. ASME B16.5 – Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard-Revision of ASME B16.5-1996.

D. American Water Works Association (AWWA).
   1. AWWA C207 – Steel Pipe Flanges for Waterworks Service - Sizes 4 in. Through 144 in. (100 mm through 3,600 mm).

1.4 DEFINITIONS

A. Landfill gas piping: shall include, but not be limited to header piping, lateral piping, horizontal piping, dripleg piping, landfill gas (LFG) extraction well piping, landfill gas wellhead piping, condensate

sump related piping, and all other applicable piping associated with the landfill gas collection and control system.

1.5 SUBMITTALS

A. HDPE Pipe: Submit manufacturing test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration. Include results of tests with shipment of materials, with 2 additional copies of test results.

1.6 QUALITY CONTROL

A. Source Quality Control: If Manufacturer's test data is inadequate or unavailable, the OWNER reserves right to reject or require additional tests to satisfy material requirements at no additional cost to the OWNER.

B. Comply with appropriate codes and standards of following organizations for handling, fusion, and underground installation of low pressure polyethylene pipe.
1. American Gas Association (AGA).
2. Plastic Pipe Institute (PPI).
3. ASTM.
4. ANSI.
5. ASME.

C. Provide pipe welding personnel that are currently certified as fusion welder.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store or stack pipe so as to prevent damage from marring, crushing or puncture. Limit maximum stacking height to 6 ft.

B. Store in accordance with manufacturer's recommendations.

C. Protect pipe from excessive heat or harmful chemicals.

PART 2 PRODUCTS

2.1 POLYETHYLENE (PE) PIPE

A. Provide PE pipe of SDR indicated on the Contract Drawings complying with ASTM D 3350. Piping shall conform to either ASTM D 2513 or F 714 or superseded standard.

B. Physical Properties of HDPE Pipe
1. High Performance, high molecular weight, high density polyethylene pipe (type 3408 resin).
2. ASTM D3350, minimum cell classification value 345464C.
3. Standard dimension ratio: See Drawings.
4. Marking: Intervals of 5 ft. or less.
   a. Manufacturer's name or trademark.
   b. Nominal pipe size.
   c. Type of plastic pipe (i.e., PE 3408).
   d. Standard dimension ratio (i.e., SDR 17) or as specified on the Construction Drawings or within these Technical Specifications.
   e. ASTM D2513.
   f. Extrusion date, period of manufacture or lot, or batch number.

g. Provide PE products made from a high density, high modulus resin conforming with cell classification PE 3245434C or better in accordance with ASTM D3350.

C. Dimensions:
1. Conform to standard dimensions and tolerances of ASTM D2513.

2.2 HDPE FITTINGS

A. Provide fittings from polyethylene compound having cell classification equal to or exceeding compound used in pipe to insure compatibility of polyethylene resins.

B. Flange Joints:
1. 150-lb carbon steel or convoluted epoxy coated ductile iron backup flanges as recommended by manufacturer.
2. Zinc plated carbon steel nuts, bolts, and washers.
3. Neoprene full face flange gaskets.
4. Flanges and bolt patterns consistent with ASME B16.5/AWWA C207/ASTM A536, as recommended by manufacturer.

C. Dimensions of fittings conforming to standard dimensions and tolerances according to ASTM D3261.

D. Provide fittings with pressure rating equal to or greater than pressure rating of pipe.

2.3 HDPE LANDFILL GAS CONDENSATE SUMPS

A. Provide landfill gas condensate sumps as indicated in the Construction Drawings.
1. Each sump assembly shall be fabricated from HDPE pipe and fittings, and include a liquid reservoir section constructed to the size necessary to handle the quantity of condensate expected from the Blower/Aftercooler skids at a nominal flow rate of 10,075 standard cubic feet per minute (SCFM) and designed for pressure applications up to 5.8 pounds per square inch gauge (PSIG). The condensate sump, submersible pneumatic pump, pump discharge hose, air supply hose, control system and control connections, including the necessary valves and appurtenances as indicated on the Construction Drawings and/or specified herein. The sump shall be manufactured as a turn-key unit complete unit with all ancillary devices and be from a reputable manufacturer such as Real Environmental Products, LLC., of Jackson, California or approved equal.
2. The sumps shall collect condensate draining from the landfill gas piping; and, blower and aftercooler skid unit demisters. The sump pumps shall automatically pump based on the specified installation elevation as shown in the Construction Drawings. Additional sumps may be required and not necessarily shown on the Construction Drawings to be able to provide enough pumping head to be able to convey condensate to the Project Site existing Condensate Storage Tank.
3. For each sump location, the condensate discharge piping shall include a check valve; and isolation shut-off ball valves for pump discharge and air supply piping as indicated on the Construction Drawings and set forth in these Technical Specifications.
4. All materials in contact with the landfill gas, the condensate, and landfill environment shall be designed to provide corrosion resistance for the intended service. Hose connections and condensate discharge pipes to the pumps shall be as recommended by the sump manufacturer for the fluid, pressures and flows to be conveyed. Hose ends shall be stainless steel quick connects, to facilitate removal for maintenance.

2.4 POLYVINYL CHLORIDE (PVC) PIPE:

A. Provide Schedule 40 and Schedule 80 PVC pipe complying with ASTM D 1785.

B. PVC Fittings:
1. Provide Schedule 40 PVC fittings 8 inches and smaller complying with ASTM D 2466, socket-type.

2. Provide PVC fittings 10 inches and larger rated for minimum pressure of 80 psig at 73°F and injection molded from Type 1 PVC.
3. Provide Schedule 80 PVC fittings complying with ASTM D 2467 for socket-type and ASTM D 2464 for threaded-type.

C. PVC Flanges:
1. Provide 150-pound, flat-face, socket-type Schedule 80 PVC flanges. Diameter and drilling of flanges shall comply with ANSI B16.5 for Class 150.
2. Provide full-face, neoprene flange gaskets, 1/16-inch thick with "A" scale hardness of 45 to 60 durometer.
3. Provide correct number and sizes of steel hexagon bolts, washers, and hexagon nuts, electrogalvanized with zinc or cadmium.

D. PVC Solvent Primer: Provide solvent primer as recommended by PVC product supplier and complying with ASTM F 656.

E. PVC Solvent Cement: Provide medium-bodied solvent cement as recommended by PVC product supplier and complying with ASTM D 2564.

2.5 CORRUGATED METAL PIPE (CMP)

A. All corrugated metal pipe to be used for road crossing encasements for the LFG main header pipe shall be gauge 16 aluminized steel pipe. Schedule 40 Steel pipe may be used for shallow burial locations as shown on the Construction Drawings.

B. Corrugated metal pipe and Schedule 40 Steel pipe shall be sized as shown on the Contract (Construction) Drawings.

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

A. Pipe will be rejected for failure to conform to Specifications, or for the following:
1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5% of shipment or delivery.

B. Pipe will be rejected for cracks sufficient to impair strength, durability, or service-ability of pipe.
1. Defects indicating improper proportioning, mixing, and molding.
2. Damaged ends, where such damage would prevent making satisfactory joint.

C. Acceptance of fittings, stubs, or other specifically fabricated pipe sections will be based on visual inspection at Project site and documentation that they conform to these Specifications.

3.2 INSTALLATION

A. Trench, backfill, and compact in accordance with Section 02225-Trenching and Backfilling; and , Construction Drawings.

B. Carefully lower pipes and fittings into trenches.

C. CONTRACTOR to account for seasonal impacts on HDPE pipe lengths prior to welding and insulation per manufacturer's recommendations. For example, for summertime installations provide a slightly longer length of HDPE pipe when connections are made between two fixed points or structures to compensate for contraction of the pipe in a cooler trench bottom. Provide additional pipe lengths in

accordance with the HDPE pipe manufacturer's instructions and/or as shown on the Construction Drawings.

D. Install pipe and fittings so that there will be no deviation at the joints and so that inverts present a smooth surface. Pipe and fittings that do not fit together to form a tight fitting joint are not permitted.

E. Install pipes in the locations and to the required lines and grades indicated on the Construction Drawings.

F. Maintain trench excavations that are free of water during the progress of the work. Do not lay pipes in water. Do not weld pipe joints in water.

G. Repair trench cave-ins.

H. Maintain pipe, fittings and pipe interiors in a clean condition throughout installation.

I. Correct and adjust line and grade of pipe by scraping earth foundation or by scraping away or compacting fill under the barrel of the pipe. Do not block or wedge pipe.

J. Wherever the trench has been excavated to a depth in excess of 6 inches below design grade, correct the grade by placing crushed stone or gravel fill.

K. If unsuitable materials or unsuitable conditions are encountered in the trench, the OWNER may direct excavation below design grade and placement of gravel or crushed stone foundation to backfill the trench to design grade. This work will be done by Work Change Directive or Change Order.

L. Install fittings at locations indicated on the Construction Drawings. Do not install pipe fittings after laying pipe.

M. Do not change the location of trenching pipe laying or pipe sizes without OWNER's approval.

N. Install piping to form a completely connected system, including connections to valves and appurtenances specified in other sections.

3.3 HEAT FUSION OF HDPE PIPING:

A. Join HDPE pipe by butt-fusion method, providing a completely uniform and monolithic pipe interior.

B. Join pipe sections at ground level to a length recommended by the manufacturer such that maximum allowable stress, when pulling the pipe into position alongside the trench, is not exceeded. Use appropriate materials and equipment, as recommended by the HDPE pipe manufacturer, when pulling butt-fused pipe sections alongside the trench to prevent pipe damage.

C. Use detergents and solvent solutions, when required to clean pipe ends. Use in accordance with manufacturer's recommendations.

D. Do not bend pipe to a radius greater than that recommended by manufacturer for that type and grade of pipe.

E. Do not subject pipe to strains that will overstress or buckle piping or impose excessive stress on joints.

F. Join branch saddle connections in accordance with manufacturer's recommendations and procedures. Provide branch saddle fusion equipment of the size necessary to properly facilitate saddle fusion within the trench.

G. Before butt fusing pipe, inspect each pipe section for presence of dirt, sand, mud, shavings, and other debris or animals. Remove debris and animals from pipe.

H. At end of each working day, cover open ends of fused pipe. Cap to prevent entry by animals or debris.

I. Use compatible fusion techniques when polyethylene pipes of different melt indexes are fused together. Refer to manufacturer's specifications for compatible fusion.

3.4 FLANGE JOINING

A. Use on HDPE flanged pipe connection sections or Electrofusion couplers as shown on the Construction drawings.

B. Connect slip-on carbon steel backup flanges with nuts and bolts.

C. Butt fuse HDPE fabricated flange adapters to pipe.

D. Take the following precautions when connecting flange joints.
1. Align flanges or flange/valve connections to provide tight seal. Neoprene full face gaskets are required for flange/valve connections.
2. Place U.S. Standard round washers as may be required on some flanges per manufacturer's recommendations. Lubricate bolts in accordance with manufacturer's recommendations.
3. Tighten flange bolts in sequence and accordance with manufacturer's recommendations. CAUTION: Do not over-torque bolts.
4. Tighten bolts in sequence to uniform torque in accordance with manufacturer's recommendations.

3.5 PIPE PLACEMENT

A. Provide grade control equipment to accurately install pipe to design grades and slopes. Slope may not vary by more than 0.1% from the design slope, unless otherwise directed by the OWNER.

B. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as to not cause excessive gouging or surface abrasion; and not to exceed 400 ft.

C. Notify OWNER prior to installing pipe into trench and allow time for OWNER'S inspection. If the CONTRACTOR installs pipe into the trench before the OWNER has inspected it, the OWNER can require the CONTRACTOR to remove the pipe for inspection without further cost to the OWNER.

D. Correct irregularities found during inspection.

E. Complete tie-ins within trench whenever possible to prevent overstressed connections.

F. Complete HDPE flanged branch saddle connections within trench. Butt fused branch saddle only permitted on pipes 18" or greater. No electrofusion branch saddles shall be permitted. All other connectors shall be made using appropriately sized Tees or other fittings as appropriate.

G. Allow pipe sufficient time to adjust to trench temperature prior to any testing, segment tie-ins, or backfilling activity.

H. Install reducers adjacent to laterals or tees.

I. To reduce branch saddle stress, saddles shall be installed at slope equal to and continuous with lateral or header piping.

J. Place in trench by allowing at least 12 in./100 ft for thermal contraction and expansion.

K. CONTRACTOR must coordinate construction of header lines near access roads with OWNER to limit impediment of normal landfill operations.

3.6 PIPE TESTING

A. Test pipe sections in accordance with Section 01669.

B. Pig all piping sections to clean pipe shavings prior to placing the LFG piping in operation.

END OF SECTION

SECTION 15200

VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing all labor, materials, tools, equipment, and performing all work and services necessary for or incidental to installation of all types of valves incorporated in the work, including the items in the schedules indicated on the Construction or Contract Drawings and as specified herein.

B. Although such work is not specifically shown or specified, furnishing and installing supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for sound, secure, complete and compatible installations.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01630 – Substitutions.

C. Section 02221 – Excavating.

D. Section 02225 – Trenching and Backfilling.

1.3 REFERENCES

A. ASTM D1784 – Standard Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds.

1.4 SUBMITTALS

A. Per Section 01300 - Submittals.

B. Information contained in submittals must include, but is not necessarily limited to, the following:

1. Valve pressure/temperature rating and flange rating.
2. Valve body material and valve trim.
3. Operator and actuators.
4. Inner lining material, lining pressure and temperature.
5. Indicator attachments.
6. Valve dimensions, weight and class.
7. Maximum non-shock shutoff.
8. Valve flow coefficient Cv.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inspect materials thoroughly upon arrival. Examine materials for damage. Report damaged material immediately. Secure and pay for replacement material items immediately.

B. Store valves in approved sheltered locations. Ensure site is accessible in all types of weather.

C. Observe manufacturer's directions regarding storage, handling, and incorporating in Work.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide valves of same manufacturer throughout where possible.

B. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

C. Valves to be same size as pipe in which they are installed unless otherwise indicated on the Construction Drawings.

D. Handle valves, fittings, and other accessories in such manner as to ensure delivery to the point of installation in sound, undamaged condition. Carry, do not drag structures and materials to the point of installation.

E. Provide all valves, except those specified otherwise, with appropriate operator. Ensure direction of rotation to open each valve is from right to left (counter-clockwise). Furnish valve body or operator with impression cast showing word "OPEN" and arrow indicating open direction.

F. Furnish valves suitable for their intended use.

2.2 VALVES

A. Butterfly Valves:

1. Refer to Specification 11187, Part 2 Products, for valve manufacturer and type.

2. 6 inch and smaller: Provide lever-operated handle.

3. 8 inch and larger: Provide gear-operated handle.

B. Check Valves

1. Refer to Specification 11187, Part 2 Products, for valve manufacturer and type.

2. Swing check valves: Minimum 150-psi non-shock cold water pressure rating and having an external lever and spring or lever and weight to balance the disc. Furnish with tight-fitting disc with minimum 0.5 psi back pressure. Furnish flanged and suitable for 150 psi working pressure and for installation as indicated on the Construction or Contract Drawings.

C. Modulating Valves (Flo-Serv).

1. Actuators (Rotork). Specified by approved System Manufacturer.

2. Pressure Transmitters (Rosemount). Specified by approved System Manufacturer.

D. Automatic/Pneumatic Controls Valves (Same Manufacturer as the Blower/Aftercooler System manufacturer), approved by said manufacturer.

2.3 PIPE SUPPORTS

A. Provide the pipe supports as shown on the Contract (Construction) Drawings, specified, and required to adequately support and secure all piping systems.

1. Provide pipe supports fabricated from metal framing channel and fittings with electrogalvanized zinc or cadmium finish, as supplied by Unistrut, Superstrut, or Engineer or OWNER approved equal.

2. Provide pipe anchors and guides fabricated from galvanized steel to the dimensions shown in the Contract Drawings. Anchors should not allow pipe slippage under loading. Provide clearance between guides and the outside diameter of the pipes, to allow free sliding.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Tighten valve flange bolting per manufacturer's recommendations.

C. Install valves per manufacturer's recommendations.

3.2 TRENCH EXCAVATION, BEDDING, AND BACKFILL

A. Trench excavation, bedding, and backfill conforming to the requirements of Section 02225.

3.3 PLACEMENT

A. Place all structures and maintain lines and grades as indicated on the Drawings. Do not deviate from the required line or grade except with permission of the OWNER.

B. Strictly adhere to the installation recommendations of the equipment or material manufacturers.

C. Also comply with the following requirements. Provide all special tools and devices such as jacks, chokers, and similar items necessary for the installation.

END OF SECTION

DIVISION 16

ELECTRICAL

SECTION 16010
ELECTRICAL BASICREQUIREMENTS

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Basic requirements for electrical systems.

B. Related Sections include but are not necessarily limited to:
   l. Division 1 - General Requirements.
   2. Section 16120 - Wire and Cable - 600 Volt and Below.

1.2 DEFINITIONS

A. For the purposes of providing materials and installing electrical work the following definitions shall be used.
   I. Outdoor area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
   2. Non-architecturally finished area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
   3. Hazardous areas: Class I, II or III areas as defined in NFPA 70.
   4. Shop fabricated: Manufactured or assembled equipment for which a UL test procedure has not been established.

1.3 QUALITY ASSURANCE

A. Referenced Standards:
   1. See individual specification items.

B. Where Underwriters Laboratories, Inc. (UL) test procedures have been established for the product type, use UL or ETL Testing Laboratories (ETL) approved electrical equipment and provide with the UL or ETL label.

1.4 SYSTEM DESCRIPTION

A. Electrical power, control and instrumentation systems for the operation and monitoring of the Miramar Landfill Gas Recovery Improvements Project.
   1. This project does not includes the installation of an Emergency Back-Up power generator.

1.5 SUBMITTALS

A. Shop Drawings:
   I. See individual specification sections for submittal requirements for equipment.
   1. Non-equipment requirements:
      a. Provide manufacturer's technical information on products to be used, including product descriptive bulletin.
      b. Include data sheets that include manufacturer's name and product model number. Clearly identify all optional accessories.
      c. Acknowledgement that products are UL or ETL listed or are constructed utilizing UL or ETL recognized components.

d. Manufacturer's delivery, storage, handling and installation instructions.
e. Product installation details.
f. See individual specification sections for any additional requirements.

B. Operation and Maintenance Manuals:
1. See Manufacturers manuals.

C. When a specification section includes products specified in another specification section, each section shall have the required shop drawing transmittal form per Section 01300 and all sections shall be submitted simultaneously.

1.6 DELIVERY, STORAGE, AND HANDLING

A. See individual specifications.

1.7 AREA DESIGNATIONS

A. Designation of an area will determine the NEMA rating of the electrical equipment enclosures, types of conduits and installation methods to be used in that area.
1. Outdoor areas: Wet.
2. Indoor areas: Dry. Also, wet when specifically designated on the Drawings or in the Specifications.
3. Hazardous areas: Class1, Division 2 as identified on Contract Drawings

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Refer to specific material paragraphs below.

B. Provide all components of a similar type by one manufacturer.

2.2 MATERIALS

A. Field Fabricated Electrical Equipment Support Pedestals and Racks:
1. Approved manufacturers (substitutions of manufacturer are acceptable if material is shown to be equivalent):
a. Modular strut:
1) Unistrut Building Systems.
2) B-Line.
3) Globe Strut.
2. Material requirements:
a. Modular strut:
1) Galvanized steel: ASTM A123 or ASTM A153.
2) Stainless steel: AISI Type 316.
3) PVC coat galvanized steel: ASTM A123 or ASTM A153 and 20 mil PVC coating.
b. Structural members:
1) Galvanized steel: ASTM A123.
2) Aluminum: AA Type 6063-T6.
c. Mounting plates:
1) Galvanized steel: ASTM A123.
2) Aluminum: AA Type 6063-T6.
d. Mounting hardware:
1) Galvanized steel.
2) Stainless steel.

B. Field touch-up of galvanized surfaces.
   1. Zinc-rich Aromatic Urethane Primer.
      a. One coat, 3.0 mils, 90-97 Tneme-Zinc, VOC - 2.67.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and wire all equipment, including pre-purchased equipment, and perform all tests necessary to assure conformance to the Drawings and Specifications and ensure that equipment is ready and safe for energization.

B. Install equipment in accordance with the requirements of:
   1. NFPA 70 (NEC)
   2. California Electrical Code (Title 24, Part 3)
   3. ANSI/IEEE C2.
   4. The manufacturer's instructions.

C. In general, conduit routing is shown diagrammatically on the Construction Drawings.
   1. The CONTRACTOR is responsible for routing all conduits including those shown on the one-line and control diagrams and conduit runs shown on the conduit plans.
   2. Conduit routings that are shown are approximate, exact routing to be as required for equipment furnished and field conditions.

D. The CONTRACTOR is to furnish and install all conduit and conductors required.
   1. The indicated home run conduit and conductor size shall be used for the entire branch circuit.
   2. See Section 16120 for combining multiple branch circuits.

E. Do not use equipment that exceed dimensions or reduce clearances indicated on the Drawings or as required by the NFPA 70.

F. Install equipment plumb, level, square and true with construction features and securely fastened.

G. Install above grade electrical equipment, including pull and junction boxes, minimum of 6 IN from process, gas, air and water piping and equipment where possible and when below grade the separation must be a minimum of 36 IN.

H. Install equipment so it is readily accessible for operation and maintenance, is not blocked or concealed and does not interfere with normal operating and maintenance requirements of other equipment.

I. Device Mounting Schedule:
   1. Mounting heights as indicated below:
      a. Light switch (to center): 48 IN.
      b. Receptacle in non-architecturally finished areas (to center): 48 IN.
      c. Telephone outlet for wall-mounted phone (to center): 48 IN.
      d. Safety switch (to center of operating handle): 48 IN.
      e. Separately mounted motor starter (to center of operating handle): 48 IN.
      f. Pushbutton or selector switch control station (to center): 48 IN.
      g. Panelboard (to top): 72 IN.

J. Avoid interference of electrical equipment operation and maintenance with structural members, building features and equipment of other trades. When it is necessary to adjust the intended location of electrical equipment, unless specifically dimensioned or detailed, the CONTRACTOR may make adjustments of up to 6 IN to equipment location with the Engineer's approval.

K. Provide electrical equipment support system per the following area designations:
   1. Dry or wet areas:
      a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit clamps.
      b. Aluminum system consisting of: Aluminum channels and fittings with stainless steel nuts and hardware and conduit clamps.
      c. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.

L. Provide all necessary anchoring devices and supports rated for the equipment load based on dimensions and weights verified from approved submittals, or as recommended by the manufacturer.
   1. Do not cut, or weld to, building structural members.
   2. Do not mount safety switches or other equipment to equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.

M. Provide corrosion resistant spacers to maintain 1/4 IN separation between equipment and mounting surface in wet areas or on below grade walls.

N. Do not place equipment fabricated from aluminum in direct contact with earth or concrete.

O. Screen or seal all openings into equipment mounted outdoors to prevent the entrance of rodents and insects.

P. Do not use materials that may cause the walls or roof of a building to discolor or rust.

Q. Identify electrical equipment and components in accordance with instruction in individual specifications or on Drawings.

3.2 FIELD QUALITY CONTROL

A. Verify exact rough-in location and dimensions for connection to electrified equipment, provided by others.

B. Replace equipment and systems found inoperative or defective and re-test.

C. Cleaning:
   1. See requirements where noted or follow manufacturer's recommended procedures.

D. Apply touch-up paint as required to repair scratches and other marks.

E. Replace nameplates damaged during installation.

3.3 DEMONSTRATION

A. Demonstrate equipment in accordance with specific instructions in these specifications.

END OF SECTION

SECTION 16060
ELECTRICAL GROUNDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material and installation requirements for grounding system(s).

B. Related Sections include but are not necessarily limited to:
   1. Section 16010 - Electrical Basic Requirements.
   2. Section 16120 - Electrical Wire and Cable - 600 Volt and Below.
   3. Section 16130 - Electrical Raceways and Boxes.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. See individual specification items.

B. Assure ground continuity is continuous throughout the entire Project.

1.3 SUBMITTALS

A. Miscellaneous:
   1. Ground rod and/or grounding system resistance and continuity test reports signed by the Project's supervising electrical foreman.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
   1. Ground rods and bars and grounding clamps, connectors and terminals:
      a. Burndy.
      b. Harger Lightning Protection.
      c. Heary Brothers.
      d. Joslyn.
      e. Robbins Lightning Protection.
      f. Thompson.
   2. Exothermic weld connections:
      a. Erico Products Inc., Cadweld.
      b. Harger Lightning Protection.
      c. Thermoweld.
   3. Cast in place ground plates:
      a. Erico Products Inc., Cadweld or approved equivalent.

2.2 COMPONENTS

A. Wire and Cable:
   1. Bare conductors: Soft drawn stranded copper meeting ASTM B8.
   2. Insulated conductors: Color coded green or green with a yellow stripe, per Section 16120.

B. Conduit: As specified in Section 16130.

C. Ground Bars:
   1. Solid copper:
      a. 1/4 IN thick.
      b. 2 or 4 IN wide.
      c. 24 IN long minimum in main service entrance electrical rooms, 12 IN long elsewhere.
   2. Predrilled grounding lug mounting holes.
   3. Stainless steel or galvanized steel mounting brackets.
   4. Insulated standoffs.

D. Ground Rods:
   1. 3/4 IN x 10 FT.
   2. Stainless steel or copper clad steel:

E. Grounding Clamps, Connectors and Terminals:
   1. Mechanical type:
      a. Standards: UL 467.
      b. High copper alloy content.
   2. Compression type for interior locations:
      a. Standards: UL 467.
      b. High copper alloy content.
      c. Non-reversible.
      d. Terminals for connection to bus bars shall have two bolt holes.
   3. Compression type suitable for direct burial in earth or concrete:
      a. Standards: UL 467, IEEE 837.
      b. High copper alloy content.
      c. Non-reversible.

F. Exothermic Weld Connections:
   1. Copper oxide reduction by aluminum process.
   2. Molds and loads properly sized for each application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Install products in accordance with manufacturer's instructions.
   2. Size grounding conductors and bonding jumpers in accordance with NFPA 70 Article 250, except where larger sizes are indicated on the Drawings.
   3. Remove paint, rust, or other non-conducting material from contact surfaces before making ground connections.
   4. Where ground conductors pass through floor slabs or building walls provide non-metallic sleeves and install per these specifications and the Approved Construction Drawings approved Construction Drawings.
   5. Do not splice grounding conductors except at ground rods.
   6. Install ground rods and grounding conductors in undisturbed, firm soil.
      a. Provide excavation required for installation of the ground conductors.
      b. Use driving studs or other suitable means to prevent damage to threaded ends of sectional rods.
      c. Unless otherwise specified, connect conductors to ground rods with compression type terminals or exothermic weld.
      d. Provide sufficient slack in grounding conductor to prevent conductor breakage during backfill or due to ground movement.
      e. Backfill excavation completely, thoroughly tamping to provide good contact between backfill materials and ground rods and conductors.
      f. Provide ground rod wells as indicated on the Approved Construction Drawings.

7. Do not use exothermic welding if it will damage the structure to which the grounding conductor is being welded.

B. Grounding Electrode System:
   1. Provide a grounding electrode system in accordance with NFPA 70 Article 250 and as indicated on the Drawings.
   2. Grounding conductor terminations:
      a. Cast in place ground plates, use compression type terminal and bolt it to the ground plate with stainless steel bolt(s), lock washer(s) and flat washer(s).
      b. Ground bars mounted on wall, use compression type terminal and bolt it to the ground bar with two bolts.
      c. Ground bars in electrical gear, use compression type terminal and bolt it to the ground bar.
      d. Piping systems, use mechanical type connections.
      e. Building steel, below grade and encased in concrete, use compression type connector or exothermic weld.
      f. At all above grade terminations, the conductors shall be labeled per Section 16010.

C. Supplemental Grounding Electrode:
   1. Provide the following grounding in addition to the equipment ground conductor supplied with the feeder conductors.
   2. Equipment support rack and pedestals mounted outdoors:
      a. Connect metallic structure to a cast in place ground plate where indicated on the Approved Construction Drawings.
      b. Grounding conductor: 2/0 AWG minimum.

D. Low Voltage Transformer Separately Derived Grounding System:
   1. Ground separately mounted step-down transformers XO terminal to one of the following:
      a. Closest building steel using mechanical type terminal bolted to the steel, compression type connection or exothermic weld.
      b. Closest domestic cold water metal pipe using a mechanical type connection.
      c. Ground bar or ground grid.
   2. Grounding bar: 1 FT in length and mounted adjacent to transformer.
   3. Interconnect all ground bars in a radial fashion to the main ground bar.
      a. Terminate the conductors on ground bars with a compression type terminal and bolt it to the ground bar with two bolts.
      b. Grounding conductor: Bare conductor, size as indicated on the Drawings.

E. Telecommunications Grounding System:
   1. Coil 5 FT of insulated #6 AWG conductor at each telephone terminal board and mechanically connected to the ground bar.
   2. Grounding bar: Mounted on or adjacent to telephone terminal board.
   3. Interconnect all telecommunication ground bars in a radial fashion to the main ground bar.
      a. Grounding conductor: Bare conductor, size as indicated on the Drawings.

F. Raceway Grounding:
   1. All metallic conduit shall be installed so that it is electrically continuous.
   2. All conduits to contain a grounding conductor with insulation identical to the phase conductors, unless otherwise indicated on the Drawings.
   3. Provide grounding-type insulating bushings:
      a. For all equipment not supplied with a conduit hub.
      b. On ends of non-metallic ductbank conduit.
   4. Provide double locknuts at all panels, junction and outlet boxes.
   5. Bond all conduit, at entrance and exit of equipment, to the equipment ground bus or lug.
   6. Provide bonding jumpers if conduits are installed in concentric knockouts.

7. Make all metallic raceway fittings and grounding clamps tight to ensure equipment grounding system will operate continuously at ground potential to provide low impedance current path for proper operation of overcurrent devices during possible ground fault conditions.

G. Equipment Grounding:
   1. Ground all equipment supplied from electrical gear through the gear's equipment ground bus. Provide an equipment grounding conductor connected to the ground bus and equipment ground lug.
   2. Use generator manufacturer's provisions for grounding electric generators, or manufacturer's written instructions, except as shown on the Contract Drawings.

3.2 FIELD QUALITY CONTROL

A. Leave grounding system uncovered until observed by Engineer Representative.

B. Provide a continuity test on the components of the grounding electrode system.

C. Complete grounding system: Resistance of 5 ohms or less.

D. Test resistance of installed ground system after backfilling and before connection to any other grounded system including underground piping, utility services or other building ground systems.
   1. Test ground grid resistance by fall-of-potential method.
   2. Perform test at the ground rod(s).

END OF SECTION

SECTION 16120
ELECTRICAL WIRE AND CABLE - 600 VOLT AND BELOW

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material and installation requirements for:
      a. Building wire.
      b. Medium votage cable
      c. Power control.
      d. Control cable.
      e. Instrumentation cable.
      f. Wire connectors.
      g. Insulating tape.
      h. Pulling lubricant.

B. Related Sections include but are not necessarily limited to:
   1. Division 1 - General Requirements.
   2. Section 16010 - Electrical Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. See individual specifications.

1.3 DEFINITIONS

A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.

B. Instrumentation Cable: Multiple conductor, insulated, twisted or untwisted, with outer sheath. The following are specific types of instrumentation cables:
   1. Analog signal cable: Used for the transmission of low current (e.g., 4-20mA DC) or low voltage (e.g., O-iO V DC signals, using No. 16 AWG and smaller conductors. Commonly used types are defined in the following:
      a. UTP: Unshielded twisted pair.
      b. TSP: Twisted shielded pair.
      c. TST: Twisted shielded triad.

C. Medium Voltage Cable: Type MV-105, copper conductor rated for 15,000 volts.

D. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, #8 AWG and larger.

E. Control Cable: Multi-conductor, insulated, with outer sheath containing building wires, #16, #14, #12 or #10 AWG.

F. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.4 SUBMITTALS

A. Shop Drawings:
   1. See specific requirements as indicated in individual specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

1. See specific requirements as indicated in individual specifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
   1. Building wire, medium voltage, power and control cable:
      a. American Insulated Wire Corporation.
      b. General Cable.
      c. Rome Cable Corporation.
      d. Manhattan/CDT.
      e. Southwire Company.
   2. Instrumentation cable:
      a. Analog cable:
         1) Alpha Wire Corporation.
         2) American Insulated Wire Corporation.
         3) Belden Wire and Cable.
         4) General Cable.
         5) Manhattan/CDT.
   3. Wire connectors:
      a. Burndy Corporation.
      b. Buchanan.
      c. Ideal.
      d. Ilsco.
      e. Minnesota Mining and Manufacturing Co.
      f. Teledyne Penn Union.
      g. Thomas and Betts.
      h. Phoenix Contact.
   4. Insulating tape:
      a. Minnesota Mining and Manufacturing Co.
      b. Plymouth Bishop Tapes.
      c. Red Seal Electric Co.

B. Submit requests for substitution in accordance with Specification Section 01630.

2.2 MANUFACTURED UNITS

A. Building Wire:
   1. Conductor shall be copper with 600 V rated insulation.
   2. Conductors shall be stranded, except for conductors used in lighting and receptacle circuits may be stranded or solid.
   3. Surface mark with manufacturers name or trademark, conductor size, insulation type and UL label.
   4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 for type THHN/THWN and THHN/THWN-2 insulation.
   5. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 for type XHHW-2 insulation.

B. Power Cable:
   1. Conductor shall be copper with 600 V rated insulation.
   2. Surface mark with manufacturers name or trademark, conductor size, insulation type and UL label.
   3. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 and 1277 for type THHN/THWN insulation with an overall PVC jacket.
   4. Number of conductors as required, including a bare ground conductor.
   5. Individual conductor color coding:
      a. ICEA Method 4.
      b. See Part 3 of this specification for additional requirements.
   6. Conform to NFPA 70 Type TC.

C. Medium Voltage Cable
   1. Conductor shall be copper with 15,000V, 133% rated insulation.
   2. Cable shall be capable of operating continuously at a conductor temperature not in excess of 105 degrees C for normal operation, 140 degrees C for emergency overload conditions and 250 degrees C for short circuit conditions.
   3. Conform to UL 1072 – Medium Voltage Cables
   4. Conform to ICEA S-93-639 (NEMA WC 74)

D. Control Cable:
   1. Conductor shall be copper with 600 V rated insulation.
   2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
   3. Conform to NEMA/ICEA WC 57/S-73-539 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
   4. Number of conductors as required, provided with or without bare ground conductor of the same AWG size. When a bare ground conductor is not provided, an additional insulated conductor shall be provided and used as the ground conductor (e.g., 6/c #14 w/g and 7/c #14 are equal).
   5. Individual conductor color coding:
      a. NEMA/ICEA Method 1, Table E-2.
      b. See Part 3 of this Specification for additional requirements.
   6. Conform to NFPA 70 Type TC.

E. Instrumentation Cable:
   1. Surface mark with manufacturers name or trademark, conductor size, insulation type and UL label.
   2. Analog cable:
      a. Tinned copper conductors.
      b. 300 V or 600 V PVC insulation with PVC jacket.
      c. Twisted or twisted with 100 percent foil shield coverage with drain wire.
      d. Individual conductor color coding: ICEA Method 1, Table K-2.
      e. Conform to UL 2250, UL 1581 and NFPA 70 Type ITC.

F. Wire Connectors:
   1. Twist/screw on type:
      a. Insulated pressure or spring type solderless connector.
      b. 600 V rated.
      c. Ground conductors: Conform to UL 486C and/or UL 467 when required by local codes.
      d. Phase and neutral conductors: Conform to UL 486C.
   2. Compression and mechanical screw type:
      a. 600 V rated.
      b. Ground conductors: Conform to UL 467.
      c. Phase and neutral conductors: Conform to UL 486A.
   3. Terminal block type:
      a. High density, screw-post barrier-type with white center marker strip.
      b. 600 V and ampere rating as required, for power circuits.
      c. 600 V, 20 ampere rated for control circuits.
      d. 300 V, 15 ampere rated for instrumentation circuits.
      e. Conform to NEMA ICS 4 and UL 486A.

G. Insulating Tape:
   1. Pressure sensitive vinyl.
   2. Premium grade.
   3. Heat, cold, moisture, and sunlight resistant.
   4. Thickness, depending on use conditions: 7, 8.5, or 10 mil.
   5. For cold weather or outdoor location, tape must also be all-weather.
   6. Comply with UL 510.

H. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Permitted Usage of Insulation Types:
1. Type XHHW-2:
a. Building wire and power cable No. 6 AWG and larger in architectural and non-architectural finished areas.
b. Building wire and power and control cable in conduit below grade.
2. Type THHN/THWN and THHN/THWN-2:
a. Building wire and power and control cable No. 8 AWG and smaller in architectural and non-architectural finished areas.

B. Conductor Size Limitations:
1. Feeder and branch power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the Drawings.
2. Control conductors shall not be smaller than No. 14 AWG unless otherwise indicated on the Drawings.
3. Instrumentation conductors shall not be smaller than No. 18 AWG unless otherwise indicated on the Drawings.

C. Color Code All Wiring as Follows:
1. Building wire:

	240 V, 208 V, 240/120 V, 208/120 V	480 V, 480/277 V
Phase 1	Black	Brown
Phase 2	Red *	Orange
Phase 3	Blue	Yellow
Neutral	White or Gray	White or Gray
Ground	Green or green with yellow stripe	Green or green with yellow stripe

* Orange when it is a high leg of a 120/240 V Delta system.

a. Conductors #6 AWG or smaller: Insulated phase, neutral and ground conductors shall be identified by a continuous colored outer finish along its entire length.
b. Conductors larger than #6 AWG:
1) Insulated phase and neutral conductors shall be identified by one of the following methods:
a) Continuous colored outer finish along its entire length.
b) 3 IN of colored tape applied at the termination.
2) Insulated grounding conductor shall be identified by one of the following methods:
a) Continuous green outer finish along its entire length.
b) Stripping the insulation from the entire exposed length.
c) Using green tape to cover the entire exposed length.
3) The color coding shall be applied at all accessible locations, including but not limited to: junction and pull boxes, wireways, manholes and handholes.
2. Power cables ICEA Method 4 with:
a. Phase and neutral conductors identified with 3 IN of colored tape, per the Table herein, applied at the terminations.
b. Ground conductor: Bare.
3. Control cables NEMA/ICEA Method 1, Table E-2:

a. When a bare ground is not provided, one of the colored insulated conductors shall be re-identified by stripping the insulation from the entire exposed length or using green tape to cover the entire exposed length.
b. When used in power applications the colored insulated conductors used as phase and neutral conductors may have to be re-identified with 3 IN of colored tape, per the Table herein, applied at the terminations.

D. Install all wiring in raceway unless otherwise indicated on the Drawings.

E. Feeder, branch, control and instrumentation circuits shall not be combined in a raceway, cable tray, junction or pull box, except as permitted in the following:
1. Where specifically indicated on the Drawings.
2. Where field conditions dictate and written permission is obtained from the Engineer.
3. Control circuits shall be isolated from feeder and branch power and instrumentation circuits but combining of control circuits is permitted. The combinations shall comply with the following:
a. 12 Vdc, 24 Vdc and 48 Vdc may utilize a common raceway.
b. 125 Vdc shall be isolated from all other AC and DC circuits.
c. AC control circuits shall be isolated from all DC circuits.
4. Instrumentation circuits shall be isolated from feeder and branch power and control circuits but combining of instrumentation circuits is permitted. The combinations shall comply with the following:
a. Analog signal circuits may utilize a common raceway.
5. For lighting and receptacle circuits, multiple branch circuits may be installed in a raceway as allowed by the NEC, with the wire ampacity derated in accordance with the requirements of the NEC. Raceway fill shall not exceed the limits established by the NEC.

F. Ground the drain wire of shielded instrumentation cables at one end only. The preferred grounding location is at the load (e.g., control panel), not at the source (e.g., field mounted transmitter).

G. Splices and taps for the following circuit types shall be made in the indicated enclosure type using the indicated method.
1. Feeder and branch power circuits:
a. Device outlet boxes:
1) Twist/screw on type connectors.
b. Junction and pull boxes and wireways:
1) Twist/screw on type connectors for use on #8 and smaller wire.
2) Compression, mechanical screw or terminal block or terminal strip type connectors for use on #6 AWG and larger wire.
c. Motor terminal boxes:
1) Twist/screw on type connectors for use on #10 AWG and smaller wire.
2) Mechanical screw type connectors for use on #8 AWG and larger wire.
d. Manholes or handholes:
1) Twist/screw on type connectors pre-filled with epoxy for use on #8 AWG and smaller wire.
2) Watertight compression or mechanical screw type connectors for use on #6 AWG and larger wire.
2. Control circuits:
a. Junction and pull boxes: Terminal block type connector.
b. Manholes or handholes: Twist/screw on type connectors pre-filled with epoxy.
c. Control panels and motor control centers: Terminal block or strips provided within the equipment or field installed within the equipment by the Contractor.
3. Instrumentation circuits can be spliced where field conditions dictate and written permission is obtained from the Engineer. Maintain electrical continuity of the shield when splicing twisted shielded conductors.
a. Junction and pull boxes: Terminal block type connector.

b. Control panels and motor control centers: Terminal block or strip provided within the equipment or field installed within the equipment by the Contractor.

4. Non-insulated compression and mechanical screw type connectors shall be insulated with tape or hot or cold shrink type insulation to the insulation level of the conductors.

H. Insulating Tape Usage:
1. For insulating connections of #8 AWG wire and smaller: 7 mil vinyl tape.
2. For insulating splices and taps of #6 AWG wire or larger: 10 mil vinyl tape.
3. For insulating connections made in cold weather or in outdoor locations: 8.5 mil, all weather vinyl tape.

END OF SECTION

SECTION 16130
ELECTRICAL RACEWAYS AND BOXES

PART I - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material and installation requirements for:
      a. Conduits.
      b. Conduit fittings.

B. Related Sections include but are not necessarily limited to:
   1. Division 1 - General Requirements.
   2. Section 16010 - Electrical Basic Requirements.
   3. Section 16140 - Electrical Wiring Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. See individual specifications.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Identify dimensional size of pull and junction boxes to be used.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See specific instructions in these specifications as applicable.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
   1. Rigid metallic conduits:
      a. Allied Tube and Conduit Corporation.
      b. Triangle PWC Inc.
      c. Western Tube and Conduit Corporation.
      d. Wheatland Tube Company.
      e. LTV Steel Company.
   2. PVC coated rigid metallic conduits and repair kits:
      a. Occidental Coating Company.
      b. Perma-Cote.
      c. Rob-Roy Ind.
      d. Raychem "GelTek" tape.
   3. Rigid non-metallic conduit:
      a. Carlon.
      b. Certain Teed Corporation.
      c. Canadian General Electric Company.
      d. Western Plastics Corporation.

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4. Flexible conduit:
   a. AFC Cable Systems.
   b. Anamet, Inc.
   c. Electri-Flex.
   d. Flexible Metal Hose Company.
   e. International Metal Hose Company.
   f. Triangle PWC Inc.
   g. Southwire Allflex.
5. Wireway:
   a. Hoffman Engineering Company.
   b. Wiegmann.
   c. Square D.
   d. Circle AW
6. Conduit fittings and accessories:
   a. Appleton.
   b. Carlon.
   c. Crouse-Hinds.
   d. Killark.
   e. OZ Gedney Company.
   f. RACO.
   g. Steel City.
   h. Thomas and Betts.
   i. Western Plastics Company.
7. Support systems:
   a. Unistrut Building Systems.
   b. B-Line Systems Inc.
   c. Kindorf.
   d. Minerallac Fastening Systems.
   e. Caddy.
8. Outlet, pull and junction boxes:
   a. Appleton Electric Co.
   b. Crouse-Hinds.
   c. Killark.
   d. O-Z/Gedney.
   e. Steel City.
   f. Raco.
   g. Bell.
   h. Hoffman Engineering Co.
   i. Wiegmann.
   j. B-Line Circle AW.
   k. Adalet.

B. Substitution: Submit requests for substitution for approval well in advance of construction.

2.2 RIGID METALLIC CONDUITS

A. Rigid Galvanized Steel Conduit (RGS):
   1. Mild steel with continuous welded seam.
   2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing. Threads galvanized after cutting.
   3. Internal coating: Baked lacquer, varnish or enamel for a smooth surface.
   4. Standards: ANSI C80.1, UL 6.

B. PVC-Coated Rigid Steel Conduit (PVC-RGS):
   1. Nominal 40 mil Polyvinyl Chloride Exterior Coating:
      a. Coating: Bonded to hot-dipped galvanized rigid steel conduit conforming to ANSI C80.1.

b. The bond between the PVC coating and the conduit surface: Greater than the tensile strength of the coating.
2. Nominal 2 mil minimum, urethane interior coating.
3. Urethane coating on threads.
4. Conduit: Epoxy prime coated prior to application of PVC and urethane coatings.
5. Female Ends: Have a plastic sleeve extending a minimum of 1 pipe diameter or 2 IN, whichever is less beyond the opening. The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used with it
6. Standards: ANSI C80.1, UL 6, NEMA RN 1.

C. Electrical Metallic Tubing (EMT):
1. Mild steel with continuous welded seam.
2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.
3. Internal Coating: Baked lacquer, varnish, or enamel for a smooth surface.
4. Standards: ANSI C80.3, UL 797.

2.3 RIGID NON-METALLIC CONDUIT

A. Schedules 40 (PVC-40) and 80 (PVC-80):
1. Polyvinyl-chloride (PVC) plastic compound which meets, as a minimum, ASTM D1784 cell classification PVC 12233-A, B, or C.
2. Rated for direct sunlight exposure.
3. Fire retardant and low smoke emission.
4. Shall be suitable for use with 90 degrees C wire and shall be marked "maximum 90 Deg C".
5. Standards: ASTM D1784, NEMA TC 2, UL 651.

2.4 FLEXIBLE CONDUIT

A. Flexible Galvanized Steel Conduit (FLEX):
1. Formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Standard: UL 1.

B. PVC-Coated Flexible Galvanized Steel (liquid-tight) Conduit (FLEX-LT):
1. Core formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Extruded PVC outer jacket positively locked to the steel core.
3. Liquid and vapor tight.
4. Standard: UL 360.

2.5 WIREWAY

A. General:
1. Suitable for lay-in conductors.
2. Designed for continuous grounding.
3. Covers:
a. Hinged or removable in accessible areas.
b. Non-removable when passing through partitions
4. Finish: Rust inhibiting primer and manufacturers' standard paint inside and out except for stainless steel type.
5. Standards: UL 870, NEMA 250.

B. General Purpose (NEMA 1 rated) Wireway:
1. 14 or 16 gage steel without knockouts.
2. Cover: Solid, non-gasketed and held in place by captive screws.

C. Rain tight (NEMA 3R) Wiring Trough:
1. 14 or 16 GA galvanized steel without knockouts.
2. Cover: Non-gasketed and held in place by captive screws.

D. Watertight (NEMA 4X rated) Wireway:
   1. 14 GA Type 304 or 316 stainless steel bodies and covers with out knockouts and 10 GA stainless steel flanges.
   2. Cover: Fully gasketed and held in place with captive clamp type latches.
   3. Flanges: Fully gasketed and bolted.

2.6 CONDUIT FITTINGS AND ACCESSORIES

A. Fittings for Use with RGS:
   1. In hazardous locations listed for use in Class I, Groups C and D locations.
   2. Locknuts:
      a. Threaded steel or malleable iron.
      b. Gasketed or non-gasketed.
      c. Grounding or non-grounding type.
   3. Bushings:
      a. Threaded, insulated metallic.
      b. Grounding or non-grounding type.
   4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.
   5. Couplings:
      a. Threaded straight type: Same material and finish as the conduit with which they are used on.
      b. Threadless type: Gland compression or self-threading type, concrete tight (not approved for this project).
   6. Unions:
      a. Threaded galvanized steel or zinc plated malleable iron.
   7. Conduit bodies (elbows and tees):
      a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
      b. Standard and mogul size.
      c. Cover: Clip-on type with stainless steel screws. Gasketed or non-gasketed galvanized steel, zinc plated cast iron or cast copper free aluminum.
   8. Conduit bodies (round):
      a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
      b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron or cast copper free aluminum.
   9. Sealing fittings:
      a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
      b. Standard and mogul size with area as required by the latest edition of the NEC.
      c. With or without drain and breather.
      d. Fiber and sealing compound: UL listed for use with the sealing fitting.
   10. Expansion couplings:
      a. 2 IN nominal straight-line conduit movement in either direction.
      b. Galvanized steel with insulated bushing.
      c. Gasketed for wet locations.
      d. Internally or externally grounded.
   11. Expansion/deflection couplings:
      a. 3/4 IN nominal straight-line conduit movement in either direction.
      b. 30-degree nominal deflection from the normal in all directions.
      c. Metallic hubs, neoprene outer jacket and stainless steel jacket clamps.
      d. Internally or externally grounded.
      e. Watertight, raintight and concrete tight.
   12. Standards: UL 467, UL 514B, UL 886.

B. Fittings for Use with PVC-RGS:
   1. The same material and construction as those fittings listed under paragraph "Fittings for Use with RGS" and coated as defined under paragraph "PVC Coated Rigid Steel Conduit (PVC-RGS)."

C. Fittings for Use with EMT:
   1. Connectors:
      a. Straight, angle and offset types furnished with locknuts.
      b. Zinc plated steel.
      c. Insulated gland compression type.
      d. Concrete and raintight.
   2. Couplings:
      a. Zinc plated steel.
      b. Gland compression type.
      c. Concrete and raintight.
   3. Conduit bodies (elbows and tees):
      a. Body: Copper free aluminum with set screw.
      b. Standard and mogul size.
      c. Cover: Screw down type with steel screws. Gasketed or non-gasketed galvanized steel or copper free aluminum.
   4. Standard: UL 514B.

D. Fittings for Use with FLEX:
   1. Connector:
      a. Zinc plated malleable iron.
      b. Squeeze or clamp-type.
   2. Standard: UL 514B.

E. Fittings for Use with FLEX-LT:
   1. Connector:
      a. Straight or angle type.
      b. Metal construction, insulated and gasketed.
      c. Composed of locknut, grounding ferrule and gland compression nut.
      d. Liquid tight.
   2. Standard: UL 467, 514B.

F. Fittings for Use with Rigid Non-Metallic Conduit:
   1. Coupling and adapters shall be of the same material, thickness, and construction as the conduits with which they are used.
   2. Standards: UL 651, NEMA TC 3.
   3. Solvent cement for welding fittings shall be supplied by the same manufacturer as the conduit and fittings.
      a. Standard: ASTM D2564.

G. Weather and Corrosion Protection Tape:
   1. PVC based tape, 10 mils thick.
   2. Protection against moisture, acids, alkalis, salts and sewage and suitable for direct bury.
   3. Used with appropriate pipe primer.

2.7 ALL RACEWAY AND FITTINGS

A. Mark Products:
   1. Identify the nominal trade size on the product.
   2. Stamp with the name or trademark of the manufacturer.

2.8 OUTLET BOXES

A. Metallic Outlet Boxes:
   1. Hot-dip galvanized steel.
   2. Conduit knockouts and grounding pigtail.
   3. Styles:
      a. 2 IN x 3 IN rectangle.
      b. 4 IN square.
      c. 4 IN octagon.

d. 4 11/16” square (5S)
e. Masonry/tile.

4. Accessories:
a. Flat blank cover plates.
b. Barriers.
c. Extension, plaster or tile rings.
d. Box supporting brackets in stud walls.
e. Adjustable bar hangers.

5. Standards: NEMA OS 1, UL 514A.

B. Cast Outlet Boxes:
1. Zinc plated cast iron or die-cast copper free aluminum with manufacturers’ standard finish.
2. Threaded hubs and grounding screw.
3. Styles:
a. "FS" or "FD".
b. "Bell".
c. Single or multiple gang and tandem.
d. "EDS" or "EFS" for hazardous locations.
4. Accessories: 40 mil PVC exterior coating and 2 mil urethane interior coating.
5. Standards: UL 514A and UL 886.

C. See Section 16140 for wiring devices, wallplates and coverplates.

2.9 PULL AND JUNCTION BOXES

A. NEMA 1 Rated:
1. Body and cover: 14 GA, galvanized steel or steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. With or without concentric knockouts on four sides.
3. Flat cover fastened with screws.

B. NEMA 4 Rated:
1. Body and cover: 14 GA steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. Seams continuously welded and ground smooth.
3. No knockouts.
4. External mounting flanges.
5. Hinged or non-hinged cover held closed with stainless steel screws and clamps.
6. Cover with oil resistant gasket.

C. NEMA 4X Rated (metallic):
1. Body and cover: 14 GA Type 304 or 316 stainless steel.
2. Seams continuously welded and ground smooth.
3. No knockouts.
4. External mounting flanges.
5. Hinged door and stainless steel screws and clamps.
6. Door with oil-resistant gasket.

D. Miscellaneous Accessories:
1. Rigid handles for covers larger than 9 SF or heavier than 25 LBS.
2. Split covers when heavier than 25 LBS.
3. Weld nuts for mounting optional panels and terminal kits.
4. Tamper proof screws.
5. Terminal blocks: Screw-post barrier-type, rated 600 volt and 20 ampere minimum.
6. Sectional terminal blocks, track mounted, clamp plate, 600 volt or 250 volt rated with mounting track, end barriers, end anchors and jumper strips where required.

E. Standards: NEMA 250, UL 50.

2.10 SUPPORT SYSTEMS

A. Multi-conduit surface or trapeze type support and pull or junction box supports:
   1. Material requirements.
      a. Galvanized steel: ASTM A123 or ASTM A153.
      b. Stainless steel: AISI Type 316.
      c. PVC coat galvanized steel: ASTM A123 or ASTM A153 and 20 mil PVC coating.
      d. Aluminum: AA Type 6063-T6.
      e. Fiberglass: Fire-retardant polyester or vinylester resin, ASTM E84, UL 94.

B. Single conduit and outlet box support fasteners:
   1. Material requirements:
      a. Zinc plated steel.
      b. Stainless steel.
      c. Malleable iron.
      d. PVC coat malleable iron or steel: 20 mil PVC coating.
      e. Steel protected with zinc phosphate and oil finish.

2.11 OPENINGS AND PENETRATONS IN WALLS AND FLOORS

A. Sleeves, smoke and fire stop fitting through walls and floors:

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION - GENERAL

A. Shall be in accordance with the requirements of NFPA 70.

B. Size of Raceways:
   1. Raceway sizes are shown on the Drawings, if not shown on the Drawings, then size in accordance with NFPA 70.
   2. Unless specifically indicated otherwise, the minimum raceway size shall be:
      a. Conduit: 3/4 IN.
      b. Wireway: 2-1/2 IN x 2-1/2 IN.

C. Field Bending and Cutting of Conduits:
   1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
   2. Do not reduce the internal diameter of the conduit when making conduit bends.
   3. Prepare tools and equipment to prevent damage to the PVC coating.
   4. Degrease threads after threading and apply a zinc rich paint.
   5. Debur interior and exterior after cutting.

D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.

E. The protective coating integrity of conduits, fittings, and accessories shall be maintained.
   1. Repair RGS, utilizing a zinc rich paint.
   2. Repair PVC-RGS utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicone composition strip, followed by a protective coating of vinyl tape. The total nominal thickness: 40 mil.
   3. Repair surfaces which will be inaccessible after installation prior to installation.

F. Remove moisture and debris from conduit before wire is pulled into place.
   1. Pull mandrel with diameter nominally 1/4 IN smaller than the interior of the conduit, to remove obstructions.
   2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
   3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.

G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.

H. Where portions of a raceway are subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent circulation of warm air to colder section of the raceway.

I. Fill openings in walls, floors, and ceilings and finish flush with surface.

3.2 RACEWAY ROUTING

A. Raceways shall be routed where shown on drawings.
   1. Conduit and fittings shall be installed, as required, for a complete system that has a neat appearance and is in compliance with all applicable codes.
   2. Run in straight lines parallel to or at right angles to building lines.
   3. Do not route conduits:
      a. Through areas of high ambient temperature or radiant heat.
      b. In suspended concrete slabs.
   4. Conduit shall not interfere with, or prevent access to piping, valves, ductwork, or other equipment for operation, maintenance and repair.
   5. Provide pull boxes or conduit bodies as needed so that there is a maximum of 360 degrees of bends in the conduit run or in long straight runs, to limit pulling tensions.

B. All rigid conduits within a structure shall be installed exposed except as follows:
   1. As indicated on the Drawings.
   2. Concealed above gypsum wall board or acoustical tile suspended ceilings.
   3. Concealed within stud frame, poured concrete, concrete block and brick walls of an architecturally finished area.
   4. Embedded in floor slabs or buried under floor serving equipment in non-architecturally finished areas that are not located on or near a wall or column and the ceiling height is greater than 12 FT.
   5. Embedded in floor slabs or buried under floor slabs where shown on the Contract Drawings or with the Engineer's permission.

C. Maintain minimum spacing between parallel conduit and piping runs in accordance with the following when the runs are greater than 30 FT:
   1. Between instrumentation and telecommunication: 1 IN.
   2. Between instrumentation and 125 V, 48 V and 24 V DC, 2 IN.
   3. Between instrumentation and 600 V and less AC power or control: 6 IN.
   4. Between telecommunication and 125 V, 48 V and 24 V DC, 2 IN.
   5. Between telecommunication and 600 V and less AC power or control: 12 IN.
   6. Between 125 V, 48 V and 24 Vdc and 600 V and less AC power or control: 2 IN.
   7. Between process, gas, air and water pipes: 6 IN.
   8. The spacing requirements in 1 through 7 above shall not be applied to conduit runs on pipe/conduit support racks where available space on the racks precludes such spacing.

D. Conduits shall be installed to eliminate moisture pockets. Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.

E. Conduit shall not be routed on the exterior of structures except as specifically indicated on the Drawings.

F. Where sufficient room exists within the housing of roof-mounted equipment, the conduit shall be stubbed up inside the housing.

G. Provide all required openings in walls, floors, and ceilings for conduit penetration.
   1. New construction:
      a. Sleeves and blockouts:
         1) Set in masonry walls during erection.
         2) Set in concrete walls and floors during forming.
      b. Sleeves not considered as structural replacement for the displaced concrete.

H. Conduit embedded in columns and floor slabs or buried under slab-on-grade:
   1. Run in the most direct, practical route.
   2. Not to be installed under equipment pads.
   3. No crossovers.
   4. Secured in place to prevent movement during the backfill and pour.

I. Conduits and accessories embedded in concrete where shown on the Contract Drawings:
   1. Shall not be considered as structural replacement for the displaced concrete.
   2. In reinforced concrete construction:
      a. Conduit shall not be run in beams.
      b. Place conduit after reinforcing steel has been laid.
      c. The reinforcement steel shall not be displaced by the conduit.
      d. Provide a minimum of 1-1/2 IN of cover over conduit, excluding surface finish.
      e. Conduits parallel to main reinforcement shall be run near the center of the wall.
      f. Conduits perpendicular to main reinforcement shall be run midway between wall or slab supports.

3.3 RACEWAY APPLICATIONS

A. Permitted raceway types per wire or cable types:
   1. Power wire or cables: All raceway types.
   2. Control wire or cables: All raceway types.
   3. Instrumentation cables: Metallic raceway except non-metallic may be used underground.
   4. Telecommunication cables: All raceway types.

B. Permitted raceway types per area designations:
   1. Dry areas:
      a. RGS.
   2. Wet areas:
      a. RGS.

C. Permitted raceway types per routing locations:
   1. In stud framed walls:
      a. EMT.
   2. In concrete block or brick walls:
      a. PVC-40.
   3. Above acoustical tile ceilings:
      a. EMT.
   4. Embedded in poured concrete walls and floors:
      a. PVC-40.
      b. PVC-RGS or RGS with field applied weather and corrosion protection tape when emerging from concrete into areas designated as dry or wet.
      c. PVC-RGS when emerging from concrete into areas designated as wet.
   5. Beneath floor slab-on-grade:
      a. PVC-40.
   6. Through floor penetrations:
      a. PVC-RGS or RGS with field applied weather and corrosion protection tape when emerging from concrete into areas designated as dry or wet.
      b. PVC-RGS in areas designated as wet.
   7. Direct buried conduits and ductbanks:
      a. PVC-80.
      b. 90 degree elbows for transitions to above grade:
         1) RGS with field applied weather and corrosion protection tape.
         2) PVC-RGS.
      c. Long sweeping bends greater than 15 degrees:
         1) RGS with field applied weather and corrosion protection tape.
         2) PVC-RGS.
   8. Concrete encased ductbanks:

a. PVC-40.
b. 90 degree elbows for transitions to above grade:
   1) RGS with field applied weather and corrosion protection tape.
   2) PVC-RGS.
c. Long sweeping bends greater than 15 degrees:
   1) RGS for sizes 2 IN and larger.

D. FLEX conduits shall be installed for connections to light fixtures, HVAC equipment and other similar devices above the ceilings. The maximum length shall not exceed:
1. 6 FT to light fixtures.
2. 3 FT to all other equipment.

E. FLEX-LT conduits shall be install as the final conduit connection to light fixtures, dry type transformers, motors, electrically operated valves, instrumentation primary elements, and other electrical equipment that is liable to vibrate. The maximum length shall not exceed:
1. 6 FT to light fixtures.
2. 3 FT to motors.
3. 2 FT to all other equipment.

F. NEMA 1 Rated Wireway:
1. Surface mounted in electrical rooms.
2. Surface mounted above 10 FT in areas designated dry in non-architecturally finished areas.
3. Surface mounted in areas designated dry in non-architecturally finished areas.

G. NEMA 3R Wiring Trough:
1. Surface mounted in exterior locations.

H. NEMA 4X Rated Wireway:
1. Surface mounted in areas designated as wet and or corrosive.

3.4 CONDUIT FITTINGS AND ACCESSORIES

A. Rigid non-metallic conduit and fittings shall be joined utilizing solvent cement.
1. Immediately after installation of conduit and fitting, the fitting or conduit shall be rotated 1/4 turn to provide uniform contact.

B. Install Expansion Fittings:
1. Where conduits span structural expansions joints.
2. Where conduits are exposed to the sun and conduit run is greater than 200 FT.
3. Elsewhere as identified on the Drawings.

C. Install Expansion/Deflection Fittings:
1. Where conduits enter a structure.
   a. Except electrical manholes and handholes.
   b. Except where the ductbank is tied to the structure with rebar.
2. Elsewhere as identified on the Drawings.

D. Threaded connections shall be made wrench-tight.

E. Conduit Joints shall be watertight:
1. Where subjected to possible submersion.
2. In areas classified as wet.
3. Underground.
4. Outdoors

F. Terminate Conduits:
1. In outlet boxes:
   a. With an insulated grounding bushing and locknuts.
   b. With an insulated compression type connector.
2. In NEMA 1 rated enclosures:
   a. With an insulated grounding bushing and locknut.

3. In NEMA 4 and 4X rated enclosures:
   a. With a threaded, insulated and gasketed hub.

3.5 CONDUIT SUPPORT

A. Permitted multi-conduit surface or trapeze type support system per area designations and conduit types:
   1. Dry or wet areas:
      a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit clamps.
   2. Conduit type shall be compatible with the support system material.
      a. Galvanized steel system may be used with RGS and EMT.
      b. Stainless steel system may be used with RGS and PVC-RGS.
      c. PVC coated galvanized steel system may be used with PVC-RGS, PVC-40 and PVC-80.

B. Permitted single conduit support fasteners per area designations and conduit types:
   1. Architecturally finished areas:
      a. Material: Zinc plated steel, or steel protected with zinc phosphate and oil finish.
      b. Types of fasteners: Spring type hangers and clips, straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
      c. Provide anti-rattle conduit supports when conduits are routed through metal studs.
   2. Dry or wet areas:
      a. Material: Zinc plated steel, stainless steel and malleable iron.
      b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
   3. Conduit type shall be compatible with the support fastener material.
      a. Zinc plated steel, steel protected with zinc phosphate and oil finish and malleable iron fasteners may be used with RGS and EMT.
      b. Stainless steel system may be used with RGS and PVC-RGS.
      c. PVC coated fasteners may be used with PVC-RGS, PVC-40 and PVC-80.

C. In seismic locations provide required sway bracing per local building codes.

D. Conduit support general requirements:
   1. Maximum spacing between conduit supports per NFPA 70.
   2. Support conduit from the building structure.
   3. Do not support conduit from process, gas, air or water piping; or from other conduits.
   4. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS or to the maximum uniform load recommended by the manufacturer if the support is rated less than 25 LBS.
      a. Do not exceed maximum concentrated load recommended by the manufacturer on any support.
      b. Conduit hangers: Continuous threaded rods combined with struts or conduit clamps: Do not use perforated strap hangers and iron bailing wire.
      c. Do not use suspended ceiling support systems to support raceways.
      d. Hangers in metal roof decks:
         1) Utilize fender washers.
         2) Not extend above top of ribs.
         3) Not interfere with vapor barrier, insulation, or roofing.
   5. Conduit support system fasteners:
      a. Use sleeve-type expansion anchors as fasteners in masonry wall construction. Do not use concrete nails and powder-driven fasteners.

3.6 OUTLET, PULL AND JUNCTION BOX INSTALLATION

A. General: Install products in accordance with manufacturer's instructions:
   1. See Section 16010 and the Drawings for area classifications.
   2. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.

3. Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.

B. Outlet Boxes:
   1. Permitted uses of metallic outlet boxes:
      a. Housing of wiring devices:
         1) Recessed in all stud framed walls and ceilings.
         2) Recessed in poured concrete, concrete block and brick walls of an architecturally finished areas and exterior building walls.
      b. Pull or junction box:
         1) Above gypsum wall board or acoustical tile ceilings.
         2) Above 10 FT in an architecturally finished area where there is no ceiling.
         3) Above 10 FT in dry non-architecturally finished areas.
   2. Permitted uses of cast outlet boxes:
      a. Housing of wiring devices surface mounted in non-architecturally finished dry and wet areas.
      b. Pull and junction box surface mounted in non-architecturally finished dry and wet areas.
   3. Mount device outlet boxes where indicated on the Drawings and at heights as scheduled in Section 16010.
   4. Set device outlet boxes plumb and vertical to the floor.
   5. Outlet boxes recessed in walls:
      a. Install with appropriate stud wall support brackets or adjustable bar hangers so that they are flush with the face of the wall.
      b. Locate in ungrouted cell of concrete block with bottom edge of box flush with bottom edge of block and flush with the face of the block.
   6. Back-to-back outlet or junction box installations are not permitted.

C. Pull and Junction Boxes:
   1. Install pull or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections. Make covers of boxes accessible.
   2. Permitted uses of NEMA 1 enclosure:
      a. Pull or junction box surface mounted above removable ceiling tiles of an architecturally finished area.
      b. Areas designated as dry.
   3. Permitted uses of NEMA 4 enclosure:
      a. Pull or junction box surface mounted in areas designated as wet.
      b. Outdoors in non-corrosive areas
   4. Permitted uses of NEMA 4X metallic enclosure:
      a. Pull or junction box surface mounted in areas designated as corrosive or wet.
      b. Outdoors in corrosive or non-corrosive areas.

END OF SECTION

SECTION 16195
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Nameplates and labels.
2. Wire and cable markers.
3. Conduit markers.

B. Related Sections include but are not necessarily limited to:
1. Division 1 - General Requirements.
2. Section 16010 - Electrical Basic Requirements.
3. See individual specifications and CQA Plan for complete list of Referenced Standards.

1.2 QUALITY ASSURANCE

I. Conform to reqqirements of ANSI/NFPA 70.

1.3 SUBMITTALS

A. Manufacturer's Data sheets.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See specific instructions in these specifications as applicable.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
I. Wire Markers:
a. Thomas and Betts.
b. Brady.
2. Nameplates and Labels:
a. Generic.

B. Submit requests for substitution in accordance with Specification Section 01630.

2.2 MANUFACTURED UNITS

A. Wire Markers:
I. Thermal printed (non-smudging) on self adhesive medium.
2. Numbers shall match those shown on contract drawings.
3. Specification text.

B. Nameplates:
1. Engraved three-layer laminated plastic, black letters on white background.
2. Size as dictated by equipment manufacturer.
3. Letter height as dictated by nameplate size.

Reed R. Stout, P.E.

C. Labels:
   1. Thermal printed adhesive tape, with 3/16 inch black letters on white background. Use only for identification of individual control devices.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Nameplates and Labels:
   1. Degrease and clean surfaces to receive nameplates and labels.
      a. Install nameplate and label parallel to equipment lines.
   2. Wire markers:
      a. To be installed by persons with clean hands.
      b. All markers to be installed with numbers visible without twisting wires.
      c. All markers on horizontal terminations to be installed reading from left to right.
      d. All markers on vertical terminations to be installed reading toward termination.

END OF SECTION

SECTION 16440
ELECTRICAL SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   I. Low voltage switchboards.

B. Related Sections include but are not necessarily limited to:
   1. Division 1 - General Requirements .
   2. Section 16010 - Electrical Basic Requirements.
   3. Section 16490 - Electrical Overcurrent and Short Circuit Protective Devices.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   l. See individual specifications.

B. Verify the space required for the switchboard is equal to or less than the space allocated.

1.3 SUBMITTALS

A. Shop Drawings:
   I. Fabrication and/or layout drawings:
      a. Switchboard layout with alphanumeric designation, protective devices size and type, as indicated in the one-line diagram or switchboard schedule.

B. Operation and Maintenance Manuals:
   l. See manufacturers' manuals.
   2. Fabrication and/or layout drawings:
      a. Front elevation and plan drawing of the assembly.
      b. One-line and schematic diagrams.
      c. Conduit space locations within the assembly.

C. Miscellaneous:
   I. Ground fault protection system test report signed by the projects supervising electrical foreman.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
   I. Cutler-Hammer (Eaton)
   2. General Electric Company.
   3. Square D Company.
   4. Siemens.
   5. As called out on drawings

B. Submit requests for substitution in accordance with Specification Section O 1630.

Reed R. Stout, P.E.

2.2 SWITCHBOARDS

A. Ratings:
1. Voltage, number of phases, number of wires, and main bus current rating as indicated on the Drawings.
2. Bus withstand and circuit breaker interrupting fault rating as indicated on the Drawings.
3. Service Entrance Equipment rated.

B. Construction:
1. Standards: NEMA PB-2, UL 891.
2. Completely enclosed, dead-front, self-supporting metal structure.
3. Vertical panel sections bolted together.
4. Frames bolted together to support and house bus, cables and other equipment.
5. Frames and insulating blocks to support and brace main buses for short circuit stresses up to ratings indicated on the Drawings.
6. All sections front aligned.
7. Devices front removable and load connections front accessible for mounting switchboard against a wall.
8. NEMA 3R rated enclosure.
9. Interior and exterior steel surfaces cleaned and painted with rust inhibiting primer and manufacturer's standard paint.

C. Buses:
1. Material: Tin-plated aluminum or silver-plated copper.
2. Main horizontal bus:
   a. Fully rated and continuous over length of switchboard with all three phases arranged in the same vertical plane.
   b. Sufficient size to limit temperature rise to 65 DegC over average air temperature outside the enclosure of 40 DegC.
3. Neutral bus: Fully rated and continuous over length of switchboard.
4. Ground bus: 1/4 x 2 IN copper, continuous over length of switchboard and solidly grounded to each vertical section structure.
5. Bus joints connected using through bolts and conical spring-type washers for maximum conductivity.

D. Overcurrent and Short Circuit Protective Devices:
1. Main overcurrent protective device:
   a. Individually mounted insulated case circuit breaker.
2. Feeder overcurrent protective devices:
   a. Group mounted molded case circuit breaker.
3. See Section 16490 for overcurrent and short circuit protective device requirements.
4. Factory installed.
5. Means to padlock all main and feeder devices in the open position.

E. Surge protective device: Integrally mounted, see Section 16491.

F. Metering:
1. Shall be compatible with San Diego Gas & Electric requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install switchboards in accordance with manufacturer's instructions.

B. Arrange switchboards as shown on the Drawings.

C. Outdoor locations:
   1. NEMA 3R enclosure.
   2. Install on concrete housekeeping pad, align front of switchboard 3 inches behind top edge of pad chamfer and securely fasten to pad.

D. Miscellaneous:
   1. Provide circuit protective devices and other associated equipment as indicated on the Drawings.
   2. All control wiring shall be neatly laced and have flexibility at hinge locations.
   3. Tag switchboard and all circuit breakers identifying equipment and circuit fed.

3.2 FIELD QUALITY CONTROL

A. Test the ground fault protection system as indicated in Section 16490.

END OF SECTION

SECTION 16710
FIBER OPTIC CABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material and installation requirements for:
      a. Fiber Optic Cable.
      b. Unmanaged Ethernet Switch

B. Related Sections include but are not necessarily limited to:
   1. Division 1 - General Requirements.
   2. Section 16010 - Electrical Basic Requirements.

1.2 QUALITY ASSURANCE

A. Referenced Standards:
   1. See individual specifications.

1.3 DEFINITIONS

A. Optical Fiber Cable: Step index single-mode optical fiber with protective UV cured acrylate coating.

B. Unmanaged Ethernet Switch: 5-port industrial Ethernet switch with (5) 10/100BaseT(X)(RJ45 connector), 100BaseFX (single-mode, SC connector).

1.4 SUBMITTALS

A. Cutsheets:
   1. Provide manufacturer's specification cutsheets.

1.5 DELIVERY, STORAGE, AND HANDLING

1. See specific requirements as indicated in individual specifications.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable (substitutions of manufacturer are acceptable if material is shown to be equivalent):
   1. Fiber optic cable:
      a. Berk-Tek.
   2. Unmanaged Ethernet Switch:
      a. Moxa

B. Submit requests for substitution in accordance with Specification Section 01630.

2.2 MANUFACTURED UNITS

A. Fiber Optic Cable:
   1. Fiber optic cable shall be Berk-Tek part no. OPD006AB0403 .
   2. Fiber optic cable shall be outside plant loose tube fiber optic cables that are designed for installation in environments such as aerial lashing, conduit and pathways that are subject to wide temperature variations and likely to fill with water.

3. Entire length of fiber is subjected to a 0.7 GPa (J OO kpsi) minimum proof stress as per EIA/TIA FOTP-31.
4. Coating diameter: 245 +/- I O micrometers.
5. Loose tube buffer jacket material: thermoplastic.
6. Buffer jacket OD: 2.4 mm (0.094 in).
7. Buffet tube color code: Yellow for single-mode.
8. Gel fill ing: Water-blocking fil ler to prevent water ingress.
9. Fiber color coating: UV cured colorant.
10. Fiber colors: Blue, Orange, Green, Brown, Slate, and White as per TIA/EIA-598.
11. Cable configuration: Water absorbent strength mem bers are appl ied between loose tube and outer jacket. Two glass rod strength members are parallel with the loose tube. A polyurethane jacket is extruded over the assembly.
12. Operating temperature: -40 deg C to +75 deg C.
13. Installation temperature: -30 deg C to +60 deg C.
14. Maxim um Loading: Installation 450 l b. & Long Term 135 lb.
15. Minimum Bend Radius: Instal lation 6 in. & Long Term 4 in.
16. Qual ified to ANSI/ICEA S-87-640 and Telcordia G R-20.
17. Compression (crush) Strength: 220 N/cm per TIA/EIA FOTP-41 .
18. Impact: 2 impacts at 5.88 N-m per TIA/EIA FOTP-25.
19. Cable Flex: 500 cycles per EIA/TIA FOTP-1 04.

B. Ethernet Switch:
   a. Ethernet Switch shal l be Moxa EDS-205A-S-SC.
   2. Ethernet Switch shal l be unmanaged 5 port industrial Ethernet switch that support IEEE 802.3 and IEEE 802.3u/x with 10/l OOM full/half-duplex, MDI/MDI-X auto-sensing. The switch shal l provide 12/24/48 VDC redundant power inputs that can be connected simultaneously to l ive AC/DC power sources.

PART 3 - EXECUTION

3.J INSTALLATION

A. Fiber Optic:
   I. Pole Line:
      a. Fiber Optic cable shall be lashed per Corning Standard Recommended Procedure 005-010, Issue 11, September 20 I O or more recent update.
   2. Underground:
      a. Fiber optic shall be installed underground in I " Schedule 40 PVC conduit with 24" radi us 90 degree elbows.

B. Ethernet Switch:
   I. Ethernet switches and power supplies shall be installed in N EMA 4 enclosures, size as required.

END OF SECTION

SUPPLEMENTARY SPECIAL PROVISIONS

APPENDICES

APPENDIX A

CEQA CONSISTENCY EVALUATION

THE CITY OF SAN DIEGO

MEMORANDUM

DATE: August 3, 2017

TO: Luis Campos, Associate Engineer – Civil, Environmental Services Department

FROM: Elena Pascual, Junior Planner, Planning Department

SUBJECT: Miramar Landfill Gas Recovery Improvements Project - 15162 Evaluation

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The CEQA and Environmental Policy Section of the Planning Department has completed a California Environmental Quality Act (CEQA) Section 15162 consistency evaluation for the Miramar Landfill Gas Recovery Improvements project by the City of San Diego's Environmental Services Department (ESD), which is described in greater detail as follows.

Previously Certified CEQA Document

On July 13, 2007, the San Diego City Council certified a Final Environmental Impact Report (FEIR) for the Miramar Service Life Extension / Height Increase project (Project No. 122833 / SCH No. 2006051004).

Background

On July 13, 2007, the San Diego City Council certified the Final Environmental Impact Report (FEIR) for the Miramar Service Life Extension / Height Increase project (Project No. 122833 / SCH No. 2006051004). The FEIR, which analyzed the environmental effects associated with increasing the permitted height of the West Miramar Landfill, found that future modifications to the landfill gas and control system arising from the landfill's vertical expansion would include extending existing vertical extraction wells and associated piping, and installing additional vertical wells.

Scope of Proposed Action

The proposed project would entail construction of additions to the Landfill Gas (LFG) collection system as well as construction of a new centralized blower station (CBS). The additions to the LFG collection system would include additional LFG extraction wells, sub-header, and header piping. The CBS would consist of consolidated blowers and a condensate management system. These improvements would address the regulatory and operational needs at the Miramar Landfills.

CEQA Guidelines Section 15162 Consistency Evaluation

The scope of the proposed project would be consistent with the Proposed Project section, which was analyzed in the 2007 FEIR. The Proposed Project section addresses future landfill

gas collection system improvements associated with the vertical expansion of the West Miramar Landfill and lists improvements consistent with those in the proposed project. Thus, the proposed project would be consistent with the 2007 FEIR in accordance with CEQA Guidelines Section 15162 and Public Resources Code Section 21166.

Section 15162 Criteria

When an EIR has been certified or a negative declaration adopted for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:

(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

None of the three criteria listed above has occurred, therefore the CEQA and Environmental Policy Section of the Planning Department determined there is no need to prepare subsequent or supplemental environmental documents for the proposed amendments.

CEQA 15162 Consistency Evaluation

The CEQA and Environmental Policy Section of the Planning Department reviewed the proposed project and conducted a CEQA Section 15162 consistency evaluation pursuant to Public Resources Code 21166 and CEQA Guidelines Section 15162. The proposed project would not result in new significant direct, indirect, or cumulative impacts over and above those

disclosed in the previously certified 2007 FEIR.

Elena Pascual

_____
Elena Pascual
Junior Planner
Planning Department

cc: Rebecca Malone, Senior Planner, Planning Department

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).

Larry Gardner
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 SPEND CURVE

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:	

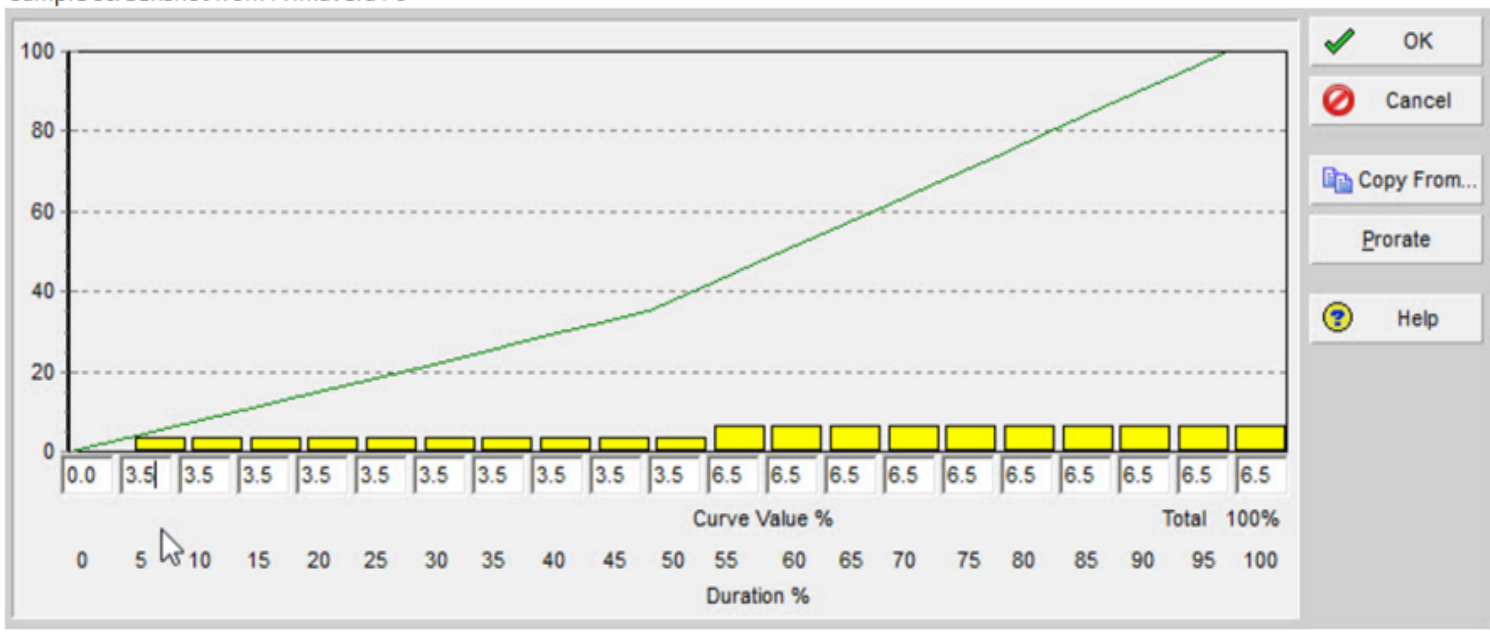
Contractor Signature and Date: _____

Sample Project Spend Curve

Sample Date Entries Required

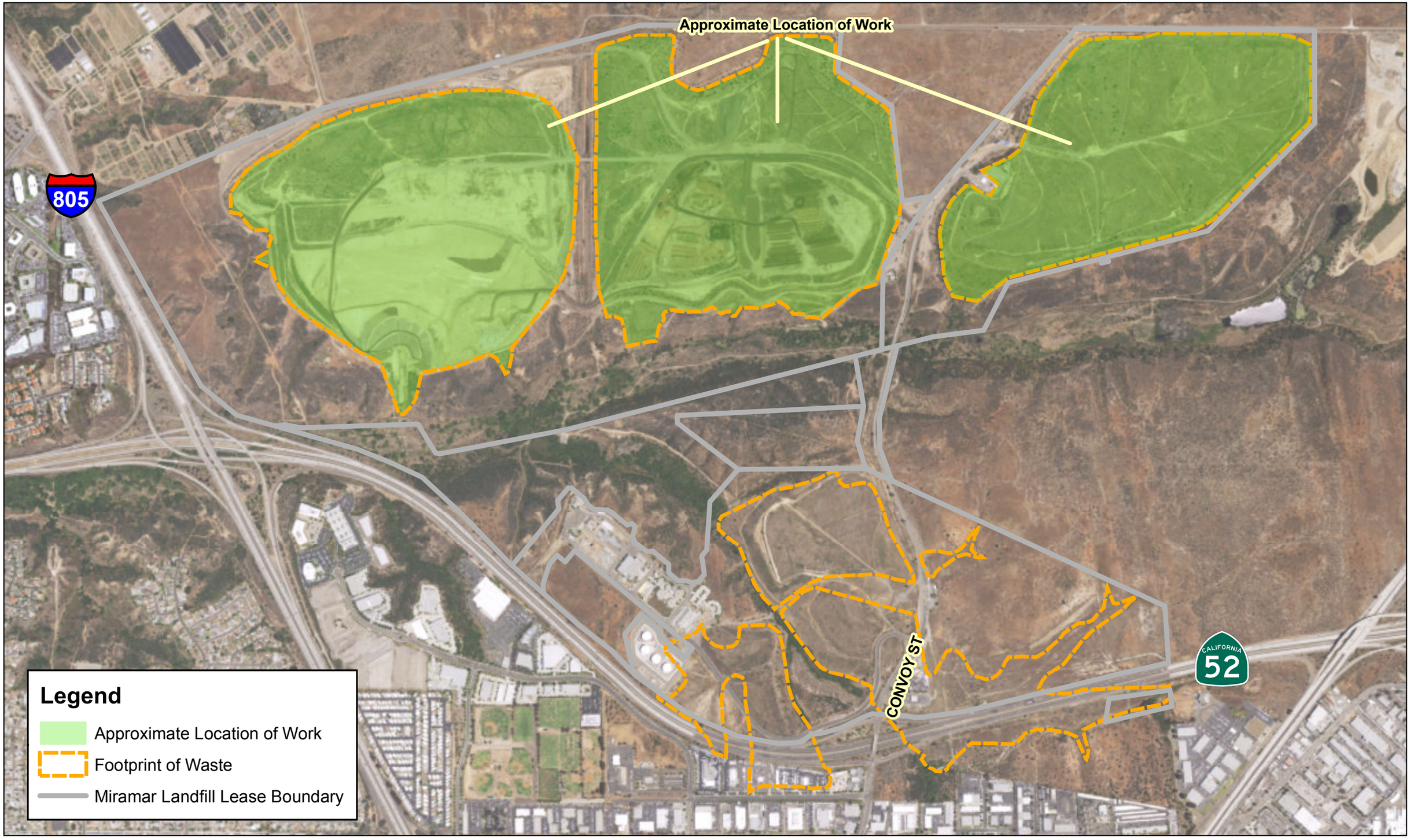
Incremental Curve Value	0.0%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
Duration % Increment	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

Sample Screenshot from Primavera P6



APPENDIX E

LOCATION MAP



The City of SAN DIEGO

Miramar Landfill Gas Recovery Improvements

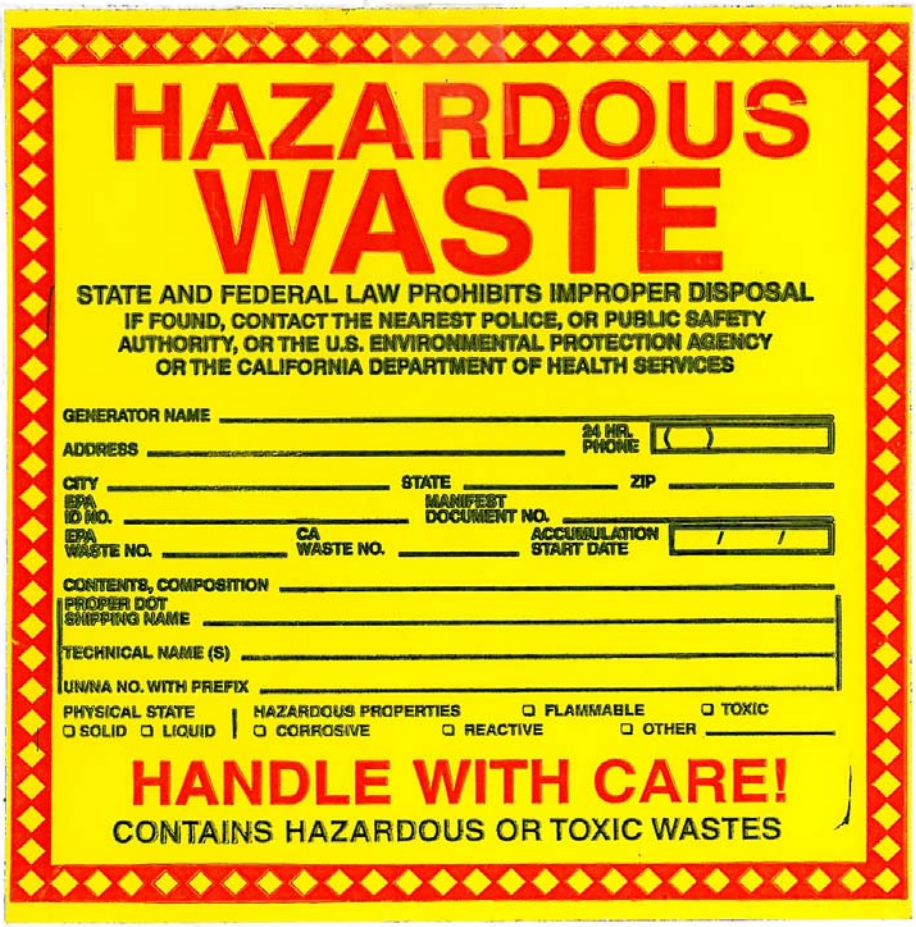
N

Miramar Landfill Gas Recovery Improvements Location Map

0 500 1,000 2,000 3,000 4,000 Feet

APPENDIX F

HAZARDOUS LABEL/FORMS


HAZARDOUS
WASTE
STATE AND FEDERAL LAW PROHIBITS IMPROPER DISPOSAL
IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY
AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY
OR THE CALIFORNIA DEPARTMENT OF HEALTH SERVICES
GENERATOR NAME
ADDRESS
24 HR. PHONE
CITY
STATE
ZIP
EPA ID NO.
MANIFEST DOCUMENT NO.
EPA WASTE NO.
CA WASTE NO.
ACCUMULATION START DATE
CONTENTS, COMPOSITION
PROPER DOT SHIPPING NAME
TECHNICAL NAME (S)
UN/NA NO. WITH PREFIX
PHYSICAL STATE
SOLID
LIQUID
HAZARDOUS PROPERTIES
CORROSIVE
FLAMMABLE
REACTIVE
TOXIC
OTHER
HANDLE WITH CARE!
CONTAINS HAZARDOUS OR TOXIC WASTES

INCIDENT/RELEASE ASSESSMENT FORM [1]

If you have an emergency, Call 911

Handlers of hazardous materials are required to report releases. The following is a tool to be used for assessing if a release is reportable. Additionally, a non-reportable release incident form is provided to document why a release is not reported (see back).

Questions for Incident Assessment:	YES	NO
1. Was anyone killed or injured, or did they require medical care or admitted to a hospital for observation?	❒	❒
2. Did anyone, other than employees in the immediate area of the release, evacuate?	❒	❒
3. Did the release cause off-site damage to public or private property?	❒	❒
4. Is the release greater than or equal to a reportable quantity (RQ)?	❒	❒
5. Was there an uncontrolled or unpermitted release to the air?	❒	❒
6. Did an uncontrolled or unpermitted release escape secondary containment, or extend into any sewers, storm water conveyance systems, utility vaults and conduits, wetlands, waterways, public roads, or off site?	❒	❒
7. Will control, containment, decontamination, and/or clean up require the assistance of federal, state, county, or municipal response elements?	❒	❒
8. Was the release or threatened release involving an unknown material or contains an unknown hazardous constituent?	❒	❒
9. Is the incident a threatened release (a condition creating a substantial probability of harm that requires immediate action to prevent, reduce, or mitigate damages to persons, property, or the environment)?	❒	❒
10. Is there an increased potential for secondary effects including fire, explosion, line rupture, equipment failure, or other outcomes that may endanger or cause exposure to employees, the general public, or the environment?	❒	❒

If the answer is YES to any of the above questions – report the release to the California Office of Emergency Services at 800-852-7550 and the local CUPA daytime: (619) 338-2284, after hours: (858) 565-5255. Note: other state and federal agencies may require notification depending on the circumstances.

Call 911 in an emergency

If all answers are NO, complete a Non Reportable Release Incident Form (page 2 of 2) and keep readily available. Documenting why a "no" response was made to each question will serve useful in the event questions are asked in the future, and to justify not reporting to an outside regulatory agency.

If in doubt, report the release.

[1] This document is a guide for accessing when hazardous materials release reporting is required by Chapter 6.95 of the California Health and Safety Code. It does not replace good judgment, Chapter 6.95, or other state or federal release reporting requirements.

NON REPORTABLE RELEASE INCIDENT FORM

1. RELEASE AND RESPONSE DESCRIPTION Incident #_____

Date/Time Discovered	Date/Time Discharge	Discharge Stopped ☐ Yes ☐ No
Incident Date / Time:		
Incident Business / Site Name:		
Incident Address:		
Other Locators (Bldg, Room, Oil Field, Lease, Well #, GIS)		
Please describe the incident and indicate specific causes and area affected. Photos Attached?: ☐Yes ☐No		
Indicate actions to be taken to prevent similar releases from occurring in the future.		

2. ADMINISTRATIVE INFORMATION

Supervisor in charge at time of incident:	Phone:
Contact Person:	Phone:

3. CHEMICAL INFORMATION

Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Chemical	Quantity ☐ GAL ☐ LBS ☐ FT^3
Clean-Up Procedures & Timeline:	
Completed By:	Phone:
Print Name:	Title:

EMERGENCY RELEASE FOLLOW - UP NOTICE REPORTING FORM

A

BUSINESS NAME	FACILITY EMERGENCY CONTACT & PHONE NUMBER ( ) -

B

INCIDENT DATE MO DAY YR	TIME OES NOTIFIED (use 24 hr time)	OES CONTROL NO.

C

INCIDENT ADDRESS LOCATION	CITY / COMMUNITY	COUNTY ZIP

D

CHEMICAL OR TRADE NAME (print or type)	CAS Number

CHECK IF CHEMICAL IS LISTED IN 40 CFR 355, APPENDIX A ☐	CHECK IF RELEASE REQUIRES NOTIFI - CATION UNDER 42 U.S.C. Section 9603 (a) ☐

PHYSICAL STATE CONTAINED ☐ SOLID ☐ LIQUID ☐ GAS	PHYSICAL STATE RELEASED ☐ SOLID ☐ LIQUID ☐ GAS	QUANTITY RELEASED

ENVIRONMENTAL CONTAMINATION ☐ AIR ☐ WATER ☐ GROUND ☐ OTHER	TIME OF RELEASE	DURATION OF RELEASE ___DAYS ___HOURS ___MINUTES

E

ACTIONS TAKEN

F

KNOWN OR ANTICIPATED HEALTH EFFECTS (Use the comments section for addition information)

☐ ACUTE OR IMMEDIATE (explain) _____

☐ CHRONIC OR DELAYED (explain) _____

☐ NOTKNOWN (explain)

G

ADVICE REGARDING MEDICAL ATTENTION NECESSARY FOR EXPOSED INDIVIDUALS

H

COMMENTS (INDICATE SECTION (A - G) AND ITEM WITH COMMENTS OR ADDITIONAL INFORMATION)

I

CERTIFICATION: I certify under penalty of law that I have personally examined and I am familiar with the information submitted and believe the submitted information is true, accurate, and complete.

REPORTING FACILITY REPRESENTATIVE (print or type) _____

SIGNATURE OF REPORTING FACILITY REPRESENTATIVE _____ DATE: _____

EMERGENCY RELEASE FOLLOW-UP NOTICE
REPORTING FORM INSTRUCTIONS

GENERAL INFORMATION:

Chapter 6.95 of Division 20 of the California Health and Safety Code requires that written emergency release follow-up notices prepared pursuant to 42 U.S.C. § 11004, be submitted using this reporting form. Non-permitted releases of reportable quantities of Extremely Hazardous Substances (listed in 40 CFR 355, appendix A) or of chemicals that require release reporting under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9603(a)] must be reported on the form, as soon as practicable, but no later than 30 days, following a release. The written follow-up report is required in addition to the verbal notification.

BASIC INSTRUCTIONS:

- The form, when filled out, reports follow-up information required by 42 U.S.C § 11004. Ensure that all information requested by the form is provided as completely as possible.
- If the incident involves reportable releases of more than one chemical, prepare one report form for each chemical released.
- If the incident involves a series of separate releases of chemical(s) at different times, the releases should be reported on separate reporting forms.

SPECIFIC INSTRUCTIONS:

Block A: Enter the name of the business and the name and phone number of a contact person who can provide detailed facility information concerning the release.

Block B: Enter the date of the incident and the time that verbal notification was made to OES. The OES control number is provided to the caller by OES at the time verbal notification is made. Enter this control number in the space provided.

Block C: Provide information pertaining to the location where the release occurred. Include the street address, the city or community, the county and the zip code.

Block D: Provide information concerning the specific chemical that was released. Include the chemical or trade name and the Chemical Abstract Service (CAS) number. Check all categories that apply. Provide best available information on quantity, time and duration of the release.

Block E: Indicate all actions taken to respond to and contain the release as specified in 42 U.S.C. § 11004(c).

Block F: Check the categories that apply to the health effects that occurred or could result from the release. Provide an explanation or description of the effects in the space provided. Use Block H for additional comments/information if necessary to meet requirements specified in 42 U.S.C. § 11004(c).

Block G: Include information on the type of medical attention required for exposure to the chemical released. Indicate when and how this information was made available to individuals exposed and to medical personnel, if appropriate for the incident, as specified in 42 U.S.C. § 11004(c).

Block H: List any additional pertinent information.

Block I: Print or type the name of the facility representative submitting the report. Include the official signature and the date that the form was prepared.

MAIL THE COMPLETED REPORT TO:

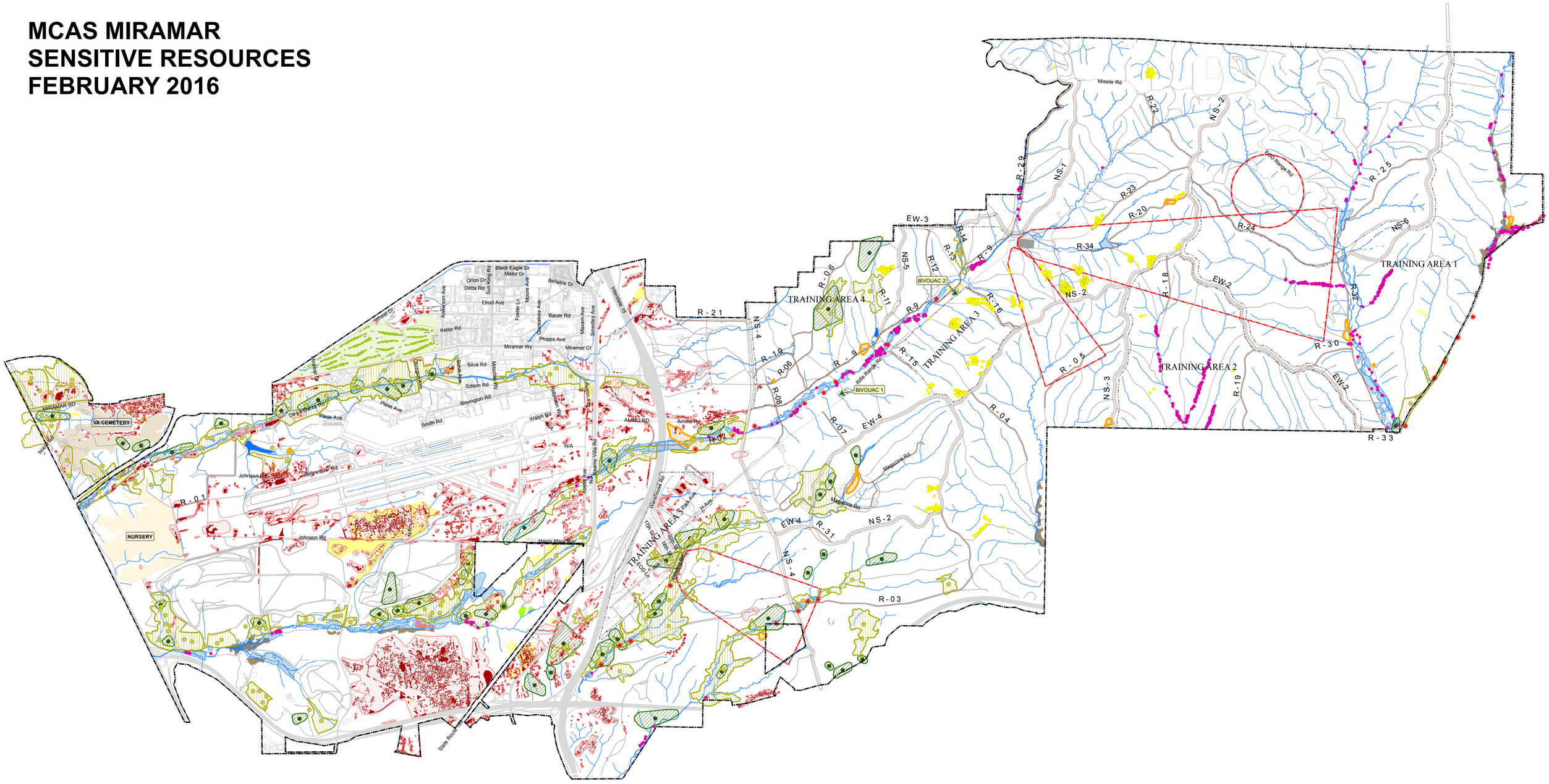
State Emergency Response Commission (SERC)
Attn: Section 304 Reports
Hazardous Materials Unit
3650 Schriever Avenue
Mather, CA 95655

NOTE: Authority cited: Sections 25503, 25503.1 and 25507.1, Health and Safety Code. Reference: Sections 25503(b)(4), 25503.1, 25507.1, 25518 and 25520, Health and Safety Code.

APPENDIX G

MARINE CORPS AIR STATION ENVIRONMENTALLY SENSITIVE LANDS MAP

MCAS MIRAMAR
SENSITIVE RESOURCES
FEBRUARY 2016



Miramar Landfill Gas Recovery Improvements
Appendix G - Marine Corps Air Station Environmentally Sensitive Lands Map

MARINE CORPS AIR STATION MIRAMAR

Marine Corps Air Station Miramar
Environmental Management Department
Natural Resources Division POC: David Boyer
Phone: 858.577.1125/4088

Map Publication Date: FEBRUARY 3, 2016

THE NORTH AMERICAN DATUM 1983 (NAD 83) AND THE WORLD GEODETIC SYSTEM 1984 DATUM (WGS 84) ARE EQUIVALENT FOR MAPPING, CHARTING AND NAVIGATION AT THIS SCALE.

NAD 83 / WGS 84

SCALE 1:24,000

0 — 5,000 — 10,000 — 15,000 Feet

0 — 0.9 — 1.8 — 2.7 Miles

0 — 1,100 — 2,200 — 3,300 Meters

ELLIPSOID .....GEODETIC REFERENCE SYSTEM 1980
PROJECTION .....CA STATE PLANE ZONE VI
HORIZONTAL DATUM ... NORTH AMERICAN DATUM 1983 / WORLD GEODETIC SYSTEM 1984

NOTES

BOUNDARIES SHOULD NOT BE CONSIDERED AUTHORITATIVE. TELEPHONE AND ELECTRIC SERVICE LINES ARE NOT SHOWN. IN DEVELOPED AREAS ONLY THROUGH ROADS ARE CLASSIFIED. ROAD CLASSIFICATION SHOULD BE REFERRED TO WITH CAUTION. THERE MAY BE PRIVATE INHOLDINGS WITHIN THE BOUNDARIES OF THE NATIONAL OR STATE RESERVATIONS SHOWN ON THIS MAP.

ALTHOUGH EVERY EFFORT HAS BEEN MADE TO ENSURE THE ACCURACY OF THE INFORMATION, ERRORS AND CONDITIONS ORIGINATING FROM PHYSICAL SOURCES TO DEVELOP THE DATABASE MAY BE REFLECTED IN THE DATA SUPPLIED THE USER MUST BE AWARE OF DATA CONDITIONS AND ULTIMATELY BEAR RESPONSIBILITY FOR THE APPROPRIATE USE OF THE INFORMATION WITH RESPECT TO POSSIBLE ERRORS, ORIGINAL MAP SCALE, COLLECTION METHODOLOGY, CURRENCY OF THE DATA, AND OTHER CONDITIONS SPECIFIC TO CERTAIN DATA. THIS INFORMATION DOES NOT DEPICT ALL POSSIBLE RESOURCES. FIELD VERIFICATION OF ALL DATA IS REQUIRED FOR SITE-SPECIFIC PROJECTS. THIS INFORMATION IS DEEMED RELIABLE, BUT NOT GUARANTEED.

Surveyed Endangered Species

- WILLOWY MONARDELLA (2012 CENSUS)
- DEL MAR MANZANITA (2006 CENSUS)
- 2013 CA GNATCATCHER SIGHTINGS
- HISTORICAL CA GNATCATCHER SIGHTINGS (2004, 2007, 2009)
- LEAST BELL'S VIREO TERRITORIES (2011, 2014)
- 2013 CA GNATCATCHER USE AREAS
- HISTORICAL CA GNATCATCHER USE AREAS (2004, 2007, 2009)

Areas Surveyed for Vernal Pool Resources

- VERNAL POOLS / PONDED SITES WITH ENDANGERED SPECIES
- VERNAL POOLS / PONDED SITES SURVEYED (NO ENDANGERED SPECIES)
- VERNAL POOL SURVEY WATERSHEDS

Other Sensitive Areas

- ADDITIONAL SENSITIVE RESOURCES
- POSSIBLE WATERS OF THE U.S.
- NATIVE GRASSLAND
- OAK WOODLAND
- RARE OTAY CEANOTHUS

ATTACHMENT F

INTENTIONALLY LEFT BLANK

ATTACHMENT G

CONTRACT AGREEMENT

CONTRACT AGREEMENT

CONSTRUCTION CONTRACT

This contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and **NEO San Diego LLC and Aptim Environmental & Infrastructure, Inc.**, herein called "Contractors" for construction of **Miramar Landfill Gas Recovery Gas Improvements** ; Bid No. **K-18-1707-DBB-3** in the amount of **Four Million Three Hundred Ninety One Thousand Two Hundred Ninety One Dollars ($4,391,291.00)** (the "Installation") and **Three Million Eight Hundred Twenty Seven Thousand Eighty Three Dollars ($3,827,083.00)** (the "Remaining Scope") **Eight Million Two Hundred Eighteen Thousand Three Hundred Seventy Four Dollars ($8,218,374.00)**, which is comprised of the Base Bid plus Additive/Deductive Alternates.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractors 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 Contractors.

   (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).

   (d) That certain documents entitled **Miramar Landfill Gas Recovery Improvements**, on file in the office of the Public Works Department as Document No. **S-16052**, as well as all matters referenced therein.

2. The Contractors 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 **Miramar Landfill Gas Recovery Improvements**, Bid Number **K-18-1707-DBB-3,** San Diego, California.

3. For such performances, the City shall pay to Contractors 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 Contractors shall accept such payment in full satisfaction of all claims incident to such performances.

4. No claim or suit whatsoever shall be made or brought by Contractors against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.

5. This contract is effective as of the date that the Mayor or designee signs the agreement.

IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

THE CITY OF SAN DIEGO

By _____

Print Name: Stephen Samara
Interim Deputy Director
Public Works Contracts

Date: 8/7/2018

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By _____

Print Name: Thomas Zeleny
Deputy City Attorney

Date: 8/10/18

CONTRACTOR

By _____

Print Name: Stephen R. Martin
Aptim Environmental & Infrastructure, Inc.

Title: Vice President

Date: 08/03/2018

City of San Diego License No.: B2017014274

State Contractor's License No.: 815620

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000006502

CONTRACTOR

By _____

Print Name: _____

Title: _____

Date: _____

City of San Diego License No.: _____

State Contractor's License No.: _____

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: _____

IN WITNESS WHEREOF, this Agreement is signed by the City of San Diego, acting by and through its Mayor or designee, pursuant to Municipal Code §22.3102 authorizing such execution.

THE CITY OF SAN DIEGO

By Stephen Samara

Print Name: Stephen Samara
Interim Deputy Director
Public Works Contracts

Date: 8/7/2018

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By

Print Name: Thomas Zelency
Deputy City Attorney

Date: 8/10/18

CONTRACTOR

By

Print Name: Anthony Falbo
NEO San Diego, LLC

Title: Senior Vice President

Date: 8/6/18

City of San Diego License No.: N/A

State Contractor's License No.: N/A

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: N/A

CONTRACTOR

By

Print Name:

Title:

Date:

City of San Diego License No.:

State Contractor's License No.:

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER:

CERTIFICATIONS AND FORMS

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

Bidder's General Information

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106

State of California

County of San Diego

The bidder, being first duly sworn, deposes and says that he or she is authorized by the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

CONTRACTOR CERTIFICATION

DRUG-FREE WORKPLACE

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 7-13.3, "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

AMERICAN 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 American With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 7-13.2, "American 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 Contractors, I am familiar with the requirements of City of San Diego Municipal Code § 22.3004 regarding Contractors Standards as outlined in the WHITEBOOK, Section 7-13.4, ("Contractor Standards"), of the project specifications, and that Contractors has complied with those requirements.

I further certify that each of the Contractor's subcontractors whose subcontracts are greater than $50,000 in value has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

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:

_____

(Name of Project or Task)

as particularly described in said contract and identified as Bid No.____; SAP No. (WBS/IO/CC) __; and **WHEREAS**, the specification of said contract requires the Contractors 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 Contractors under the terms of said contract, the undersigned Contractors, 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 _____Contractors named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractors executed the said Release.

Notary Public in and for said County and State

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.

LIST OF SUBCONTRACTORS

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONL Y*** 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 Contractors 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	DIR Registration Number	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 CERTIFIED ②	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	DIR Registration Number	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.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	DIR Registration Number	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 CERTIFIED ②	CHECK IF JOINT VENTURE PARTNER SHIP
	Name: Frank's Industrial Services, Inc. Address: P.O. Box 596 City: Harabor City State: CA Zip: 90710 Phone: 310-539-7817 Email: sgsedillo@yahoo.com	1000005601	Contractor	CA 700250	Electrical	$835,000.00	SBE	State of CA	
	Name: SD Drilling, Inc. Address: 24660 E. Old Julian Highway City: Ramona State: CA Zip: 92065 Phone: 760-789-4935 Email: sddrilling.us	1000008910	Contractor	958254	Large Diameter Auger Drilling	$1,695,440.00	MBE 34287 ELBE 12SD0626	Dept. of Transportation City of San Diego	

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		

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.

SUBCONTRACTORS ADDITIVE/DEDUCTIVE ALTERNATE (USE ONLY WHEN ADDITIVE ALTERNATES ARE REQUIRED)

ALTERNATE A

ADDITIVE/ DEDUCTIVE ALTERNATE	NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	DIR Registration Number	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 CERTIFIED ②	CHECK IF JOINT VENTURE PARTNER SHIP
	Name: BFRNCIC, INC DBA Landmark Consultants Address: 9555 Genesee Ave., Suite 200 City: San Diego State: CA Zip: 92121 Phone: 858-587-8070 Email: ron@lmco.net	1000005403	Contractor	Professional Land Surveyor 7226	Survey Staking	$212,160.00	SLBE	City of San Diego	
	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.

ELECTRONICALLY SUBMITTED FORMS

THE FOLLOWING FORMS MUST BE SUBMITTED IN PDF FORMAT WITH BID SUBMISSION

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**

Bids will not be accepted until ALL forms are submitted as part of the bid submittal

BID BOND

See Instructions to Bidders, Bidder Guarantee of Good Faith
(Bid Security)

KNOW ALL MEN BY THESE PRESENTS,

That _____ as Principal, and

_____ 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

_____

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 _____ day of _____, 20_____

_____ (SEAL) _____ (SEAL)

(Principal) (Surety)

By: _____ By: _____

(Signature) (Signature)

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

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
SEE ATTACHED					

Contractor Name: APTIM

Certified By: John A. Wilpert (Name) Title: VP, Construction

Signature: [signature] Date: February 12, 2018

USE ADDITIONAL FORMS AS NECESSARY

Litigation History

As a major international construction and engineering company with operations around the world, APTIM, as a normal course of business, is engaged in legal actions in connection with engineering and construction projects, technology licenses and other matters. These claims, include employment-related claims and contractual disputes or claims for personal injury or property damage which occur in connection with services performed relating to project or construction sites. APTIM does not currently believe that pending contractual, employment-related personal injury or property damage claims will have a material adverse effect on our earnings or liquidity or ability to execute your project. Further information is available upon request.

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

NEO San Diego LLC			
Legal Name		DBA	
5244 Convoy Street	San Diego	CA	92111
Street Address	City	State	Zip
Suparna Chakladar	(951) 833-4153	(866) 683-9459	
Contact Person, Title	Phone	Fax	

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.

Anthony Falbo	Senior Vice President
Name	Title/Position
Buffalo, NY	
City and State of Residence	Employer (if different than Bidder/Proposer)
Responsible Official	
Interest in the transaction	

Suparna Chakladar	Vice President
Name	Title/Position
Redondo Beach, CA	
City and State of Residence	Employer (if different than Bidder/Proposer)
Program Manager	
Interest in the transaction	

*** 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.

Anthony Falbo - Senior Vice President		August 7, 2018
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

NEO San Diego LLC			
Legal Name		DBA	
5244 Convoy Street	San Diego	CA	92111
Street Address	City	State	Zip
Suparna Chakladar	(951) 833-4153	(866) 683-9459	
Contact Person, Title	Phone	Fax	

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.

Lester Sakoda	Wellfield Superviosr
Name	Title/Position
Sylmar, CA	
City and State of Residence	Employer (if different than Bidder/Proposer)
Project Manager	
Interest in the transaction	

Name	Title/Position
City and State of Residence	Employer (if different than Bidder/Proposer)
Interest in the transaction	

*** 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.

Anthony Falbo - Senior Vice President		August 7, 2018
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

Aptim Environmental & Infrastructure, Inc.			
Legal Name		DBA	
4171 Essen Lane	Baton Rouge	Louisiana	70809
Street Address	City	State	Zip
Stephen R. Martin, Vice President	225-932-2500	225-987-8436	
Contact Person, Title	Phone	Fax	

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.

Christopher Romo	Project Manager
Name	Title/Position
Prescott, AZ	
City and State of Residence	Employer (if different than Bidder/Proposer)
Interest in the transaction	

Kevin Rellinger	Operations Manager
Name	Title/Position
Findlay, OH	
City and State of Residence	Employer (if different than Bidder/Proposer)
Interest in the transaction	

*** 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.

Stephen R. Martin, Vice President		008/03/2018
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.

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:________ Address:________ City:________ State:________ Zip:________ Phone:________ Email: ________	N/A			
Name:________ Address:________ City:________ State:________ Zip:________ Phone:________ Email: ________				
Name:________ Address:________ City:________ State:________ Zip:________ Phone:________ Email: ________				
Name:________ Address:________ City:________ State:________ Zip:________ Phone:________ Email: ________				

**** USE ADDITIONAL FORMS AS NECESSARY ****

City of San Diego

CITY CONTACT: Brittany Friedenreich, **Contract Specialist, Email:** BFriedenreic@sandiego.gov
Phone No. (619) 533-3104, **Fax No**. (619) 533-3633

ADDENDUM 1

e - Bidding

FOR

MIRAMAR LANDFILL GAS RECOVERY IMPROVEMENTS

BID NO.:	**K-18-1707-DBB-3**
SAP NO. (WBS/IO/CC):	**S-16052**
CLIENT DEPARTMENT:	**2115**
COUNCIL DISTRICT:	**4, 6**
PROJECT TYPE:	**FA**

BID DUE DATE:
2:00 PM
JANUARY 16, 2018
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTS
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

1. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the project package. Vendors are reminded that all previous requirements to this solicitation remain in full force and effect.

2. PURSUANT TO THE AMENDED AND RESTATED LANDFILL GAS LEASE AND OPERATING AGREEMENT BETWEEN THE CITY OF SAN DIEGO, CALIFORNIA AND NEO SAN DIEGO LLC, DATED FEBRUARY 1, 2011, THE FOLLOWING SHALL APPLY:

a. **DELETE** and **REPLACE** all references of the term "bid" with the term "offer".

b. **DELETE** from Page 7, Section 1: Prequalification of Contractors.

c. **DELETE** all references to pre-qualification of contractors.

James Nagelvoort, Director
Public Works Department

Dated: *December 15, 2017*
San Diego, California

JN/bf

City of San Diego

CITY CONTACT: Brittany Friedenreich. **Contract Specialist, Email**: BFriedenreic@sandiego.gov
Phone No. (619) 533-3104, **Fax No.** (619) 533-3633

ADDENDUM 2

e - Bidding

FOR

MIRAMAR LANDFILL GAS RECOVERY IMPROVEMENTS

BID NO.:	K-18-1707-DBB-3
SAP NO. (WBS/IO/CC):	S-16052
CLIENT DEPARTMENT:	2115
COUNCIL DISTRICT:	4, 6
PROJECT TYPE:	FA

BID DUE DATE:

2:00 PM
JANUARY 16, 2018
CITY OF SAN DIEGO
PUBLIC WORKS CONTRACTS
1010 SECOND AVENUE, 14th FLOOR, MS 614C
SAN DIEGO, CA 92101

A. CHANGES TO CONTRACT DOCUMENTS

The following changes to the Contract Documents are hereby made effective as though originally issued with the bid package. Bidders are reminded that all previous requirements to this solicitation remain in full force and effect.

B. BIDDER's QUESTIONS

Q1. The specifications state Contractor is to obtain building permits. In order to provide the necessary qualified engineering services what building permits or permit categories is the city expecting with respect to City grading permit for the blower station. Does the landfill's grading permit cover this project?

A1. Yes, this project is consistent with the Final Environmental Impact Report (FEIR) for the Miramar Service Life Extension / Height Increase project (Project No. 122833 / SCH No. 2006051004).

Q2. Foundation and structural city building permit , if so we shall include engineering and geotechnical services

A2. City is providing engineering and geotechnical services for the building permit, but the Contractor will be required to contact Development Services to pull the permit and provide any additional fees.

Q3. City Electrical permit for the blower station, again engineering will be added to our bid.

A3. Contractor will be required to contact Development Services to pull the permit and provide any additional fees.

Q4. City pressure vessel permitting

A4. At this time, pressure vessel permitting is not required for this project.

Q5. City grading permit for haul road crossing, if so we shall include engineering and geotechnical services.

A5. This project is consistent with the Final Environmental Impact Report (FEIR) for the Miramar Service Life Extension / Height Increase project (Project No. 122833 / SCH No. 2006051004)

For more information regarding permitting, please contact the City's Development Services Department.

C. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Attachment E, Supplementary Special Provisions, page 39, Section 7 – RESPONSIBILITIES OF THE CONTRACTOR, **ADD** the following:

7-13.4 Contractor Standards and Pledge of Compliance. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

1. The Contract is subject to City's Municipal Code §22.3004 as amended 10/29/13 by ordinance O-20316.

2. You shall complete a Pledge of Compliance attesting under penalty of perjury that you complied with the requirements of this section.

3. You shall ensure that all Subcontractors complete a Pledge of Compliance attesting under penalty of perjury that they complied with the requirements of this section.

4. You may access the Pledge of Compliance at:

   http://www.sandiego.gov/purchasing/pdf/contractor_standards_questionnaire.pdf

5. You shall require in each subcontract that the Subcontractor shall abide by the provisions of the City's Municipal Code §22.3004. A sample provision is as follows:

   "Compliance with San Diego Municipal Code §22.3004: The Subcontractor acknowledges that it is familiar with the requirements of San Diego Municipal Code §22.3004 ("Contractor Standards"), and agrees to comply with requirements of that section. The Subcontractor further agrees to complete the Pledge of Compliance, incorporated herein by reference."

ADD:

7-13.8 Equal Pay Ordinance.

1. You shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) in section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.

2. You shall require all of your Subcontractors to certify compliance with the EPO in their written subcontracts.

3. You shall post a notice informing your employees of their rights under the EPO in the workplace or job site.

4. By signing this Contract with the City of San Diego, you acknowledge the EPO requirements and pledge ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.

D. CERTIFICATIONS AND FORMS

1. To Certifications and Forms, Contractor Certification, Contractor Standards – Pledge of Compliance, page 234, **DELETE** in its entirety and **SUBSTITUTE** with page 5 of 6 of this Addendum.

2. To Certifications and Forms, **ADD** Contractor Certification, Equal Pay Ordinance Certification on page 6 of 6 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *January 11, 2018*
San Diego, California

JN/AJ/mlw

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 7-13.4, ("Contractor Standards"), 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.

Stephen R. Martin
Vice President
Aptim Environmental & Infrastructure, Inc.

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.

Stephen R. Martin
Vice President
Aptim Environmental & Infrastructure, Inc.

Bid Results

Bidder Details

Vendor Name NEO San Diego LLC
Address 1 North Lexington Ave, Suite 1450
White Plains, NY 10601
United States

Respondee Suparna Chakladar
Respondee Title Vice President
Phone 951-833-4153 Ext.
Email schakladar@fortistar.com
Vendor Type
License #
CADIR

Bid Detail

Bid Format Electronic
Submitted February 12, 2018 12:39:19 PM (Pacific)
Delivery Method
Bid Responsive
Bid Status Submitted
Confirmation # 131180
Ranking 0

Respondee Comment

Buyer Comment

Attachments

File Title	File Name	File Type
Cover Letter, Certifications, Chula Vista Study	NEO San Diego_uploaded to PlanetBids on 2-12-18.pdf	Contractor's Certificate of Pending Actions
Bonding Capacity Letter	NEO San Diego_Bonding Capacity Letter from APTIM.pdf	Bid Bond

Line Items

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
	Main Bid					
1	Bonds (Payment and Performance)					
	524126	LS	1	$75,000.00	$75,000.00	
2	SWPPP Development					
	541330	LS	1	$15,125.00	$15,125.00	
3	SWPPP Implementation					
	237990	LS	1	$25,200.00	$25,200.00	
4	SWPPP Permit Fee (EOC Type I)					
	541330	AL	1	$5,000.00	$5,000.00	
5	Mobilization/Demobilization					
	237310	LS	1	$123,783.00	$123,783.00	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
6	Field Orders (EOC Type II)					
		AL	1	$324,075.00	$324,075.00	
7	Central Blower System (CBS) - 3-300 Hp Blower + Aftercooler System w/ Demisters (2) +Interconnect Piping (Complete, Supplied by PEI or Equivalent)					
	237110	LS	1	$1,322,326.00	$1,322,326.00	
8	Equipment Concrete Pads (2 CBS)					
	237310	CY	40	$1,716.00	$68,640.00	
9	2" Crushed Aggregate Base					
	238910	SF	2125	$3.33	$7,076.25	
10	Chain Link Fence (8ft.)					
	237310	LF	250	$35.32	$8,830.00	
11	Chain Link Gate (8ft.)					
	237310	EA	2	$1,765.00	$3,530.00	
12	Chain Link Gate (3ft.)					
	237310	EA	3	$883.33	$2,649.99	
13	36" HDPE SDR-26 Pipe - Above/Below grade					
	237110	LF	3015	$200.62	$604,869.30	
14	30" HDPE SDR-26 Pipe - Above/Below grade					
	237110	LF	5060	$141.06	$713,763.60	
15	20" HDPE SDR 26 Pipe - Above/Below-grade					
	237110	LF	80	$200.96	$16,076.80	
16	12" HDPE SDR-17 Pipe - Above/Below grade					
	237110	LF	1520	$51.99	$79,024.80	
17	8" HDPE SDR-17 Pipe - Above/Below grade					
	237110	LF	1630	$37.02	$60,342.60	
18	6" HDPE SDR-17 Pipe - Above/Below grade					
	237110	LF	7830	$26.38	$206,555.40	
19	4" HDPE SDR-17 Pipe - Above/Below grade					
	237110	LF	33240	$17.71	$588,680.40	
20	4" HDPE SDR 11 Condensate Drip Pipe					
	237110	LF	25	$81.62	$2,040.50	
21	3" X 6" HDPE SDR-11 Dual-Contained Condensate Return Pipe/Forcemain Pipe					
	237110	LF	50	$109.75	$5,487.50	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
22	2" HDPE SDR-11 Condensate Return/Forcemain Pipe					
	237110	LF	4000	$2.68	$10,720.00	
23	3" HDPE SDR-9 Compressed Air Line Pipe					
	237110	LF	50	$10.67	$533.50	
24	2" HDPE SDR-9 Compressed Air Line Pipe					
	237110	LF	1500	$3.10	$4,650.00	
25	42" CMP Road Crossing					
	237110	LF	285	$270.19	$77,004.15	
26	36" CMP Road Crossing					
	237110	LF	230	$548.72	$126,205.60	
27	36" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	1	$52,607.15	$52,607.15	
28	30" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	3	$39,860.00	$119,580.00	
29	24" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	2	$12,464.90	$24,929.80	
30	20" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	2	$9,342.37	$18,684.74	
31	12" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	6	$3,835.23	$23,011.38	
32	8" Manual Isolation Valve - Gear Operated Butterfly Type					
	237110	EA	5	$1,463.26	$7,316.30	
33	6" Manual Isolation Valve - Lever Operated Butterfly Type					
	237110	EA	15	$1,136.41	$17,046.15	
34	4" Manual Isolation Valve - Lever Operated Butterfly Type					
	237110	EA	4	$500.76	$2,003.04	
35	20" SS Flowserv V-Port Modulating Valve & Pressure Transmitters for MBC flow/pressure control, (Supplied by PEI or Equivalent)					
	237110	LS	1	$95,408.48	$95,408.48	
36	10" SS Flowserv V-Port Modulating Valve Assemblies with 100% Duty Cycle Electric with actuators (Supplied by PEI or Equivalent)					
	237110	EA	2	$41,200.00	$82,400.00	
37	10" SS Flowserv V-Port Modulating Valve, 12" SS LFG Interconnect piping and instrumentation shown, fully fabricated and welded to NCCS, (Supplied by PEI or Equivalent)					
	237110	LS	1	$5,450.00	$5,450.00	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
38	16" Automatic Isolation Valve - Pneumatic					
	237110	EA	1	$11,929.55	$11,929.55	
39	12" Automatic Isolation Valve - Pneumatic					
	237110	EA	1	$9,148.70	$9,148.70	
40	3" Air Line Isolation Valve					
	237110	EA	2	$1,376.17	$2,752.34	
41	2" Air Line Isolation Valve					
	237110	EA	6	$586.35	$3,518.10	
42	3" Condensate Return/Forcemain Isolation Valve					
	237110	EA	2	$1,366.05	$2,732.10	
43	2" Condensate Return/Forcemain Isolation Valve					
	237110	EA	10	$586.35	$5,863.50	
44	20" Electrofusion Coupling					
	237110	EA	2	$4,292.25	$8,584.50	
45	16" Electrofusion Coupling					
	237110	EA	2	$4,042.10	$8,084.20	
46	14" Electrofusion Coupling					
	237110	EA	2	$3,927.80	$7,855.60	
47	24" SS10 x 24" HDPE SDR 26 Flange Assembly					
	237110	EA	1	$6,350.00	$6,350.00	
48	12" SS10 x 12" HDPE SDR 17 Flange Assembly					
	237110	EA	1	$4,035.00	$4,035.00	
49	12" FRP Flange Assembly					
	237110	EA	2	$1,715.00	$3,430.00	
50	12" Inner /18" Outer HDPE SDR 17 Double Wall Condensate Sump (CS-1) w/4" Drainline, Isolation valves, QED AB-4BL Pump (Complete, Supplied by REP or Equivalent)					
	237110	EA	1	$40,002.21	$40,002.21	
51	12" Inner /18" Outer HDPE SDR 17 Double Wall Condensate Sump (CS-2, 3 & 5) w/4" Drainline, Isolation valves, QED AB-4BL Pump (Complete, Supplied by REP or Equivalent)					
	237110	EA	3	$42,963.07	$128,889.21	
52	12" Inner /18" Outer HDPE SDR 17 Double Wall Condensate Sump (CS-4) w/4" Drainline, Isolation valves, QED AB-4BL Pump (Complete, Supplied by REP)					
	237110	EA	1	$38,679.74	$38,679.74	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
53	Burn Ash (w/ Lead) Abatement for Vertical Extraction Well (Complete)					
	238990	VF	800	0	0	
54	Asbestos Abatement for Vertical Extraction Well (Complete)					
	238990	VF	11040	0	0	
55	6" HDPE SDR-11 Vertical Extraction Well (Complete)					
	237110	VF	11040	$140.90	$1,555,536.00	
56	Well Bore Abandonment					
	237110	VF	100	$74.60	$7,460.00	
57	2" Wellheads QED					
	237110	EA	111	$877.04	$97,351.44	
58	Well Bore Seal					
	237110	EA	111	$523.93	$58,156.23	
59	Electrical Pole work and Interconnect with Controls at CBS					
	237110	LS	1	$541,460.00	$541,460.00	
60	Electrical Interconnect at Other locations (inc. 2MW transformer at Tee) with Control Panels and Programming/Start-up					
	237110	LS	1	$183,200.00	$183,200.00	
61	Fiber Optic Install, Inc. splices, termination and testing					
	237110	LS	1	$200,625.00	$200,625.00	
62	Trench Shoring					
	237110	LF	150	$104.83	$15,724.50	
63	6" thick Pavement Removal and Replacement					
	237310	SF	600	$48.45	$29,070.00	
64	As-built Records (Complete)					
	237110	LS	1	$58,350.00	$58,350.00	
				Subtotal	**$7,954,414.35**	
	Alternate A					
65	6" SDR-11 HDPE Vertical Extraction Well (Complete) - Additional Drilling					
	237110	VF	1000	$139.76	$139,760.00	
				Subtotal	**$139,760.00**	
	Alternate B					
66	Fiber Optic Installation including splices, termination and testing - CBS to MBC (Approximately 7,000 LF)					
	237110	LS	1	$124,200.00	$124,200.00	
				Subtotal	**$124,200.00**	
				Total	**$8,218,374.35**	

Bid Results

Subcontractors

Name & Address	Description	License Num	CADIR	Amount	Type