

ENGINEER OF WORK

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


1) Registered Engineer

3/19/19
Date

Seal:




2) For City Engineer

3/27/19
Date

Seal:



TABLE OF CONTENTS

SECTION	PAGE
1. NOTICE INVITING BIDS	4
2. INSTRUCTIONS TO BIDDERS	6
3. PERFORMANCE AND PAYMENT BONDS	17
4. ATTACHMENTS:	
A. SCOPE OF WORK.....	20
B. PHASED FUNDING PROVISIONS	22
C. RESERVED.....	25
D. PREVAILING WAGES.....	26
E. SUPPLEMENTARY SPECIAL PROVISIONS.....	31
1. Appendix A - Notice of Exemption.....	46
2. Appendix B - Fire Hydrant Meter Program.....	50
3. Appendix C - Materials Typically Accepted by Certificate of Compliance.....	64
4. Appendix D - Sample City Invoice with Cash Flow Forecast.....	66
5. Appendix E - Location Map	69
6. Appendix F - Contractor's Daily Quality Control Inspection Report.....	71
7. Appendix G - Monthly Drinking Water Discharge Monitoring Form.....	74
8. Appendix H - Technical Specifications	77
9. Appendix I - Sample of Public Notice	188
10. Appendix J - Advanced Metering Infrastructure (AMI) Device Protection	190
11. Appendix K - MTS SDA and E Excavation Support Systems Requirements.....	197
F. RESERVED.....	203
G. CONTRACT AGREEMENT	204
5. CERTIFICATIONS AND FORMS.....	207

NOTICE INVITING BIDS

1. **SUMMARY OF WORK:** This is the City of San Diego's (City) solicitation process to acquire Construction services for **Otay 2nd Pipeline Phase I**. For additional information refer to Attachment A.
2. **FULL AND OPEN COMPETITION:** This solicitation is subject to full and open competition and may be bid by Contractors on the City's approved Prequalified Contractors List. For information regarding the Contractors Prequalified list visit the City's web site: <http://www.sandiego.gov>.
3. **ESTIMATED CONSTRUCTION COST:** The City's estimated construction cost for this project is **\$9,960,000**.
4. **BID DUE DATE AND TIME ARE: May 9, 2019 @2:00 P.M.**
5. **PREVAILING WAGE RATES APPLY TO THIS CONTRACT:** Refer to Attachment D.
6. **LICENSE REQUIREMENT:** To be eligible for award of this contract, Prime contractor must possess the following licensing classification: **A**
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	8.8%
2. ELBE participation	13.5%
3. Total mandatory participation	22.3%
 - 7.2. The Bid may be declared non-responsive if the Bidder fails to meet the following requirements:
 - 7.2.1. Include SLBE-ELBE certified subcontractors at the overall mandatory participation percentage identified in this document; **OR**
 - 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 bids and determination of the apparent low bidder, the City will prepare the contract documents for execution within approximately 21 days of the date of the bid opening. The City will then award the contract upon receipt of properly signed Contract, bonds, and insurance documents.
- 8.3. This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form by the City Attorney's Office.
- 8.4. The low Bid will be determined by Base Bid alone.
- 8.5. Once the low bid has been determined, the City may, at its sole discretion, award the contract for the Base Bid alone.

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
525 B Street, Suite 750 (7th Floor)
San Diego, California, 92101
Attention: Ronald McMinn Jr.

OR:

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

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.
- 1.2. The completed application must be submitted online no later than 2 weeks prior to the bid opening.
- 1.3. **Joint Venture Bidders Cumulative Maximum Bidding Capacity:** For projects with an engineer's estimate of \$30,000,000 or greater, Joint Ventures submitting bids may be deemed responsive and eligible for award if the cumulative maximum bidding capacity of the individual Joint Venture entities is equal to or greater than the total amount proposed.
 - 1.3.1. Each of the entities of the Joint Venture must have been previously prequalified at a minimum of \$15,000,000.
 - 1.3.2. Bids submitted with a total amount proposed of less than \$30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification. To be eligible for award in this scenario, the Joint Venture itself or at least one of the Joint Venture entities must have been prequalified for the total amount proposed.
 - 1.3.3. Bids submitted by Joint Ventures with a total amount proposed of \$30,000,000 or greater on a project with an engineer's estimate of less than \$30,000,000 are not eligible for Cumulative Maximum Bidding Capacity prequalification.
 - 1.3.4. The Joint Venture designated as the Apparent Low Bidder shall provide evidence of its corporate existence and furnish good and approved bonds in the name of the Joint Venture within 14 Calendar Days of receipt by the Bidder of a form of contract for execution.
- 1.4. Complete information and links to the on-line prequalification application are available at:

<http://www.sandiego.gov/cip/bidopps/prequalification.shtml>
- 1.5. Due to the City's responsibility to protect the confidentiality of the contractors' information, City staff will not be able to provide information regarding contractors' prequalification status over the telephone. Contractors may access real-time information about their prequalification status via their vendor profile on [PlanetBids™](#).

2. **ELECTRONIC FORMAT RECEIPT AND OPENING OF BIDS:** Bids will be received in electronic format (eBids) EXCLUSIVELY at the City of San Diego’s electronic bidding (eBidding) site, at: <http://www.sandiego.gov/cip/bidopps/index.shtml> and are due by the date, and time shown on the cover of this solicitation.
- 2.1. **BIDDERS MUST BE PRE-REGISTERED** with the City’s bidding system and possess a system-assigned Digital ID in order to submit and electronic bid.
- 2.2. The City’s bidding system will automatically track information submitted to the site including IP addresses, browsers being used and the URLs from which information was submitted. In addition, the City’s bidding system will keep a history of every login instance including the time of login, and other information about the user’s computer configuration such as the operating system, browser type, version, and more. Because of these security features, Contractors who disable their browsers’ cookies will not be able to log in and use the City’s bidding system.
- 2.3. The City’s electronic bidding system is responsible for bid tabulations. Upon the bidder’s or proposer’s entry of their bid, the system will ensure that all required fields are entered. **The system will not accept a bid for which any required information is missing.** This includes all necessary pricing, subcontractor listing(s) and any other essential documentation and supporting materials and forms requested or contained in these solicitation documents.
- 2.4. **BIDS REMAIN SEALED UNTIL BID DEADLINE.** eBids are transmitted into the City’s bidding system via hypertext transfer protocol secure (https) mechanism using SSL 128-256 bit security certificates issued from Verisign/Thawte which encrypts data being transferred from client to server. Bids submitted prior to the “Bid Due Date and Time” are not available for review by anyone other than the submitter who has until the “Bid Due Date and Time” to change, rescind or retrieve its proposal should it desire to do so.
- 2.5. **BIDS MUST BE SUBMITTED BY BID DUE DATE AND TIME.** Once the bid deadline is reached, no further submissions are accepted into the system. Once the Bid Due Date and Time has lapsed, bidders, proposers, the general public, and City staff are able to immediately see the results on line. City staff may then begin reviewing the submissions for responsiveness, EOCP compliance and other issues. The City may require any Bidder to furnish statement of experience, financial responsibility, technical ability, equipment, and references.
- 2.6. **RECAPITULATION OF THE WORK.** Bids shall not contain any recapitulation of the Work. Conditional Bids may be rejected as being non-responsive. Alternative proposals will not be considered unless called for.

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

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

2.8. ACCESSIBILITY AND AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE: To request a copy of this solicitation in an alternative format, contact the 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 from the date of Bid opening. The duration of the Contract Price guarantee shall be extended by the number of days required for the City to obtain all items necessary to fulfill all conditions precedent.

4. BIDS ARE PUBLIC RECORDS: Upon receipt by the City, Bids shall become public records subject to public disclosure. It is the responsibility of the respondent to clearly identify any confidential, proprietary, trade secret or otherwise legally privileged information contained within the Bid. General references to sections of the California Public Records Act (PRA) will not suffice. If the Contractor does not provide applicable case law that clearly establishes that the requested information is exempt from the disclosure requirements of the PRA, the City shall be free to release the information when required in accordance with the PRA, pursuant to any other applicable law, or by order of any court or government agency, and the Contractor will hold the City harmless for release of this information.

5. CONTRACTOR REGISTRATION AND ELECTRONIC REPORTING SYSTEM:

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

<http://www.sandiego.gov/purchasing/bids-contracts/vendorreg.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 14 Calendar Days after receiving the Contract forms.

7. INSURANCE REQUIREMENTS:

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

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

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

Title	Edition	Document Number
Standard Specifications for Public Works Construction (“The GREENBOOK”) http://www.greenbookspecs.org/	2018	PWPI010119-01
City of San Diego Standard Specifications for Public Works Construction (“The WHITEBOOK”)* https://www.sandiego.gov/publicworks/edocref/greenbook	2018	PWPI010119 -02
City of San Diego Standard Drawings* https://www.sandiego.gov/publicworks/edocref/standarddrawing	2018	PWPI010119 -03
Citywide Computer Aided Design and Drafting (CADD) Standards https://www.sandiego.gov/publicworks/edocref/drawings	2018	PWPI010119 -04
California Department of Transportation (CALTRANS) Standard Specifications – http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2018	PWPI030119-05

Title	Edition	Document Number
CALTRANS Standard Plans http://www.dot.ca.gov/des/oe/construction-contract-standards.html	2018	PWPI030119-06
California Manual on Uniform Traffic Control Devices Revision 3 (CA MUTCD Rev 3) http://www.dot.ca.gov/trafficops/camutcd/	2014	PWPI030119-07
<p>NOTE: *Available online under Engineering Documents and References at: http://www.sandiego.gov/publicworks/edocref/index.shtml</p> <p>*Electronic updates to the Standard Drawings may also be found in the link above</p>		

9. **CITY'S RESPONSES AND ADDENDA:** The City, at its discretion, may respond to any or all questions submitted in writing via the City's eBidding web site in the **form of an addendum**. No other responses to questions, oral or written shall be of any force or effect with respect to this solicitation. The changes to the Contract Documents through addenda are made effective as though originally issued with the Bid. The Bidders shall acknowledge the receipt of Addenda at the time of bid submission.
10. **CITY'S RIGHTS RESERVED:** The City reserves the right to cancel the Notice Inviting Bids at any time, and further reserves the right to reject submitted Bids, without giving any reason for such action, at its sole discretion and without liability. Costs incurred by the Bidder(s) as a result of preparing Bids under the Notice Inviting Bids shall be the sole responsibility of each bidder. The Notice Inviting Bids creates or imposes no obligation upon the City to enter a contract.
11. **CONTRACT PRICING:** This solicitation is for a Lump Sum contract with Unit Price provisions as set forth herein. The Bidder agrees to perform construction services for the City of San Diego in accordance with these contract documents for the prices listed below. The Bidder further agrees to guarantee the Contract Price for a period of 120 days from the date of Bid opening. The duration of the Contract Price guarantee may be extended, by mutual consent of the parties, by the number of days required for the City to obtain all items necessary to fulfill all contractual conditions.
12. **SUBCONTRACTOR INFORMATION:**
- 12.1. **LISTING OF SUBCONTRACTORS.** In accordance with the requirements provided in the "Subletting and Subcontracting Fair Practices Act" of the California Public Contract Code, the Bidder shall provide the **NAME** and **ADDRESS** of each Subcontractor who will perform work, labor, render services or who specially fabricates and installs a portion [type] of the work or improvement, in an amount in excess of 0.5% of the Contractor's total Bid. The Bidder shall also state within the description, whether the subcontractor is a **CONSTRUCTOR, CONSULTANT** or **SUPPLIER**. The Bidder shall state the **DIR REGISTRATION NUMBER** for all subcontractors and shall further state within the description, the **PORZION** of the work which will be performed by each

subcontractor under this Contract. The Contractor shall list only one Subcontractor for each portion of the Work. The **DOLLAR VALUE** of the total Bid to be performed shall be stated for all subcontractors listed. Failure to comply with this requirement may result in the Bid being rejected as **non-responsive** and ineligible for award. The Bidder's attention is directed to the Special Provisions – Section 3-2, “SELF-PERFORMANCE”, which stipulates the percent of the Work to be performed with the Bidders' own forces. The Bidder shall list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which Bidders are seeking recognition towards achieving any mandatory, voluntary (or both) subcontracting participation goals.

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

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

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

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

14. AWARD:

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

- 14.2.** Upon acceptance of a Bid, the City will prepare contract documents for execution within approximately 21 days of the date of the Bid opening and award the Contract approximately within 7 days of receipt of properly executed Contract, bonds, and insurance documents.
- 14.3.** This contract will be deemed executed and effective only upon the signing of the Contract by the Mayor or his designee and approval as to form the City Attorney's Office.
- 15. SUBCONTRACT LIMITATIONS:** The Bidder's attention is directed to Standard Specifications for Public Works Construction, Section 3-2, "SELF-PERFORMANCE" in The GREENBOOK and as amended in the SSP which requires the Contractor to self-perform not less than the specified amount. Failure to comply with this requirement shall render the bid **non-responsive** and ineligible for award.
- 16. AVAILABILITY OF PLANS AND SPECIFICATIONS:** Contract Documents may be obtained by visiting the City's website: <http://www.sandiego.gov/cip/>. Plans and Specifications for this contract are also available for review in the office of the City Clerk or Public Works Contracts.
- 17. ONLY ONE BID PER CONTRACTOR SHALL BE ACCEPTED:** No person, firm, or corporation shall be allowed to make, file, or be interested in more than one (1) Bid for the same work unless alternate Bids are called for. A person, firm or corporation who has submitted a sub-proposal to a Bidder, or who has quoted prices on materials to a Bidder, is not hereby disqualified from submitting a sub-proposal or quoting prices to other Bidders or from submitting a Bid in its own behalf. Any Bidder who submits more than one bid will result in the rejection of all bids submitted.
- 18. SAN DIEGO BUSINESS TAX CERTIFICATE:** The Contractor and Subcontractors, not already having a City of San Diego Business Tax Certificate for the work contemplated shall secure the appropriate certificate from the City Treasurer, Civic Center Plaza, First floor and submit to the Contract Specialist upon request or as specified in the Contract Documents. Tax Identification numbers for both the Bidder and the listed Subcontractors must be submitted on the City provided forms within these documents.
- 19. BIDDER'S GUARANTEE OF GOOD FAITH (BID SECURITY) FOR DESIGN-BID-BUILD CONTRACTS:**
- 19.1.** For bids \$250,000 and above, bidders shall submit Bid Security at bid time. Bid Security shall be in one of the following forms: a cashier's check, or a properly certified check upon some responsible bank; or an approved corporate surety bond payable to the City of San Diego for an amount of not less than 10% of the total bid amount.
- 19.2.** This check or bond, and the monies represented thereby, will be held by the City as a guarantee that the Bidder, if awarded the contract, will in good faith enter into the contract and furnish the required final performance and payment bonds.

- 19.3. The Bidder agrees that in the event of the Bidder's failure to execute this contract and provide the required final bonds, the money represented by the cashier's or certified check will remain the property of the City; and the Surety agrees that it will pay to the City the damages, not exceeding the sum of 10% of the amount of the Bid, that the City may suffer as a result of such failure.
- 19.4. At the time of bid submission, bidders must upload and submit an electronic PDF copy of the aforementioned bid security. Whether in the form of a cashier's check, a properly certified check or an approved corporate surety bond payable to the City of San Diego, the bid security must be uploaded to the City's eBidding system. 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.
- 19.5. 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**.

20. AWARD OF CONTRACT OR REJECTION OF BIDS:

- 20.1. This contract may be awarded to the lowest responsible and reliable Bidder.
- 20.2. Bidders shall complete ALL eBid forms as required by this solicitation. Incomplete eBids will not be accepted.
- 20.3. The City reserves the right to reject any or all Bids, to waive any informality or technicality in Bids received, and to waive any requirements of these specifications as to bidding procedure.
- 20.4. Bidders will not be released on account of their errors of judgment. Bidders may be released only upon receipt by the City within 3 Working Days of the bid opening, written notice from the Bidder which shows proof of honest, credible, clerical error of a material nature, free from fraud or fraudulent intent; and of evidence that reasonable care was observed in the preparation of the Bid.
- 20.5. A bidder who is not selected for contract award may protest the award of a contract to another bidder by submitting a written protest in accordance with the San Diego Municipal Code.
- 20.6. The City of San Diego will not discriminate in the award of contracts with regard to race, religion creed, color, national origin, ancestry, physical handicap, marital status, sex or age.
- 20.7. Each Bid package properly signed as required by these specifications shall constitute a firm offer which may be accepted by the City within the time specified herein.
- 20.8. The City reserves the right to evaluate all Bids and determine the lowest Bidder on the basis of the base bid and any proposed alternates or options as detailed herein.

21. BID RESULTS:

- 21.1.** The availability of the bids on the City's eBidding system shall constitute the public announcement of the apparent low bidder. In the event that the apparent low bidder is subsequently deemed non-responsive or non-responsible, a notation of such will be made on the eBidding system. The new ranking and apparent low bidder will be adjusted accordingly.
- 21.2.** To obtain the bid results, view the results on the City's web site, or request the results by U.S. mail and provide a self-addressed, stamped envelope. If requesting by mail, be sure to reference the bid name and number. The bid tabulations will be mailed to you upon their completion. The results will not be given over the telephone.

22. THE CONTRACT:

- 22.1.** The Bidder to whom award is made shall execute a written contract with the City of San Diego and furnish good and approved bonds and insurance certificates specified by the City within 14 days after receipt by Bidder of a form of contract for execution unless an extension of time is granted to the Bidder in writing.
- 22.2.** If the Bidder takes longer than 14 days to fulfill these requirements, then the additional time taken shall be added to the Bid guarantee. The Contract shall be made in the form adopted by the City, which includes the provision that no claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.
- 22.3.** If the Bidder to whom the award is made fails to enter into the contract as herein provided, the award may be annulled and the Bidder's Guarantee of Good Faith will be subject to forfeiture. An award may be made to the next lowest responsible and reliable Bidder who shall fulfill every stipulation embraced herein as if it were the party to whom the first award was made.
- 22.4.** Pursuant to the San Diego City Charter section 94, the City may only award a public works contract to the lowest responsible and reliable Bidder. The City will require the Apparent Low Bidder to (i) submit information to determine the Bidder's responsibility and reliability, (ii) execute the Contract in form provided by the City, and (iii) furnish good and approved bonds and insurance certificates specified by the City within 14 Days, unless otherwise approved by the City, in writing after the Bidder receives notification from the City, designating the Bidder as the Apparent Low Bidder and formally requesting the above mentioned items.
- 22.5.** The award of the Contract is contingent upon the satisfactory completion of the above-mentioned items and becomes effective upon the signing of the Contract by the

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

- 23. EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK:** The Bidder shall examine carefully the Project Site, the Plans and Specifications, other materials as described in the Special Provisions, Section 3-9, "TECHNICAL STUDIES AND SUBSURFACE DATA" and the proposal forms (e.g., Bidding Documents). The submission of a Bid shall be conclusive evidence that the Bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of Work, the quantities of materials to be furnished, and as to the requirements of the Bidding Documents Proposal, Plans, and Specifications.
- 24. CITY STANDARD PROVISIONS:** This contract is subject to the following standard provisions. See The WHITEBOOK for details.
- 24.1.** The City of San Diego Resolution No. R-277952 adopted on May 20, 1991 for a Drug-Free Workplace.
- 24.2.** The City of San Diego Resolution No. R-282153 adopted on June 14, 1993 related to the Americans with Disabilities Act.
- 24.3.** The City of San Diego Municipal Code §22.3004 for Contractor Standards.
- 24.4.** The City of San Diego's Labor Compliance Program and the State of California Labor Code §§1771.5(b) and 1776.
- 24.5.** Sections 1777.5, 1777.6, and 1777.7 of the State of California Labor Code concerning the employment of apprentices by contractors and subcontractors performing public works contracts.
- 24.6.** The City's Equal Benefits Ordinance (EBO), Chapter 2, Article 2, Division 43 of The San Diego Municipal Code (SDMC).
- 24.7.** The City's Information Security Policy (ISP) as defined in the City's Administrative Regulation 90.63.
- 25. PRE-AWARD ACTIVITIES:**
- 25.1.** The contractor selected by the City to execute a contract for this Work shall submit the required documentation as specified 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**.

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

PERFORMANCE BOND, LABOR AND MATERIALMEN'S BOND

FAITHFUL PERFORMANCE BOND AND LABOR AND MATERIALMEN'S BOND:

Cass Construction, Inc., a corporation, as principal, and Liberty Mutual Insurance Company, a corporation authorized to do business in the State of California, as Surety, hereby obligate themselves, their successors and assigns, jointly and severally, to The City of San Diego a municipal corporation in the sum of Ten Million Seven Hundred Seventy Thousand Fifty Four Dollars and Zero Cents (\$10,770,054.00) for the faithful performance of the annexed contract, and in the sum of Ten Million Seven Hundred Seventy Thousand Fifty Four Dollars and Zero Cents (\$10,770,054.00) 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.

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

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

Dated August 27, 2019

Approved as to Form

Cass Construction, Inc.

Principal

By Wes Wise

Wes Wise, President

Printed Name of Person Signing for Principal

Mara W. Elliott, City Attorney

By M. M. Mercer
Deputy City Attorney

Liberty Mutual Insurance Company

Surety

By Tara Bacon
Tara Bacon, Attorney-in-fact

Approved:

By [Signature]
James Nagelvoort
Director
Public Works

790 The City Drive South, Suite 200

Local Address of Surety

Orange, CA 92868

Local Address (City, State) of Surety

714-634-5719

Local Telephone No. of Surety

Premium \$ 62,924.00

Bond No. 024240573

CALIFORNIA ACKNOWLEDGMENT

CIVIL CODE § 1189

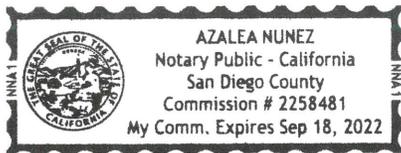
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California }
County of San Diego

On August 28, 2019 before me, Azalea Nunez, Notary Public
Date Here Insert Name and Title of the Officer

personally appeared Wes Wise
Name(s) of Signer(s)

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



Place Notary Seal and/or Stamp Above

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

WITNESS my hand and official seal.

Signature *Azalea Nunez*
Signature of Notary Public

OPTIONAL

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

Description of Attached Document

Title or Type of Document: Performance Bond, Labor and Materialmen's Bond

Document Date: 08/27/19 Number of Pages: 1

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: Wes Wise

Corporate Officer – Title(s): President

Partner – Limited General

Individual Attorney in Fact

Trustee Guardian or Conservator

Other: _____

Signer is Representing: _____

Signer's Name: _____

Corporate Officer – Title(s): _____

Partner – Limited General

Individual Attorney in Fact

Trustee Guardian or Conservator

Other: _____

Signer is Representing: _____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE § 1189

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

State of California

County of San Diego)

On August 27, 2019 before me, Minna Huovila, Notary Public
(insert name and title of the officer)

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

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

WITNESS my hand and official seal.

Signature 

(Seal)





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

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

Certificate No: 8196955 - 969522

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Tara Bacon, Dale G. Harshaw, Minna Huovila, Kyle King, John R. Qualin, Geoffrey Shelton

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

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 5th day of October, 2018.



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

By: David M. Carey, Assistant Secretary

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

State of PENNSYLVANIA ss
County of MONTGOMERY

On this 5th day of October, 2018 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

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



COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: Teresa Pastella, Notary Public

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

ARTICLE IV - OFFICERS: Section 12. Power of Attorney.

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

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

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

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

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

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

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 27th day of August, 2019.



By: Renee C. Llewellyn, Assistant Secretary

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

ATTACHMENTS

ATTACHMENT A
SCOPE OF WORK

SCOPE OF WORK

1. **SCOPE OF WORK:** Otay 2nd Pipeline Project provides for the construction of 4,600 ft. (0.9 mile) of new 48-inch pipeline on Woodman Street between Imperial Avenue and Skyline Drive and abandoning of the existing 36-inch Otay 2nd Pipeline. The new 48-inch pipeline alignment will start at the 65th Street and Imperial Avenue and will run south crossing the trolley tracks. Then it will run east on Imperial Avenue turning south at Woodman Street and will end at Skyline Drive connecting to the existing Otay 2nd Pipeline. This new pipeline is proposed to feed the new Cielo and Woodman Pump Station. This project will relocate the existing Pressure Regulating Valve from the Imperial Avenue median, that presently posed safety hazard to maintenance personnel, to the easement South of Imperial Avenue and 65th Street.
 - 1.1. The Work shall be performed in accordance with:
 - 1.1.1. The Notice Inviting Bids and Plans numbered **40351-01-D** through **40351-47-D**, inclusive, and Traffic Control Plans **40351-T01-D** through **40351-T40-D**.
2. **LOCATION OF WORK:** The location of the Work is as follows:

Per Location Map **Appendix E**.
3. **CONTRACT TIME:** The Contract Time for completion of the Work shall be **350 Working Days**.

ATTACHMENT B
PHASED FUNDING PROVISIONS

PHASED FUNDING PROVISIONS

1. PRE-AWARD

- 1.1. Within 10 Working Days of the Notice of Intent to Award, the Contractor must contact the Project Manager to discuss fund availability for each phase and shall also submit the following:
 - 1.1.1. Construction Cost Loaded Schedule in accordance with 6-1, "CONSTRUCTION SCHEDULE AND COMMENCEMENT OF THE WORK" and 7-3, "PAYMENT.
- 1.2. Contractor's failure to perform any of the following may result cancelling your award of the Contract:
 - 1.2.1. Meeting with the City's Project Manager to discuss the Phased Funding Schedule.
 - 1.2.2. Agreeing to a Phased Funding Schedule within **thirty** Working Days after meeting with the City's Project Manager.

2. POST-AWARD

- 2.1. Do not start any construction activities for the next phase until the NTP has been issued by the Engineer. The City will issue separate Notice to Proceed (NTP) documents for each phase.
- 2.2. If requested, the Engineer may issue the NTP for the next phase before the end of the current approved phase.

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

BID NUMBER: K-19-1832-DBB-3

CONTRACT OR TASK TITLE: Otay 2nd Pipeline Phase I

CONTRACTOR: Cass Construction, Inc.

Funding Phase	Phase Description	Phase Start	Phase Finish	Not-to-Exceed Amount
1	TCP Application, WPCP Development, MTS ROW Permit (by City), Mobilization & Bond, Potholing Ex. Utilities for Shop Drawings.	12/1/2019 (NTP)	7/31/2020	\$5,000,000
	Community Outreach, Submittals & Shop Drawings, Material Procurement/Purchase of Long Lead Items (inc. CMLC steel, PRS Hatch/Vault/PRV/Instrumentation, Butterfly Valves), & CMLC Manufacturing/Delivery. Installation of CMLC pipe, PRS, Jack & Bore, and related appurtenances will begin in Phase 1. Phase 1 will be starting with the Jack & Bore operation shown on C-01/C-10 continuing with C-02 & C-03. Concurrently the PRS installation shown on C-09 will be installed with the Jack & Bore operation.			
2	Continuing to completion the installation of CMLC and related appurtenances shown on	8/1/2020	8/31/2021	\$5,770,054
	C-04 to C-07, connections to ex. system, pipeline abandonment, AC Overlay, Surface Improvements, & Striping.			
Contract Total				\$10,770,054

Notes:

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

CITY OF SAN DIEGO

CONTRACTOR

PRINT NAME: Nabil Batta
Construction Manager

PRINT NAME: Wes Wise

Signature: Nabil Batta

Title: President

Date: 11-18-2019

Signature: Wes Wise

PRINT NAME: Shaza Nezha
Project Manager

Date: 11-18-19

Signature: [Signature]

Parita Ammerlahn
[Signature]
11/18/19

Date: 11/18/2019

ATTACHMENT C

RESERVED

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 Contractor and its subcontractors shall ensure that all workers who perform work under this Contract are paid not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations (DIR). This includes work performed during the design and preconstruction phases of construction including, but not limited to, inspection and land surveying work.
 - 1.1.1. Copies of such prevailing rate of per diem wages are on file at the City and are available for inspection to any interested party on request. Copies of the prevailing rate of per diem wages also may be found at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>. Contractor and its subcontractors shall post a copy of the prevailing rate of per diem wages determination at each job site and shall make them available to any interested party upon request.
 - 1.1.2. The wage rates determined by the DIR refer to expiration dates. If the published wage rate does not refer to a predetermined wage rate to be paid after the expiration date, then the published rate of wage shall be in effect for the life of this Contract. If the published wage rate refers to a predetermined wage rate to become effective upon expiration of the published wage rate and the predetermined wage rate is on file with the DIR, such predetermined wage rate shall become effective on the date following the expiration date and shall apply to this Contract in the same manner as if it had been published in said publication. If the predetermined wage rate refers to one or more additional expiration dates with additional predetermined wage rates, which expiration dates occur during the life of this Contract, each successive predetermined wage rate shall apply to this Contract on the date following the expiration date of the previous wage rate. If the last of such predetermined wage rates expires during the life of this Contract, such wage rate shall apply to the balance of the Contract.
 - 1.2. **Penalties for Violations.** Contractor and its subcontractors shall comply with California Labor Code section 1775 in the event a worker is paid less than the prevailing wage rate for the work or craft in which the worker is employed. This shall be in addition to any other applicable penalties allowed under Labor Code sections 1720 – 1861.

- 1.3. Payroll Records.** Contractor and its subcontractors shall comply with California Labor Code section 1776, which generally requires keeping accurate payroll records, verifying and certifying payroll records, and making them available for inspection. Contractor shall require its subcontractors to also comply with section 1776. Contractor and its subcontractors shall submit weekly certified payroll records online via the City's web-based Labor Compliance Program. Contractor is responsible for ensuring its subcontractors submit certified payroll records to the City.
- 1.3.1.** Contractor and their subcontractors shall also furnish records specified in Labor Code section 1776 directly to the Labor Commissioner in the manner required by Labor Code section 1771.4.
- 1.4. Apprentices.** Contractor and its subcontractors shall comply with California Labor Code sections 1777.5, 1777.6 and 1777.7 concerning the employment and wages of apprentices. Contractor is held responsible for the compliance of their subcontractors with sections 1777.5, 1777.6 and 1777.7.
- 1.5. Working Hours.** Contractor and their subcontractors shall comply with California Labor Code sections 1810 through 1815, including but not limited to: (i) restrict working hours on public works contracts to eight hours a day and forty hours a week, unless all hours worked in excess of 8 hours per day are compensated at not less than 1½ times the basic rate of pay; and (ii) specify penalties to be imposed on contractors and subcontractors of \$25 per worker per day for each day the worker works more than 8 hours per day and 40 hours per week in violation of California Labor Code sections 1810 through 1815.
- 1.6. Required Provisions for Subcontracts.** Contractor shall include at a minimum a copy of the following provisions in any contract they enter into with a subcontractor: California Labor Code sections 1771, 1771.1, 1775, 1776, 1777.5, 1810, 1813, 1815, 1860 and 1861.
- 1.7. Labor Code Section 1861 Certification.** Contractor in accordance with California Labor Code section 3700 is required to secure the payment of compensation of its employees and by signing this Contract, Contractor certifies that "I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this Contract."
- 1.8. Labor Compliance Program.** The City has its own Labor Compliance Program authorized in August 2011 by the DIR. The City will withhold contract payments when payroll records are delinquent or deemed inadequate by the City or other governmental entity, or it has been established after an investigation by the City or other governmental entity that underpayment(s) have occurred. For questions or assistance, please contact the City of San Diego's Prevailing Wage Unit at 858-627-3200.

- 1.9. Contractor and Subcontractor Registration Requirements.** This project is subject to compliance monitoring and enforcement by the DIR. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid or proposal, subject to the requirements of section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, unless currently registered and qualified to perform public work pursuant to Labor Code section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.
- 1.9.1.** A Contractor's inadvertent error in listing a subcontractor who is not registered pursuant to Labor Code section 1725.5 in response to a solicitation shall not be grounds for filing a bid protest or grounds for considering the bid non-responsive provided that any of the following apply: (1) the subcontractor is registered prior to bid opening; (2) within twenty-four hours after the bid opening, the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5; or (3) the subcontractor is replaced by another registered subcontractor pursuant to Public Contract Code section 4107.
- 1.9.2.** By submitting a bid or proposal to the City, Contractor is certifying that he or she has verified that all subcontractors used on this public work project are registered with the DIR in compliance with Labor Code sections 1771.1 and 1725.5, and Contractor shall provide proof of registration for themselves and all listed subcontractors to the City at the time of bid or proposal due date or upon request.
- 1.10. Stop Order.** For Contractor or its subcontractors engaging in the performance of any public work contract without having been registered in violation of Labor Code sections 1725.5 or 1771.1, the Labor Commissioner shall issue and serve a stop order prohibiting the use of the unregistered contractors or unregistered subcontractor(s) on ALL public works until the unregistered contractor or unregistered subcontractor(s) is registered. Failure to observe a stop order is a misdemeanor.
- 1.11. List of all Subcontractors.** The Contractor shall provide the list of subcontractors (regardless of tier), along with their DIR registration numbers, utilized on this Contract prior to any work being performed; and the Contractor shall provide a complete list of all subcontractors with each invoice. Additionally, Contractor shall provide the City with a complete list of all subcontractors (regardless of tier) utilized on this contract within ten working days of the completion of the contract, along with their DIR registration numbers. The City shall withhold final payment to Construction Management Professional until at least thirty (30) days after this information is provided to the City.

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

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

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

1.12.3. List of all Subcontractors. The Contractor shall not be required to hire only registered subcontractors and is exempt from submitting the list of all subcontractors that is required in section 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 **2018 Edition** of the Standard Specifications for Public Works Construction (The "GREENBOOK").
2. The **2018 Edition** of the City of San Diego Standard Specifications for Public Works Construction (The "WHITEBOOK"), including the following:
 - a) General Provisions (A) for all Construction Contracts.

SECTION 1 – GENERAL, 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 **8:30 AM to 3:30 PM**.

SECTION 2 - SCOPE OF THE WORK

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

2. You shall obtain, the following permits:
 - a) Metropolitan Transit System (MTS)

SECTION 3 – CONTROL OF THE WORK

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

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

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

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

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

5. In preparation of the Contract Documents, the designer has relied upon the following reports of explorations and tests at the Work Site:
6. Report of Geotechnical Investigation dated September 12, 2016 by Allied Technical Engineers, Inc. The reports listed above are available for review at the following link:

<https://filecloud.sandiego.gov/url/hezbr85uf2bmcyri>

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

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

3-12.8.8 Payment. To the "WHITEBOOK", ADD the following:

9. Submit supporting invoices and a Schedule of Values for the Lump Sum Bid item for "Dewatering Hazardous Contaminated Water" in accordance with 7-2.1, "Schedule of Values (SOV)". The SOV shall itemize the Work to show the following:
 - a) All costs associated with handling contaminated groundwater specified in 3-12.8.6, "Dewatering System", and 3-12.8.7, "Hazardous Waste Operations and Emergency Response (HAZWOPER) Certificate".
 - b) All costs associated with equipment used for dewatering hazardous contaminated groundwater, including costs for mobilization and demobilization.
 - c) All rental and operating costs for equipment used for dewatering contaminated groundwater.

3-13.3 Warranty. To the "WHITEBOOK", item 1, DELETE in its entirety and SUBSTITUTE with the following:

1. You shall warranty and repair all defective materials and workmanship for a period of 1 year. This call back warranty period shall start on the date the Work was accepted by the City unless the City had beneficial use of the project (excluding water, sewer, and storm drain projects). In addition, you shall warranty the Work against all latent defects for a period of 10 years and patent defects for a period of 4 years.

SECTION 4 - CONTROL OF MATERIALS

4-1.3.4 Specialty Inspection Paid for by the Contractor. To the "WHITEBOOK", ADD the following:

2. The specialty inspections required are listed as follows:
 - a) Welding Inspections.

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

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

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

11. You shall submit your list of proposed substitutions for an "equal" item **no less than 15 Working Days prior to Bid due date** and on the City's Product Submittal Form available at:

<http://www.sandiego.gov/publicworks/edocref/index.shtml>

SECTION 5 - LEGAL RELATIONS AND RESPONSIBILITIES

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

5-4 INSURANCE.

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

5-4.1 Policies and Procedures.

1. You shall procure the insurance described below, at its sole cost and expense, to provide coverage against claims for loss including injuries to persons or damage to property, which may arise out of or in connection with the performance of the Work by you, your agents, representatives, officers, employees or Subcontractors.
2. Insurance coverage for property damage resulting from your operations is on a replacement cost valuation. The market value will not be accepted.
3. You shall maintain this insurance for the duration of this Contract and at all times thereafter when you are correcting, removing, or replacing Work in accordance with this Contract. Your liabilities under the Contract, e.g., your indemnity obligations, is not deemed limited to the insurance coverage required by this Contract.

4. The payment for insurance shall be included in the Contract Price as bid by you. Except as specifically agreed to by the City in writing, you are not entitled to any additional payment. Do not begin any Work under this Contract until you have provided and the City has approved all required insurance.
5. Policies of insurance shall provide that the City is entitled to 30 Days (10 Days for cancellation due to non-payment of premium) prior written notice of cancellation or non-renewal of the policy. Maintenance of specified insurance coverage is a material element of the Contract. Your failure to maintain or renew coverage or to provide evidence of renewal during the term of the Contract may be treated by the City as a material breach of the Contract.

5-4.2 Types of Insurance.

5-4.2.1 Commercial General Liability Insurance.

1. Commercial General Liability Insurance shall be written on the current version of the ISO Occurrence form CG 00 01 07 98 or an equivalent form providing coverage at least as broad.
2. The policy shall cover liability arising from premises and operations, XCU (explosions, underground, and collapse), independent contractors, products/completed operations, personal injury and advertising injury, bodily injury, property damage, and liability assumed under an insured's contract (including the tort liability of another assumed in a business contract).
3. There shall be no endorsement or modification limiting the scope of coverage for either "insured vs. insured" claims or contractual liability. You shall maintain the same or equivalent insurance for at least 10 years following completion of the Work.
4. All costs of defense shall be outside the policy limits. Policy coverage shall be in liability limits of not less than the following:

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

5-4.2.2 Commercial Automobile Liability Insurance.

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

5-4.2.6 Railroad Protective Liability Insurance. Exclusions relating to performance of operations within the vicinity of any railroad, bridge, trestle, roadbed, tunnel, underpass, or cross shall be deleted from all policies to which they may apply. Alternatively, you may provide separate Railroad Protective Liability insurance providing coverage, including endorsements, equivalent to that required for the CGL described herein.

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

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

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

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

5-4.5 Policy Endorsements.

5-4.5.1 Commercial General Liability Insurance.

5-4.5.1.1 Additional Insured.

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

- c) your Work, e.g., your completed operations performed by you or on your behalf, or
 - d) premises owned, leased, controlled, or used by you.
4. The additional insured coverage for projects for which the Engineer's Estimate is less than \$1,000,000 shall include liability arising out of:
- a) Ongoing operations performed by you or on your behalf,
 - b) your products, or
 - c) premises owned, leased, controlled, or used by you.

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

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

5-4.5.2 Commercial Automobile Liability Insurance.

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

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

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

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

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

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

1. For Contracts with required engineering services (e.g., Design-Build, preparation of engineered Traffic Control Plans (TCP), and etc) by you, you shall keep or require all of your employees or Subcontractors, who provide professional engineering services under this contract, Professional Liability coverage with a limit of **\$1,000,000** per claim and **\$2,000,000** annual aggregate in full force and effect.
2. You shall ensure the following:
 - a) The policy retroactive date is on or before the date of commencement of the Project.
 - b) The policy will be maintained in force for a period of 3 years after completion of the Project or termination of this Contract, whichever occurs last. You agree that for the time period specified above, there will be no changes or endorsements to the policy that affect the specified coverage.
3. If professional engineering services are to be provided solely by the Subcontractor, you shall:
 - a) Certify this to the City in writing and
 - b) Agree in writing to require the Subcontractor to procure Professional Liability coverage in accordance with the requirements set forth above.

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

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

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

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

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

5-10.1.3 Weekly Updates Recipients.

1. Submit a weekly correspondence with updates, traffic control issues and locations, lane closures, and any other pertinent information (with additional contact names given during award process) to the following recipients:
Brian Vitelle, Senior Engineer, BVitelle@san Diego.gov
Mike Bajoua, ProjectManager, MBajoua@san Diego.gov
Resident Engineer, TBA, XXX@san Diego.gov

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

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

5-13 ELECTRONIC COMMUNICATION. To the "WHITEBOOK", ADD the following:

2. Virtual Project Manager shall be used on this Contract. For more information, refer to the VPM training videos at the location below:
<https://www.sandiego.gov/publicworks/edocref>

SECTION 6 – PROSECUTION AND PROGRESS OF THE WORK

6-1.1 Construction Schedule. To the "WHITEBOOK", item 1, subsection "s", DELETE in its entirety and SUBSTITUTE with the following:

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

- i. Refer to the Sample City Invoice materials in **Appendix D – Sample City Invoice with Cash Flow Forecast** and use the format shown.
- ii. See also the “Cash Flow Forecast Example” at the location below:
<https://www.sandiego.gov/publicworks/edocref>

6-1.5.2 Excusable Non-Compensable Delays. To the “WHITEBOOK”, DELETE in its entirety.

ADD:

6-1.5.2 Excusable Non-Compensable and Concurrent Delays.

1. The City shall only issue an extension of time for Excusable Delays that meet the requirements of 6-4.2, “Extensions of Time” for the following circumstances:
 - a) Delays resulting from Force Majeure.
 - b) Delays caused by weather.
 - c) Delays caused by changes to County, State, or Federal law.
2. When a non-excusable delay is concurrent with an Excusable Delay, you shall not be entitled to an extension of Contract Time for the period the non-excusable delay is concurrent with the Excusable Delay.
3. When an Excusable Non-Compensable Delay is concurrent with an Excusable Compensable Delay, you shall be entitled to an extension of Contract Time, but shall not be entitled to compensation for the period the Excusable Non-Compensable Delay is concurrent with the Excusable Compensable Delay.

6-2.1 Moratoriums. To the “WHITEBOOK”, ADD the following:

3. Do not Work in the areas where there is currently a moratorium issued by the City. The areas subject to moratorium are listed below:
 No shutdowns are allowed to the existing Water Summertime Transmission Main Shutdown Moratorium from June 1 to September 20.

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

1. The Contract Time shall not be modified except by Change Order.
2. You shall notify the City in writing within **1 Working Day** after the occurrence and discovery of an event that impacts the Project Schedule.
 - a) If you believe this event requires a Change Order, you shall submit a **written Change Order request with a report to** the City that explains the request for Change Order within **5 Working Days**. The Change Order request must include supporting data, a general description of the discovery, the basis for extension, and the estimated length of extension. The City may grant an extension of time, in writing,

for the Change Order request if you require more time to gather and analyze data.

3. The Engineer shall not grant an extension of Contract Time in accordance with 6-1.5, "Excusable Delays" unless you demonstrate, through an analysis of the critical path, the following:
 - a) The event causing the delay impacted the activities along the Project's critical path.
 - b) The increases in the time to perform all or part of the Project beyond the Contract Time arose from unforeseeable causes beyond your control and without your fault or negligence and that all project float has been used.
4. Any modifications to the Contract Time will be incorporated into the weekly document that the Engineer issues that stipulates the Contract Time. If you do not agree with this document, submit to the Engineer for review a written protest supporting your objections to the document within **30 Calendar Days** after receipt of the statement. Your failure to file a timely protest shall constitute your acceptance of the Engineer's weekly document.
 - a) Your protest will be considered a claim for time extension and shall be subject to 2-10.1, "Claims"

ADD:

6-6.1.1 Environmental Document.

1. The City of San Diego has prepared a **Notice of Exemption** for **Otay 2nd Pipeline Phase I, Project No. B-14092.02.06**, as referenced in the Contract Appendix. You shall comply with all requirements of the **Notice of Exemption** as set forth in **Appendix A**.
2. Compliance with the City's environmental document shall be included in the Contract Price.

6-6.4 Written Notice and Report. To the "WHITEBOOK", DELETE in its entirety and SUBSTITUTE with the following:

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

SECTION 7 – MEASUREMENT AND PAYMENT

7-3.1 General. To the “WHITEBOOK” ADD the following:

3. The Lump Sum Bid item for “**Construction of Conduit, Appurtenances, Innerduct & Fiber Pull Boxes**” shall include all the work including labor, material, and equipments as specified in the Plans, Contract Documents, and Technicals Section: 26 05 34.
4. The Lump Sum Bid item for “**Construction of Cathodic Protection**” shall include all the work including labor, material, and equipments as specified in the Plans, Contract Documents, and Technicals Section: 26 42 00.
5. The Lump Sum Bid item for “**Construction of Instrumentation and Controls for the Pressure Reducing Station, Complete in place**” shall include all the work including labor, material, and equipments as specified in the Plans, Contract Documents, and Technicals Section: 40 50 00.
6. The Lump Sum Bid item for “**Construction of Pressure Reducing Station**” shall include all the work including labor, material, and equipments as specified in the Plans, Contract Documents, SSP Section: 7-3.1.

7-3.2 Partial and Final Payment. To the “GREENBOOK”, paragraph (3), DELETE in its entirety and SUBSTITUTE with the following:

Upon commencement of the Work, an escrow account shall be established in a financial institution chosen by you and approved by the City. Documentation for an escrow payment shall have an escrow agreement signed by you, the City, and the escrow agent. From each progress payment, no less than 5% will be deducted and deposited by the City into the escrow account. Upon completion of the Contract, the City will notify the Escrow agent in writing to release the funds to you. Only the designated representative of the City shall sign the request for the release of Escrow funds.

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

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

SECTION 209 – PRESSURE PIPE

209-1.1.1 General. To the “WHITEBOOK”, ADD the following:

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.

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

SECTION 212 – WATER AND SEWER SYSTEM VALVES AND APPURTENANCES

212-10.6.3 Polymer Concrete Water Meter Boxes. To the “WHITEBOOK”, DELETE in its entirety and SUBSTITUTE with the following:

1. Boxes and covers shall be in accordance with the Water Approved Materials List or approved equal.
2. Boxes and covers to be installed in all areas shall have a reinforced polymer concrete frame and cover designed for AASHTO H-20 traffic loading.
3. Covers shall have a logo reading “SD CITY WATER” as well as the manufacturer’s name or logo cast in the polymer concrete surface. A cover selected at random shall be tested.
4. Covers shall be solid per SDW-136, sheet 1 only. Reader lids shall not be installed.

SECTION 306 – OPEN TRENCH CONDUIT CONSTRUCTION

306-3.3.4 Payment. To the “WHITEBOOK”, ADD the following:

12. Payment shall include all work specified per contract document for Removal of Existing 536/390 Pressure Reducing Station.

306-7.8.2.1 General. To the “WHITEBOOK”, item 2, DELETE in its entirety and SUBSTITUTE with the following:

2. Pressure testing of pipe and fittings at the lowest elevation shall be performed at 150% of the specified test pressure and no less than 100% of the specified test pressure at the highest elevation.
 - a) Specified test pressure for Class 235 pipe shall be 150 psi and is tested at 225 psi.

SECTION 307 - JACKING AND TUNNELING

307-1.7 Payment. To the “WHITEBOOK”, Delete Section 307-1.7 and replace with:

1. The payment for Jacking operations shall include casing, carrier pipes, Jacking pit, and receiving pit and shall be included in the Bid item for “ Water Main by Jacking operation with Steel Casing”.

SECTION 400 – PROTECTION AND RESTORATION

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

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

402-6 **COOPERATION.** To the “GREENBOOK”, ADD the following:

- 1. Notify SDG&E at least **21 Working Days** prior to excavating within 10 feet of SDG&E Underground High Voltage Transmission Power Lines (69 KV and higher).

SECTION 700 – MATERIALS

700-5.1 **Vehicle Detectors.** To the “WHITEBOOK”, item 1, DELETE in its entirety and SUBSTITUTE with the following:

- 10. Loop wire shall be Type 2. Loop detector lead-in cable shall be Type “B”. Slots shall be filled with elastomeric sealant, epoxy sealant, or hot-melt rubberized asphalt sealant, except asphaltic emulsion loop sealant and cold tar loop sealant are acceptable if the pavement surface will receive an asphaltic concrete overlay.

SECTION 1001 – CONSTRUCTION BEST MANAGEMENT PRACTICES (BMPs)

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

- 7. Based on a preliminary assessment by the City, this Contract is subject to WPCP.

END OF SUPPLEMENTARY SPECIAL PROVISIONS (SSP)

SUPPLEMENTARY SPECIAL PROVISIONS
APPENDICES

APPENDIX A
NOTICE OF EXEMPTION

NOTICE OF EXEMPTION

(Check one or both)

TO: X RECORDER/COUNTY CLERK
P.O. BOX 1750, MS A-33
1600 PACIFIC HWY, ROOM 260
SAN DIEGO, CA 92101-2422
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET, ROOM 121
SACRAMENTO, CA 95814

FROM: CITY OF SAN DIEGO
DEVELOPMENT SERVICES DEPARTMENT
1222 FIRST AVENUE, MS 501
SAN DIEGO, CA 92101

PROJECT NO.: WBS # B-14092.02.06

PROJECT TITLE: Design Services Contract for the Otay 2nd Pipeline-Phase 1 Project

PROJECT LOCATION-SPECIFIC: The project will include design services for 7.500 linear feet of new water pipeline which runs from the 65th and Imperial valve at the 65th and Herrick Pump Station to the intersection of Skyline Dr. and Woodman Street in the Southeastern- Encanto Community Planning Area in Council District 4.

PROJECT LOCATION-CITY/COUNTY: San Diego City/San Diego County

DESCRIPTION OF NATURE AND PURPOSE OF THE PROJECT: This action consists of awarding of an civil engineering design services contract to provide for the design, environmental studies and geotechnical analysis for the Otay 2nd Pipeline-Phase 1 Project. The design contract for this activity will include utility evaluations and potholing, on-site observations, and geotechnical investigation borings. The geotechnical borings will entail four soil borings (3 in. diameter x 15 ft. deep) and two soil borings (3 in. diameter x 30 ft. deep). The design services will also involve an evaluation of existing utilities including 21 utility service potholes ranging from 5-11 feet deep.

NAME OF PUBLIC AGENCY APPROVING PROJECT: City of San Diego

NAME OF PERSON OR AGENCY CARRYING OUT PROJECT: City of San Diego, Public Works Dept/ Silvia Rendon
525 B Street, Suite 750 (MS 908A)
San Diego, CA 92101
619- 533-4246

EXEMPT STATUS: (CHECK ONE)

- () MINISTERIAL (SEC. 21080(b)(1); 15268);
() DECLARED EMERGENCY (SEC. 21080(b)(3); 15269(a));
() EMERGENCY PROJECT (SEC. 21080(b)(4); 15269 (b)(c))
(X) STATUTORY EXEMPTION: 15262 (FEASIBILITY AND PLANNING STUDIES)

REASONS WHY PROJECT IS EXEMPT: The City of San Diego conducted an environmental review which determined that this project meets the statutory exemption criteria set forth in CEQA State Guidelines, Section 15262 which allows for a project involving only feasibility or planning studies for possible future actions which the City has not approved, adopted, or funded, does not require the preparation of an EIR or Negative Declaration, but does require consideration of environmental factors. This project will not have a legally binding effect on future activities.

LEAD AGENCY CONTACT PERSON: ANNA L. MCPHERSON AICP

TELEPHONE: 619-446-5276

IF FILED BY APPLICANT:

- 1. ATTACH CERTIFIED DOCUMENT OF EXEMPTION FINDING.
2. HAS A NOTICE OF EXEMPTION BEEN FILED BY THE PUBLIC AGENCY APPROVING THE PROJECT?
() YES (X) NO

IT IS HEREBY CERTIFIED THAT THE CITY OF SAN DIEGO HAS DETERMINED THE ABOVE ACTIVITY TO BE EXEMPT FROM CEQA

Anna L. McPherson
SIGNATURE/TITLE

/SENIOR PLANNER

November 19, 2014
DATE

CHECK ONE: (X) SIGNED BY LEAD AGENCY CLERK OR OPR:

DATE RECEIVED FOR FILING WITH COUNTY



THE CITY OF SAN DIEGO

Date of Notice: November 19, 2014

NOTICE OF RIGHT TO APPEAL ENVIRONMENTAL DETERMINATION

DEVELOPMENT SERVICES DEPARTMENT

SAP or WBS No. B-14092.02.06

PROJECT NAME/NUMBER: Design Services Contract for the Otay 2nd Pipeline- Phase 1

COMMUNITY PLAN AREA: Southeastern- Encanto

COUNCIL DISTRICT: 4

LOCATION: The project will include design services for 7,500 linear feet of new water pipeline which runs from the 65th and Imperial valve at the 65th and Herrick Pump Station to the intersection of Skyline Dr. and Woodman Street

PROJECT DESCRIPTION: This action consists of awarding of an civil engineering design services contract to provide for the design, environmental studies and geotechnical analysis for the Otay 2nd Pipeline-Phase 1 Project. The design contract for this activity will include utility evaluations and potholing, on-site observations, and geotechnical investigation borings. The geotechnical borings will entail four soil borings (3 in. diameter x 15 ft. deep) and two soil borings (3 in. diameter x 30 ft. deep). The design services will also involve an evaluation of existing utilities including 21 utility service potholes ranging from 5-11 feet deep.

ENTITY CONSIDERING PROJECT APPROVAL: City of San Diego

ENVIRONMENTAL DETERMINATION: This project is statutorily exempt from CEQA pursuant to State CEQA Guidelines Section 15262 (Feasibility and Planning Studies).

ENTITY MAKING ENVIRONMENTAL DETERMINATION: City of San Diego Development Services Department

STATEMENT SUPPORTING REASON FOR ENVIRONMENTAL DETERMINATION:

The City of San Diego conducted an environmental review which determined that this project meets the statutory exemption criteria set forth in CEQA State Guidelines, Section 15262 which allows for a project involving only feasibility or planning studies for possible future actions which the City has not approved, adopted, or funded, does not require the preparation of an EIR or Negative Declaration, but does require consideration of environmental factors. This project will not have a legally binding effect on future activities.

DEVELOPMENT PROJECT MANAGER: Silvia Rendon
MAILING ADDRESS: 525 B Street, Suite 750 (MS 908A)
San Diego, CA 92101
PHONE NUMBER: (619) 533-4246

On November 19, 2014, the City of San Diego made the above-referenced environmental determination pursuant to the California Environmental Quality Act (CEQA). This determination is appealable to the City Council. If you have any questions about this determination, contact the City Development Project Manager listed above.

Applications to appeal CEQA determination made by staff (including the City Manager) to the City Council must be filed in the office of the City Clerk within 10 business days from the date of the posting of this Notice (December 5, 2014). The appeal application can be obtained from the City Clerk, 202 'C' Street, Second Floor, San Diego, CA 92101.

This information will be made available in alternative formats upon request.

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.)

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 2 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

- 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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 3 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 4 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 5 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 6 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 7 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 8 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 9 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

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. These 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.

CITY OF SAN DIEGO CALIFORNIA DEPARTMENT INSTRUCTIONS	NUMBER DI 55.27	DEPARTMENT Water Department
SUBJECT FIRE HYDRANT METER PROGRAM (FORMERLY: CONSTRUCTION METER PROGRAM)	PAGE 10 OF 10	EFFECTIVE DATE October 15, 2002
	SUPERSEDES DI 55.27	DATED April 21, 2000

- 8.5 If damage occurs to Water Department property (i.e. fire hydrant meter, backflow, various appurtenances), the cost of repairs or replacements will be charged to the customer of record (applicant).

Water Department Director

- Tabs: 1. Fire Hydrant Meter Application
2. Construction & Maintenance Related Activities With No Return To Sewer
3. Notice of Discontinuation of Service

APPENDIX

Administering Division: Customer Support Division

Subject Index: Construction Meters
Fire Hydrant
Fire Hydrant Meter Program
Meters, Floating or Vehicle Mounted
Mobile Meter
Program, Fire Hydrant Meter

Distribution: DI Manual Holders



Application for Fire Hydrant Meter (EXHIBIT A)

(For Office Use Only)

NS REQ	FAC#
DATE	BY

METER SHOP (619) 527-7449

Meter Information

Application Date	Requested Install Date:
------------------	-------------------------

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: <small>(PERSON IN ACCOUNTS PAYABLE)</small>			Phone: ()
Site Contact Name and Title:			Phone: ()
Responsible Party Name:			Title:
Cal ID#			Phone: ()
Signature:		Date:	
<small>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</small>			

Fire Hydrant Meter Removal Request	Requested Removal Date:
Provide Current Meter Location if Different from Above:	
Signature:	Title: Date:
Phone: ()	Pager: ()

<input type="checkbox"/> City Meter	<input type="checkbox"/> Private Meter
Contract Acct #:	Deposit Amount: \$ 936.00 Fees Amount: \$ 62.00
Meter Serial #	Meter Size: 05 Meter Make and Style: 6-7
Backflow #	Backflow Size: Backflow Make and Style:
Name:	Signature: Date:

WATER USES WITHOUT ANTICIPATED CHARGES FOR RETURN TO SEWER

Auto Detailing
Backfilling
Combination Cleaners (Vactors)
Compaction
Concrete Cutters
Construction Trailers
Cross Connection Testing
Dust Control
Flushing Water Mains
Hydro Blasting
Hydro Seeing
Irrigation (for establishing irrigation only; not continuing irrigation)
Mixing Concrete
Mobile Car Washing
Special Events
Street Sweeping
Water Tanks
Water Trucks
Window Washing

Note:

1. If there is any return to sewer or storm drain, then sewer and/or storm drain fees will be charges.

Date

Name of Responsible Party
Company Name and Address
Account Number: _____

Subject: Discontinuation of Fire Hydrant Meter Service

Dear Water Department Customer:

The authorization for use of Fire Hydrant Meter # _____, located at (*Meter Location Address*) ends in 60 days and will be removed on or after (*Date Authorization Expires*). Extension requests for an additional 90 days must be submitted in writing for consideration 30 days prior to the discontinuation date. If you require an extension, please contact the Water Department, or mail your request for an extension to:

City of San Diego
Water Department
Attention: Meter Services
2797 Caminito Chollas
San Diego, CA 92105-5097

Should you have any questions regarding this matter, please call the Fire Hydrant Hotline at (619) _____ - _____.

Sincerely,

Water Department

APPENDIX C

MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE

MATERIALS TYPICALLY ACCEPTED BY CERTIFICATE OF COMPLIANCE

1. Soil amendment
2. Fiber mulch
3. PVC or PE pipe up to 16 inch diameter
4. Stabilizing emulsion
5. Lime
6. Preformed elastomeric joint seal
7. Plain and fabric reinforced elastomeric bearing pads
8. Steel reinforced elastomeric bearing pads
9. Waterstops (Special Condition)
10. Epoxy coated bar reinforcement
11. Plain and reinforcing steel
12. Structural steel
13. Structural timber and lumber
14. Treated timber and lumber
15. Lumber and timber
16. Aluminum pipe and aluminum pipe arch
17. Corrugated steel pipe and corrugated steel pipe arch
18. Structural metal plate pipe arches and pipe arches
19. Perforated steel pipe
20. Aluminum underdrain pipe
21. Aluminum or steel entrance tapers, pipe downdrains, reducers, coupling bands and slip joints
22. Metal target plates
23. Paint (traffic striping)
24. Conductors
25. Painting of electrical equipment
26. Electrical components
27. Engineering fabric
28. Portland Cement
29. PCC admixtures
30. Minor concrete, asphalt
31. Asphalt (oil)
32. Liquid asphalt emulsion
33. Epoxy

APPENDIX D

SAMPLE CITY INVOICE WITH CASH FLOW FORECAST

WBS #:	B18108
Date Submitted:	10/10/2018
NTP Date:	3/23/2018
Final Statement of WD Date:	5/23/2020
Contract #:	K-XX-XXXX-XXX-X
Contract Amount:	\$5,617,000

Construction Cash Flow Forecast
 "Sewer and Water Group Job 965 (W)"

Year	January	February	March	April	May	June	July	August	September	October	November	December
2018				15,000	25,000	52,000	52,000	100,000	10,000	100,000	100,000	100,000
2019	10,000	10,000	85,000	58,000	100,000	100,000	100,000	100,000	100,000	100,000	1,000,000	1,000,000
2020	100,000	100,000	100,000	1,000,000	1,000,000							
2021												
2022												
2023												
2024												
2025												

SAMPLE REFERENCE

APPENDIX E
LOCATION MAP

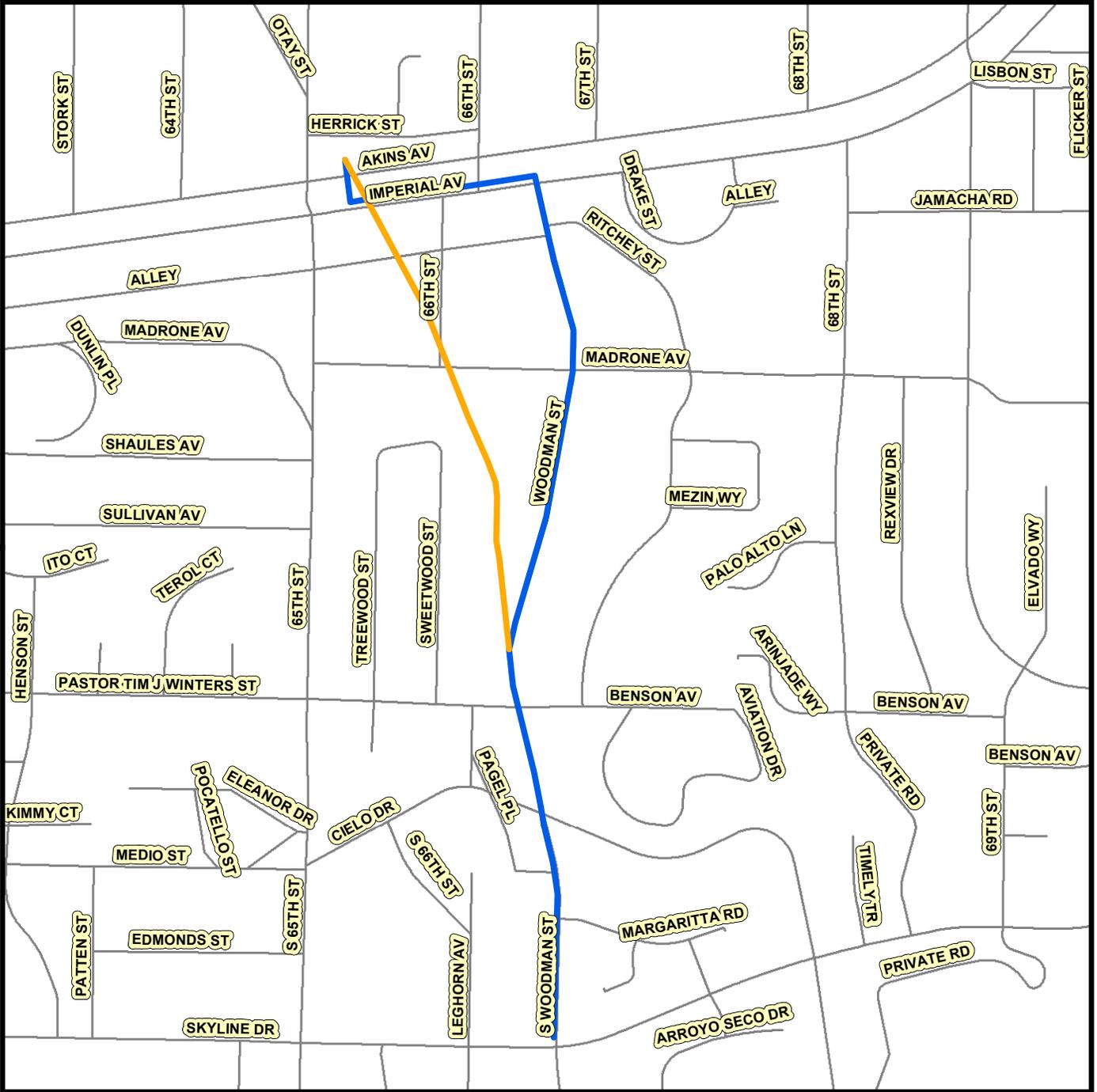
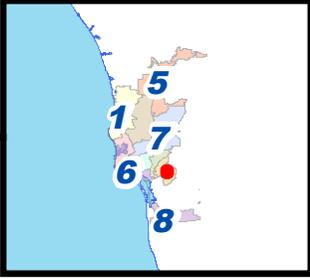
Otay 2nd Pipeline Phase I

SENIOR ENGINEER
PARITA AMMERLAHN

PROJECT MANAGER
SHAZA NEZHA

PROJECT ENGINEER
NOORA FATHULLAH

FOR QUESTIONS ABOUT THIS PROJECT
Call: 619-533-4207
Email: engineering@sandiego.gov



- Existing 36" pipe to be abandoned
- New 48" pipeline



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APPENDIX F

CONTRACTOR'S DAILY QUALITY CONTROL INSPECTION REPORT

Appendix F

City of San Diego
Asphalt Concrete Overlay

Contractor's Daily Quality Control Inspection Report

Project Title: _____ Date: _____

Locations: 1. _____
2. _____
3. _____

Asphalt Mix Specification: Attached Supplier: _____

Dig out Locations: 1. _____
2. _____
3. _____

Tack Coat Application Rate @ Locations:
1. _____
2. _____
3. _____

Asphalt Temperature at Placement @ Locations:
1. _____
2. _____
3. _____

Asphalt Depth @Locations:
1. _____
2. _____
3. _____

Compaction Test Result @Locations:
1. _____
2. _____
3. _____

Location and nature of defects:

1. _____
2. _____
3. _____

Remedial and Corrective Actions taken or proposed for Engineer's approval:

1. _____
2. _____
3. _____

Date's City Laboratory representative was present:

1. _____
2. _____
3. _____

Verified the following:

1. Proper Storage of Materials & Equipment
2. Proper Operation of Equipment
3. Adherence to Plans and Specs
4. Review of QC Tests
5. Safety Inspection

Initials:

- _____

Deviations from QCP _____ (see attached)

Quality Control Plan Administrator's Signature:

Date Signed:

APPENDIX G

MONTHLY DRINKING WATER DISCHARGE MONITORING FORM

DRINKING WATER DISCHARGE MONITORING FORM

(Use for All Discharges to the Storm Drain)

All discharge activities related to this project comply with the State Water Resources Control Board ORDER WQ 2014-0194-DWQ, STATEWIDE GENERAL NPDES PERMIT FOR DRINKING WATER SYSTEMS DISCHARGES as referenced by (http://www.waterboards.ca.gov/water_issues/programs/npdes/docs/drinkingwater/final_statewide_wqo2014_0194_dwq.pdf), and as follows:

Project Name:				WBS No.:			Watershed No.					
Qualified Person Conducting Tests:				signature								
BMPs MUST BE IN PLACE PRIOR TO ANY SCHEDULED DISCHARGE							By signing, I certify that all of the statements and conditions for drinking water discharge events are correct.					
Event #1												
Discharge Location ¹	Category ² (Select one)	Notification ³ (Select all that apply)	BMPs in Place ⁴ (Select all that apply)	Volume ⁵ (gal)	Sampling ⁶ (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence ⁷			Notes Report exceedence to RE & complete page 2 of 2
					Measure	Unit	Time	Result	Limit	No	Yes	
Inlet Location Start End	<input type="checkbox"/> Superchlorinated <small>(Chlorine added for disinfection)</small>	<input type="checkbox"/> TSW <small>(All Categories)</small>	<input type="checkbox"/> Sweep flow path <small>(gutter, street, etc.)</small>	Total	Chlorine	mg/L			0.1 mg/L= Exceedence			
	<input type="checkbox"/> Large Volume <small>(≥ 325,850 gal)</small>	<input type="checkbox"/> PUD <small>(All Categories)</small>	<input type="checkbox"/> Dechlorination <small>(diffusers, chemicals, etc.)</small>									
	<input type="checkbox"/> Well Dev/Rehab <small>(Not Typical)</small>	<input type="checkbox"/> Water Board <small>(Large Volume Only)</small>	<input type="checkbox"/> Inlet Protection									
	<input type="checkbox"/> Small Volume/Other <small>(No Sampling Required)</small>	<input type="checkbox"/> County <small>(≥100,000 gal & within ¼ mile of ocean/bay; or if enters the County's MS4)</small>	<input type="checkbox"/> Sediment Controls									
Event #2												
Discharge Location ¹	Category ² (Select one)	Notification ³ (Select all that apply)	BMPs in Place ⁴ (Select all that apply)	Volume ⁵ (gal)	Sampling ⁶ (take samples at 10 mins, 50-60 mins & last 10 mins)				Exceedence ⁷			Notes Report exceedence to RE & complete page 2 of 2
					Measure	Unit	Time	Result	Limit	No	Yes	
Inlet Location Start End	<input type="checkbox"/> Superchlorinated <small>(Chlorine added for disinfection)</small>	<input type="checkbox"/> TSW <small>(All Categories)</small>	<input type="checkbox"/> Sweep flow path <small>(gutter, street, etc.)</small>	Total	Chlorine	mg/L			0.1 mg/L= Exceedence			
	<input type="checkbox"/> Large Volume <small>(≥ 325,850 gal)</small>	<input type="checkbox"/> PUD <small>(All Categories)</small>	<input type="checkbox"/> Dechlorination <small>(diffusers, chemicals, etc.)</small>									
	<input type="checkbox"/> Well Dev/Rehab <small>(Not Typical)</small>	<input type="checkbox"/> Water Board <small>(Large Volume Only)</small>	<input type="checkbox"/> Inlet Protection									
	<input type="checkbox"/> Small Volume/Other <small>(No Sampling Required)</small>	<input type="checkbox"/> County <small>(≥100,000 gal & within ¼ mile of ocean/bay; or if enters the County's MS4)</small>	<input type="checkbox"/> Sediment Controls									

Instructional Notes found on the Page 2 of 2

Submit completed Form to RE

Receiving Water Monitoring

(Complete only if limits exceed on Page 1 of 2)

Event #1	
1) Go to the location where the discharge enters the receiving water.	
<input type="checkbox"/> Accessible <input type="checkbox"/> Unable to Determine <input type="checkbox"/> No Safe Access	
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.	
3) Visual Monitoring: Is the discharge into the receiving water...	
...causing erosion	<input type="checkbox"/> Yes <input type="checkbox"/> No
...carrying floating or suspended matter	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing discoloration	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing and impact to the aquatic life present	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with visible film	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with an sheen or coating	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing potential nuisance conditions	<input type="checkbox"/> Yes <input type="checkbox"/> No
3) If all answers are NO, stop here.	
4) If any answers are YES, Notify the RE immediately for further action	

Event #2	
1) Go to the location where the discharge enters the receiving water.	
<input type="checkbox"/> Accessible <input type="checkbox"/> Unable to Determine <input type="checkbox"/> No Safe Access	
2) If accessible, take photos and complete the visual monitoring below. If unable to determine, stop here. If no safe access, stop here.	
3) Visual Monitoring: Is the discharge into the receiving water...	
...causing erosion	<input type="checkbox"/> Yes <input type="checkbox"/> No
...carrying floating or suspended matter	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing discoloration	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing and impact to the aquatic life present	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with visible film	<input type="checkbox"/> Yes <input type="checkbox"/> No
...observed with an sheen or coating	<input type="checkbox"/> Yes <input type="checkbox"/> No
...causing potential nuisance conditions	<input type="checkbox"/> Yes <input type="checkbox"/> No
3) If all answers are NO, stop here.	
4) If any answers are YES, Notify the RE immediately for further action	

Instructional Notes to Contractor

- 1) Log the location of the inlet or discharge point. For example: Albatross St & 5th Av. Log the start date and time and the end date and time of the discharge.
- 2) Log the discharge category. "Superchlorinated" are discharges where additional chlorine is added in order to adequately disinfect and sanitize drinking water system facilities. This does NOT include potable water containing residual chlorine from the water treatment process. "Large Volume" discharges are greater than 325,850 gallons of total volume for one event. "Well Dev/Rehab" are discharges of potable ground water from a well. This is not typical. If none of these categories apply, then select "Small Volume/Other."
- 3) Notifications of the location, date, time, category, and estimated volume of discharge must be made to the contacts and per the requirements below:

Contact	Email	When to Notify
TSW	SWPPP@SanDiego.gov	3 days prior to all discharges
PUD	CompReports@SanDiego.gov RDavenport@sandiego.gov	3 days prior to all discharges
San Diego Water Board	SanDiego@WaterBoards.ca.gov cc:Ben.Neill@WaterBoards.ca.gov	3 days prior to a Large Volume discharge
County of San Diego	DEH: joseph.palmer@sdcounty.ca.gov dominique.edwards@sdcounty.ca.gov	3 days prior if ≥100,000 gal within ¼ mile of the ocean/bay
	WPP: Nicholas.DelValle@sdcounty.ca.gov	3 days prior if enters County's MS4 or unincorporated County

- 4) At a minimum, sweep gutters prior to starting discharge and use dechlorination BMPs. The contractor and RE must monitor and determine if BMPs need to be removed/modified. For example if inlet protection is causing flooding at a storm drain inlet, contractor may elect to remove BMPs. Document any modification to BMPs in notes section.
- 5) Total volume must be logged for all discharges. If discharge water is reused for other purposes such as watering a golf course, log that volume under "Reused"
- 6) Sampling is required for categories per the following table:

Category	Measure	Sample Frequency
Superchlorinated	Chlorine, Turbidity, pH	first 10 mins, 50-60 mins, last 10 mins
Large Volume	Chlorine, Turbidity	first 10 mins, 50-60 mins, last 10 mins
Well Dev/Rehab	Chlorine, Turbidity	first 10 mins, 50-60 mins, last 10 mins
Small Volume/Other	None	None

- 7) Effluent limitations must be monitored not to exceed per the following table:

Measure	Method	Limit
Volume	Estimate None	
Chlorine	Field Measurement	0.10 mg/L-Cl
Turbidity	Visual Estimate	20 NTU for inland water 225 NTU for ocean 100 NTU for well water
pH	Field Measurement	6.5 to 8.5

APPENDIX H
TECHNICAL SPECIFICATIONS

**CITY OF SAN DIEGO PUBLIC WORKS DEPARTMENT
OTAY 2nd PIPELINE-PHASE 1**

TECHNICAL SPECIFICATIONS

SECTION TITLE

CSI FORMAT TECHNICAL SPECIFICATIONS

DIVISION 26 - ELECTRICAL

- 26 05 00 General Electrical Requirements
- 26 05 19 Wires and Cables less than 600 Volts
- 26 05 26 Grounding and Bonding
- 26 05 34 Conduits, Boxes, and Fittings
- 26 27 10 Service Pedestal
- 26 27 26 Wiring Devices
- 26 42 00 Cathodic Protection

DIVISION 33 - UTILITIES

- 33 05 07.23 Open Shield Pipejacking
- 33 05 24 Carbon Steel Pipe and Fittings
- 33 05 44 Settlement Monitoring

DIVISION 40 – PROCESS INTERCONNECTION

- 40 50 00 Process Control and Instrumentation System (PCIS) General Requirements
- 40 50 20 Instrument Equipment

Attachment F - Technicals

SECTION 26 05 00 GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of the electrical system.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. One-Year Guarantee: Greenbook - General Provisions.
- B. Permits and Licenses: Greenbook - General Provisions.
- C. Submittals: Greenbook - General Provisions.
- D. Construction Facilities and Temporary Controls: Greenbook - General Provisions.
- E. Operation and Maintenance Manuals: Greenbook - General Provisions.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the Greenbook - General Provisions.
- B. In submitted catalog cuts, cross out items shown that are not pertinent to this project. Where catalog cuts list manufacturer's standard options, cross out those options not intended to be provided and clearly highlight those options that are to be provided.
- C. Submittals for the following sections shall include a copy of the pertinent contract specification section or a tabulation of each paragraph thereof with each paragraph marked either "COMPLY" or "SEE COMMENT" with explanation/justification of the comments:
 - 1. Section 262710 Service Pedestal

1.04 REGULATORY AGENCIES AND STANDARDS

- A. Electrical work shall comply with the NEC as amended by the CEC.

1.05 QUALITY CONTROL

Materials, appliances, equipment, and devices shall conform to the applicable UL standards. The label of, or listing by, UL is required for all electrical equipment.

1.06 UTILITY COMPANY REQUIREMENTS AND FEES

- A. The Owner will make application for electric and telephone service. The Contractor shall pay and the Owner will reimburse Contractor for utility company fees, cable charges, and added facilities charges.
- B. The Contractor shall make any service and installation agreements that the utility companies may require.
- C. Install electric service entrance equipment in accordance with the serving utility's requirements. Coordinate with the serving utility to ensure a timely connection by the utility. Obtain utility company approval of service entrance and metering equipment shop drawings prior to starting fabrication.

1.07 POWER FOR CONSTRUCTION

Provide for or purchase power for construction in accordance with Greenbook - General Provisions.

1.08 BID AND PAYMENT

- A. If a separate Bid item has not been provided for an item of the Work related to electrical equipment as described or shown in the Contract Documents, the payment shall be included in the Contract Price.
- B. Refer to Greenbook Section 7 – Measurement and Payment for additional information.

1.09 OPERATION AND MAINTENANCE MANUALS

Submit operation and maintenance manuals in accordance with Greenbook - General Provisions.

1.10 LOCATIONS

- A. General: Use equipment, materials, and wiring methods suitable for the types of locations in which they are located as defined below.
- B. Definitions of Types of Locations:
 - 1. Dry Locations: Indoor areas which do not fall within the definitions below for wet, damp, hazardous, or corrosive locations and which are not otherwise designated in the drawings.
 - 2. Wet Locations: Locations exposed to the weather, whether under a roof or not, unless otherwise designated in the drawings.
 - 3. Damp Locations: Spaces wholly or partially underground or having a wall or ceiling forming part of a channel or tank, unless otherwise designated in the drawings.

PART 2 - MATERIALS

2.01 GENERAL

- A. Similar materials and equipment shall be the product of a single manufacturer.
- B. Provide only products which are new, undamaged, and in the original cartons or containers.
- C. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current design.
- D. Materials and equipment shall be suitable for storage, installation, and operation at an ambient temperature of 0°C to 40°C except where more stringent conditions are stated in individual equipment specifications.
- E. Electrical equipment and panels shall be factory finished with manufacturer's standard primer and enamel topcoats, unless stated otherwise in the individual equipment specifications. Provide 1 pint of the equipment manufacturer's touchup paint per 500 square feet of painted surface for repair of damaged enamel topcoats.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. The drawings indicate connections for typical equipment only. If the equipment furnished is different from what is shown, provide the modifications necessary for a safe and properly operating installation in accordance with the equipment manufacturer's recommendations.
- B. The drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Field determine exact location based on physical size and arrangement of equipment, finished elevations, and obstructions.
- C. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the electrical systems shall be accomplished without additional cost to the Owner.
- D. Accomplish work required to pierce any waterproofing after the part piercing the waterproofing has been set in place. Seal and make watertight the openings made for this purpose.
- E. Seal weathertight equipment or components exposed to the weather.
- F. Protect equipment outlets and conduit openings with factory-made plugs or caps whenever work is not in progress at that point.

3.02 NAMEPLATES

- A. Mark service pedestal and components within to identify each item with its respective service or function.
- B. Provide nameplates with engraved lettering not less than 1/4 inch high. Use black-on-white laminated plastic, attached with rivets or sheet metal screws. Do not use embossed plastic adhesive tape.

3.03 WARNING SIGNS

- A. Install markings, identifications, warning, caution, or instruction signs where required by NEC, NFPA 70E, and NFPA 79 paragraph 4.5.1, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect.
- B. The design of safety signs and labels shall conform to ANSI Z535.4. Pedestal shall be marked to warn qualified persons of potential electric arc hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment, in conformance with NEC 2005 Article 110.16.

END OF SECTION

SECTION 26 05 19 WIRES AND CABLES LESS THAN 600 VOLTS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials and installation of wires and cables rated 600 volts and below.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. General Electrical Requirements: 260500.
- B. Grounding and Bonding: 260526.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the Greenbook - General Provisions and Section 260500.
- B. Submit material list for each conductor type. Indicate insulation material, conductor material, voltage rating, manufacturer, and other data pertinent to the specific cable, such as shielding, number of pairs, and applicable standards.

PART 2 - MATERIALS

2.01 LOW-VOLTAGE BUILDING WIRE

- A. Conductor material shall be copper.
- B. Low-voltage building wire for use at 600 volts or less shall be 600-volt insulated, Type XHHW or THWN, and rated for continuous operation at 75°C.
- C. Use No. 12 AWG minimum conductor size for power and lighting circuits.
- D. Use No. 14 AWG minimum conductor size for control circuits.
- E. Conductors for lighting and receptacle circuits that are No. 10 AWG and smaller shall be solid. All other conductors shall be stranded.

2.02 TWISTED-SHIELDED CABLE

- A. Single-pair cables shall be two No. 18 AWG stranded tinned-copper conductors individually insulated with fully color-coded PVC rated at 600 volts; insulated conductors twisted together and shielded with a spiral-wound metal foil tape overlapped for 100% shielding. Outer jacket shall be PVC.

2.03 GROUNDING CONDUCTORS--BARE COPPER

Refer to Section 260526 for bare copper grounding conductors.

2.04 CONDUCTOR TAGS

Provide adhesive-type markers. Brady, Thomas & Betts, or equal.

2.05 PLASTIC ADHESIVES

Plastic adhesives for color coding shall be 7-mil minimum thick, flame-retardant, weather-resistant tape, resisting abrasion, UL rays, moisture, alkalies, solvents, and acids. Adhesives shall meet the requirements of UL 510 and CSA C22.2.

PART 3 - EXECUTION

3.01 LOW-VOLTAGE BUILDING WIRE INSTALLATION

- A. Install wiring and cable in conduit and terminate unless otherwise noted.
- B. To reduce pulling tension in long runs, coat cables with pulling compound recommended by the cable manufacturer before being pulled into conduits.
- C. Remove debris and moisture from the conduits, boxes, and cabinets prior to cable installation.
- D. Group conductors No. 1/0 and smaller in panelboards, cabinets, pull boxes, motor control centers, and switchboard wireways; tie with plastic ties; and fan out to terminals. Lace conductors No. 2/0 and larger with marline.

3.02 IDENTIFICATION

- A. Color Coding of Low-Voltage Building Wire: Provide color coding throughout the entire network of feeders and circuits as follows:

Phase	240/120 Volts
Phase A	Black
Phase B	Red
Phase C	---
Neutral	White
Ground	Green

- B. Phase conductors No. 10 AWG and smaller and neutral/ground conductors No. 6 and smaller shall have factory color coding with solid color insulation. Do not use onsite coloring of ends of conductors or apply colored plastic adhesives in lieu of factory color

coding. Larger conductors may have onsite application of colored plastic adhesives at ends of conductors and at each splice.

- C. Control wires shall have colored insulation. Separate color codes for each wire shall be provided in each conduit that has up to seven wires. Conduits with more than seven wires shall have at least seven types of colored insulation.
- D. Tagging of Conductors: Tag control wires and instrument cables in panels, pull boxes, wireways, and at control device. Tag control wires and instrument cables with same wire numbers as on the shop drawing submittals. Tag power wires in pull boxes and wireways where there is more than one circuit. Tag power conductors with panelboard number and circuit numbers.

3.03 LOW-VOLTAGE WIRE SPLICES

- A. Solid Conductors: Use 3M "Scotchlok," Ideal "Super Nut," Buchanan B-Cap, or equal.
- B. Stranded Conductors No. 8 and Larger: Use T & B "Locktite" connectors, Burndy Versitaps and heavy-duty connectors, O.Z. solderless connectors, or equal.
- C. Stranded Conductors No. 10 and Smaller: Use crimp connectors with tools by same manufacturer and/or UL listed for connectors of all stranded conductors.
- D. Retighten bolt-type connectors 24 to 48 hours after initial installation and before taping. Tape connections made with noninsulated-type connectors with rubber-type tape, one and one-half times the thickness of the conductor insulation, then cover with Scotch 33 tape.

3.04 LOW-VOLTAGE WIRE TERMINATIONS

- A. Terminate wires and cables at each end.
- B. Provide ring tongue, nylon- or vinyl-insulated copper crimp terminals for termination on screw-type terminals, except for light switches and receptacles. Utilize installation tools recommended by the crimp manufacturer.
- C. Terminal lugs shall be electro-tin plated copper compression type or spring compression type with a corrosion protection coating. Provide color-coded system on terminal and die sets to provide the correct number and location of crimps. Permanent die index number shall be embossed on completed crimp for inspection purposes.
- D. Tighten screws to the value recommended by the manufacturer.

3.05 FIELD TESTING

- A. Perform insulation resistance test on all circuits and feeders with No. 10 size conductors and larger. Utilize a 1,000-volt d-c megohmmeter for 600-volt insulated conductors.

- B. Test each complete circuit prior to energizing. Insulation resistance between conductors and between each conductor and ground shall not be less than 25 megohms. Repair or replace wires or cables in circuits that do not pass this test and repeat the test.
- C. Evaluate ohmic values by comparison with conductors of same length and type.
- D. Inspect shielded cables for proper shield grounding, proper terminations, and proper circuit identifications.
- E. Inspect control cables for proper termination and proper circuit identification.

END OF SECTION

SECTION 260526 GROUNDING AND BONDING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of electrical grounding.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. General Electrical Requirements: 260500.
- B. Wires and Cables Less Than 600 Volts: 260519.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the 2018 Greenbook - General Provisions and Specification 260500.
- B. Submit material list for all grounding materials and equipment. Indicate size, material, and manufacturer.
- C. Submit test results. Indicate overall resistance to ground and resistance of each electrode.

1.04 PERFORMANCE REQUIREMENTS

- A. Grounding System Resistance: 25 ohms.

PART 2 - MATERIALS

2.01 GROUND RODS

- A. Ground rods shall be copper-clad steel, 3/4 inch in diameter, minimum 10 feet long, with hardened steel points.

2.02 CONNECTIONS

- A. Ground Clamps: Clamps for connection of ground wire to ground rod shall be bronze.
- B. Exothermic Connections: Provide Cadweld or equal.

2.03 CONDUCTORS

- A. Equipment Ground: Conductors shall be low-voltage building-wire type as specified in Section 260519.
- B. Bare Copper Conductors: Annealed bare copper, conforming to ASTM B3 and B8.

PART 3 - EXECUTION

3.01 EQUIPMENT GROUNDING

- A. Ground raceways and noncurrent-carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding.
- B. Additionally, all circuits shall carry one ground conductor for equipment grounding. Ground conductor shall be in excess of grounding through the metallic conduit system.

3.02 GROUND ELECTRODE

- A. Provide a handhole and ground rod as detailed in the drawings. Connect ground wire from ground rod to service pedestal ground bus as detailed in the drawings.
- B. Pea Gravel base shall be placed as shown in the ground well details per the contract drawings.

3.03 TESTS

Before making connections to the ground electrode, measure the resistance of the electrode to ground using a ground resistance tester specifically designed for ground resistance testing. Perform testing in accordance with test instrument manufacturer's recommendations using fall-of-potential method. Perform the test not less than two days after the most recent rainfall and in the afternoon after any ground condensation (dew) has evaporated. If a resistance less than the performance requirements is not obtained, provide a ground rod driven 6 inches below grade spaced 10 feet away from the ground well and connect to ground well with No. 4 AWG bare copper wire and repeat the test. If the performance requirements are still not obtained, inform the Owner for resolution.

END OF SECTION

SECTION 26 05 34 CONDUITS, BOXES, AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes material, installation, and testing for conduit, boxes, fittings, terminal boxes, and cabinets.

1.02 RELATED WORK SPECIFIED

- A. General Electrical Requirements: 260500.
- B. Grounding and Bonding: 260526.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the 2018 Greenbook - General Provisions and Specification 260500.
- B. Submit product data for the following:
 - 1. Conduit and fittings for each type specified.
 - 2. Boxes and cabinets.

1.04 QUALITY CONTROL

- A. NEMA Compliance: Comply with NEMA standards pertaining to conduits and components.
- B. UL Compliance and Labeling: Comply with requirements of UL standards pertaining to electrical conduits and components. Provide conduits and components listed and labeled by UL.

PART 2 - MATERIALS

2.01 RIGID STEEL CONDUIT AND FITTINGS

- A. Rigid Steel Conduit and Fittings: Conform to ASME C80.1, NEMA RN2, and UL 6, hot-dipped galvanized after threading. The zinc coating shall be flexible and not crack during bending.
- B. Fittings:
 - 1. Locknuts: Steel or malleable iron.

2. Bushings: Threaded type, steel or malleable iron, with 105°C rated plastic insulated throat. Plastic bushings with a temperature rating of 105°C may be used for conduits 1 inch and smaller.
3. Box Connectors for Damp and Wet Locations: Provide a watertight threaded hub on enclosure consisting of sealing fitting with tapered conduit thread, neoprene O-ring, and 105°C rated insulating throat with grounding and bonding lug.
4. Couplings: Threaded, hot-dipped galvanized after fabrication.

C. Long-Radius Elbows (90 Degrees):

Conduit Size (inches)	Minimum Radius (inches)
3/4 through 1 1/4	12
2 and 2 1/2	15
3 and 3 1/2	18
4	30
5	36
6	42

2.02 PVC-COATED RIGID STEEL CONDUIT AND FITTINGS

A. Conduit:

1. All conduits, prior to coating, shall conform to ASME C80.1 and UL 6. Conduits shall be hot-dipped galvanized inside and out with hot galvanized threads.
2. The zinc surface shall be treated prior to coating to enhance the bond between metal and plastic.
3. Both interior and exterior of the conduit shall be coated with an epoxy acrylic primer of approximately 0.5-mil thickness.
4. The exterior coating shall be applied by dipping in liquid plastisol or other equal method that will produce a finished product conforming to NEMA 5-19-1986.
5. The thickness of the PVC coating shall be a minimum of 40 mils the full length of the conduit except the threads.
6. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic.
7. Apply a chemically cured urethane coating of a thickness of 2 mils to the interior of conduit.

8. The conduit shall be bendable without damage to the PVC or urethane coatings.
9. Threads shall have an added protection of a 2-mil clear urethane coating.
10. The PVC-coated rigid galvanized steel conduit shall be certified and authorized to apply the ETL verification mark "ETL Verified to PVC-001." ETL certified to Intertek ETL SEMKO High Temperature H2O PVC Coating Adhesion Test Procedure.
11. Test results shall be available to confirm coating adhesion under the following conditions:
 - a. Conduit immersed in boiling water with a minimum mean time to adhesion failure of 24 hours (ASTM D870).
 - b. Conduit and conduit bodies' exposure to 150°F and 95% relative humidity with a minimum mean time failure of seven days (ASTM D1151).

B. Fittings:

1. Coat fittings similar to the conduits.
2. Provide a loose coupling with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling, and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 2 inches whichever is smaller. The wall thickness of the sleeve shall be the same as the plastic coating on the pipe.
3. The PVC coating on the coupling shall be ribbed to enhance installation.
4. Hubs shall have PVC sleeves equal to those on the couplings.
5. Screws on Form 8 fittings shall be of stainless steel with encapsulated plastic heads.
6. Size U bolts and RA clamps to fit conduit, and encapsulate the nuts in plastic.
7. Fittings shall otherwise be same as specified for rigid steel.
8. Elbows or bends exceeding 45 degrees shall be PVC coated and shall be of the same dimensions as specified for rigid steel long-radius elbows.
9. Conduit bodies, where applicable, shall be Form 8 with a tongue-in-groove (V-seal) gasket to effectively seal out corrosive elements.

C. Conduits and fittings shall conform to NEMA RN-1 and shall be manufactured by Robroy, Perma-coat, KorKap, or equal.

2.03 RIGID NONMETALLIC CONDUIT (PVC) AND FITTINGS

- A. Conduit: PVC Schedule 40, 90°C rise rating, conforming to NEMA TC-2 Type EC-40 and UL 651.
- B. Couplings, Adapters, End Bells, Expansion Couplings, Elbows, and Turns of 30 Degrees: Factory-made in accordance with NEMA TC-2 and TC-3.
- C. Joint Cement: As recommended by manufacturer as suitable for the climate, furnished with instructions to achieve watertight joints.
- D. Manufacturers: Carlon, Condux, or equal.

2.04 RIGID ALUMINUM CONDUIT AND FITTINGS

- A. Conduit:
 - 1. Extruded from 6063 alloy in Temper Designation T-1 with maximum 0.1% copper content and conforming to ASME C80.5 and UL 6.
 - 2. PVC Externally Coated Rigid Aluminum Conduit and Fittings: ASME C80.5.
- B. Fittings:
 - 1. Locknuts: Copper-free (less than 0.5% copper) aluminum.
 - 2. Bushings: Threaded type, of copper-free (less than 0.5% copper) aluminum, with 105°C rated plastic insulated throat. Plastic bushings with a temperature rating of 105°C may be used for conduits 1 inch and smaller.
 - 3. Box Connectors for Damp and Wet Locations: Provide a watertight cast aluminum threaded hub on enclosure consisting of sealing fitting with tapered conduit thread, neoprene O-ring, and 105°C rated insulating throat with grounding and bonding lug.
 - 4. Couplings: Threaded, made of conduit material.
 - 5. Conduit Bodies: Use copper-free (0.4% maximum) cast aluminum conduit bodies equipped with threaded covers or gasketed covers secured with at least two captive screws.
- C. Long-Radius Elbows (90 Degrees): Same as for rigid steel conduit.

2.05 LIQUID-TIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: Steel, UL 360 listed, PVC jacketed.
- B. Fittings:

1. Conform to ASME C33.84, UL listed for use with the conduit.
2. In sizes 1 1/4 inches and less, UL listed for grounding.
3. Made of steel or malleable iron, zinc plated, 105°C insulated throat, grounding and bonding lug.

2.06 CONDUIT BODIES

- A. Provide types, shapes, and sizes to suit individual applications. Provide matching gasketed covers, secured with at least two captive corrosion-resistant screws.
- B. Bodies connecting to rigid conduit shall be of the same material and material coating as the conduit, with metal threaded hubs. Provide with threaded covers or gasketed covers secured with at least two corrosion-resistant captive screws.
- C. Bodies connecting to nonmetallic conduit shall be nonmetallic conduit bodies conforming to UL 514B.

2.07 OUTLET BOXES

- A. Exposed Boxes:
 1. Cast iron or aluminum, with threaded hubs.
 2. Conduit bodies may be used instead of boxes except where boxes contain devices.
 3. Outlet boxes connecting to PVC-coated rigid conduit shall be of the same material and material coating as the conduit, with metal threaded hubs. Provide with gasketed covers secured with at least two corrosion-resistant capture screws.

2.08 JUNCTION AND PULL BOXES

- A. Provide factory-made standard sizes, and shop fabricate when nonstandard size boxes are shown or are required. Comply with UL and NEMA standards.
- B. NEMA Type 4X: Type 316 stainless steel or fiberglass, with gasketed covers and Type 316 stainless steel bolts or screws.
- C. Junction boxes shall be manufactured by Hoffman, Wiegmann, or equal.

2.09 CONDUIT SEALANT

- A. Moisture Barrier Types: Sealant shall be a nontoxic, nonshrink, nonhardening, putty-type hand-applied material providing an effective barrier under submerged conditions.

PART 3 - EXECUTION

3.01 CONDUIT USAGE SCHEDULE

Install the following types of conduits and fittings in locations listed, unless otherwise noted in the drawings. Definitions and requirements of NEC apply unless specifically modified below. Refer to Section 260500 for definitions of locations.

- A. Exterior, Exposed:
 - 1. Material: Rigid steel or aluminum conduit.
 - 2. Minimum Size: 3/4 inch.
- B. Interior of the Vault, Exposed, Dry, Wet, and Damp Locations:
 - 1. Material: Rigid steel or aluminum conduit.
 - 2. Minimum Size: 3/4 inch.
- C. In Earth, Below Concrete Slabs or Underground:
 - 1. Material: Rigid nonmetallic conduit (PVC).
 - 2. Minimum Size: 1 inch.
 - 3. Conduit Stub-Ups: Provide PVC-coated rigid steel conduit long-radius elbows for stub-ups which connect to underground rigid PVC conduit. Extensions from elbows above grade shall be PVC-coated rigid steel for a minimum of 6 inches above grade. Stub-ups into free-standing electrical gear, such as service pedestal may be rigid nonmetallic conduit.
- D. Final Connections to Motors, Transformers, Vibrating Equipment, or Instruments:
 - 1. Material: Liquid-tight flexible conduit.
 - 2. Minimum Size: 3/4 inch.

Length of liquid-tight flexible conduit shall be 5 feet or less, unless field conditions require longer lengths.

3.02 JUNCTION AND PULL BOXES--USAGE SCHEDULE

Install the following type of boxes in locations listed, unless otherwise noted in the drawings. Refer to Section 260500 for definitions of locations:

- A. Exterior: NEMA 4X.
- B. Interior, Dry: NEMA 1 or 12.

- C. Interior, Damp: NEMA 4X.

3.03 CONDUIT FILL

For runs that are not sized in drawings, compute the maximum conduit fill using NEC requirements for Type THW conductors (larger if applicable), although the actual wiring may be with types of conductors having smaller cross-sections.

3.04 CONDUIT INSTALLATION, GENERAL

- A. Conduits, fittings, and junction boxes for lighting, receptacles, and outlets are not shown for clarity. Provide as required by NEC.
- B. Run exposed conduits parallel and perpendicular to surface or exposed structural members and follow surface contours as much as practicable to provide a neat appearance.
- C. Make right-angle bends in conduit runs with long-radius elbows or conduits bent to radii not less than those specified for long-radius elbows.
- D. Make bends and offsets so that the inside diameter of conduit is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.
- E. Cap all conduits immediately after installation to prevent entrance of foreign matter.
- F. Do not use diagonal runs except when specifically noted in the drawings.
- G. Route exposed conduit to preserve headroom, access space, and work space.
- H. Treat threaded joints of rigid steel conduit with T&B "Kopr-Shield" before installing fittings where conduit is in slabs and other damp or corrosive areas.
- I. For PVC-coated rigid conduits, use manufacturer's recommended installation tools and recommendations. The manufacturer shall certify the installer before installation can proceed.
- J. Conduit Terminations:
 - 1. Terminate conduits with locknuts and bushings except where threaded hubs are specified.
 - 2. Install conduits squarely to the box and provide one locknut outside the box and one locknut and bushing inside the box.
 - 3. Install locknuts with dished side against the box.
 - 4. When terminating in threaded hubs, screw the conduit or fitting tight into the hub so that the end bears against the fire protection shoulder.

5. When chase nipples are used, install conduits and coupling square to the box and tighten the chase nipple leaving no exposed threads.

K. Conduit runs are shown schematically. Supports, pull boxes, junction boxes, and other ancillary equipment are not usually shown in drawings. If not shown, provide as required by NEC except that there shall not be more than the equivalent of three quarter bends (270 degrees) total between underground pull points. Provide additional boxes to permit pulling of wires without damage to the conductors or insulation.

L. Locations of conduit stub-ups shown in the drawings are schematic. Coordinate these locations with conduit entries of actual equipment served.

3.05 REQUIREMENTS FOR RIGID NONMETALLIC (PVC) CONDUIT

A. Comply with the installation provisions of NEMA TC-2, except as modified below.

B. Make cuts with a fine tooth handsaw. For sizes 2 inches and larger, use a miter box or similar saw guide to assure a square cut.

C. Use factory-made couplings for joining conduit.

D. Cementing and joining operation shall not exceed 20 seconds. Do not disturb joint for 5 minutes, longer (up to 10 minutes) at lower temperatures. Make joints watertight. Joining procedure shall conform to the procedures of ASTM D2855.

3.06 GROUNDING

A. Provide grounding in accordance with Section 260526.

B. Use grounding bushings for all conduits carrying a grounding conductor.

C. Provide a grounding conductor in flexible conduit, size conforming to NEC Article 250.

3.07 CONDUITS UNDERGROUND

A. Where PVC conduit is installed underground in locations other than under concrete slab, provide 24-inch minimum cover. Provide 3-inch minimum sand above and below conduits. Maintain a 12-inch minimum separation between conduit and other systems.

3.08 CONDUIT SUPPORTS

A. Support conduit at intervals and at locations as required by the NEC. Do not use perforated strap or plumber's tape for conduit supports.

3.09 CONDUIT PENETRATIONS

A. Unless otherwise indicated, dry-pack around conduits which penetrate concrete walls, floors, or ceilings.

- B. Where underground conduits penetrate a structure through vault wall, provide a malleable iron, watertight, entrance sealing device. When there is no raceway concrete encasement, provide the device with sealing assembly at each end with pressure bushings that may be tightened at any time.
- C. Buried conduit shall penetrate surface at right angle.

3.10 DAMAGED CONDUIT

- A. Repair or replace conduit damaged during or after installation.
- B. Replace crushed or clogged conduit or any conduit whose inner surface is damaged or not smooth.
- C. Repair cuts, nicks, or abrasions in the zinc coating of galvanized conduit with galvanizing repair stick, Enterprise Galvanizing "Galvabra" or equal.
- D. Repair cuts, nicks, or abrasions in the PVC coating of PVC-coated conduit with the manufacturer's recommended PVC material and build up surface thickness to match the factory coating thickness and color.

3.11 ADJUSTING AND CLEANING

Upon completion of installation of conduits and boxes, inspect interiors of conduits and boxes; clear blockages; and remove burrs, dirt, and construction debris.

3.12 JUNCTION AND PULL BOX IDENTIFICATION

- A. Identify exposed junction and pull boxes in vault by installing labels on their covers from outside. Identification shall include voltage and system type.

END OF SECTION

SECTION 26 27 10 SERVICE PEDESTAL

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials, testing, and installation of a service pedestal.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. General Electrical Requirements: 260500.
- B. Seismic Restraint for Electrical Equipment: 260548.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the Greenbook - General Provisions and Section 260500.
- B. Show ratings and characteristics including voltage ratings, busing arrangement, continuous current ratings, fault current withstand ratings, neutral bus rating, enclosure type, and mounting provisions.
- C. Submit outline and dimensional drawings and conduit entry restrictions.
- D. Obtain serving utility approval prior to fabrication.

PART 2 - MATERIALS

2.01 GENERAL

- A. Provide an enclosed meter-type service pedestal with a main disconnect and feeder breakers as indicated on the drawing. The unit shall be a nonresidential service pedestal 0 to 400 amperes, 0 to 600 volts. Bus bars shall be tin-plated copper and shall be braced to withstand the available short-circuit current. The unit shall be approved by the serving utility.
- B. Service pedestal shall meet EUSERC requirements and shall have a UL 508 industrial control panel label for service entrance equipment.

2.02 ENCLOSURE

- A. Enclosure shall be factory wired. Construct cabinet from 14-gauge Type 304 stainless steel with a 2D finish. Cabinet shall be NEMA 4X type enclosure. Construct interior of cabinet from 14-gauge cold-rolled steel electrically welded and reinforced. Nuts, bolts, screws, and rings shall be Type 304 stainless steel.

- B. Cabinet shall have continuous welded seams and shall be full-length deadfront with stainless steel hinge and ¼ turn latch and knurled knobs. Provide fully framed side-hinged outer door with swaged close tolerance sides for flush fit with top drip lip and closed-cell neoprene flange compressed gaskets.
- C. Service enclosure shall have pull section.
- D. Provide line and load connectors and meter socket with factory-installed test bypass facilities. Coordinate meter socket type with the serving utility.
- E. Provide phenolic nameplates. Provide a plastic-covered wiring diagram attached to the inside of the front door.
- F. Mark control wires at both ends by permanent wire markers.

2.03 SERVICE ENTRANCE EQUIPMENT

- A. Panelboards shall be suitable as service entrance equipment. Provide a factory-installed service-entrance type UL label.

2.04 MAIN DISCONNECT

- A. Provide a circuit breaker of trip rating as shown in the drawings and interrupting capacity not less than the available short-circuit current.

2.05 BREAKER

- A. Breakers shall be bolt-on molded-case type and interrupting capacity to meet available fault current. Provide quick-make and quick-break toggle mechanism, inverse-time trip characteristics, and trip-free operation on overload or short circuit. Automatic tripping shall be indicated by a handle position between the manual OFF and ON position. Provide trip ratings as indicated in drawings. Provide lock-on or lock-off devices.
- B. Single-pole breakers shall be full module size; two poles shall not be installed in a single module. Multiple circuit breakers shall be of the common-trip type having a single operating handle.

2.06 SURGE PROTECTIVE DEVICE (SPD)

- A. Provide SPD as shown on the single line diagram. SPD shall be listed in accordance with UL 1449. SPD shall be solid-state type and shall operate bi-directionally. Surge capacity shall be a minimum of 80,000 amperes per phase with a voltage suppression rating of 800 volts L-G for a 240-volt system.

2.07 AVAILABLE SHORT-CIRCUIT CURRENT

- A. Assume available short-circuit current to be not less than 14,000 amperes (symmetrical).

2.08 SEISMIC REQUIREMENTS

- A. The complete assembly including anchoring shall be capable of withstanding seismic forces per Section 260548.

2.09 DIRECTORIES

- A. Provide typed circuit directories on the inside face of the door of each panel. Do not provide handwritten directories.

PART 3 - EXECUTION

3.01 INSTALLATION

Secure pedestal rigidly to concrete with anchor bolts or Phillips Drill Company concrete anchors. Anchor bolts or concrete anchors shall be Type 316 stainless steel. Coordinate dimensions and location of anchor bolts with concrete pad.

END OF SECTION

SECTION 26 27 26 WIRING DEVICES

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes materials and installation of light switches, and receptacles.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. General Electrical Requirements: 260500.

1.03 SUBMITTALS

- A. Submit shop drawings in accordance with the Greenbook - General Provisions and Section 260500.
- B. Submit material list for each type of wiring device and cover plate. Indicate type, ratings, material, color, and manufacturer.

1.04 REFERENCES

- A. NEMA WD 1, General Purpose Wiring Devices.
- B. NEMA WD 6, Wiring Device Configurations.

PART 2 - MATERIALS

2.01 GENERAL

Provide wiring devices that are UL listed.

2.02 RECEPTACLES

- A. Duplex Receptacles: Provide NEMA WD 1, molded composition, gray, specification grade receptacles. Duplex receptacles for 120-volt, single-phase, 3-wire circuit to be rated 20amperes, 125 volts, NEMA Type 5-20R.
- B. Ground Fault Interrupter (GFI) Duplex Receptacles: Receptacles shall be rated 20 amperes and comply with UL 943, Class A. Provide Leviton 6398-HGI, 3M GFI-2701, or equal.

2.03 SWITCHES

- A. Switches shall be NEMA WD 1, molded composition, gray, specification grade, single pole, three way and four way as shown in the drawings.

WIRING DEVICES

- B. 120- or 277-Volt Lighting: Provide switches rated 20 amperes, 120/277-volt ac. Provide quiet operation, toggle-type switches.

2.04 COVER PLATES

- A. In wet areas, areas subject to hosing down, or where indicated, use individually gasketed weatherproof cover plates. Plates shall be gray polycarbonate lift-cover type. Outdoor GFI receptacles shall have flush locked cover in stainless steel finish. Provide Sierra WPH series or equal. Provide outdoor receptacles with covers that provide weatherproof protection while outlet is in use. Provide Tay Mac Industrial Outlet Covers or equal.

PART 3 - EXECUTION

3.01 GROUNDING

- A. Provide a bonding jumper between the grounded outlet box and the receptacle ground terminal.

3.02 TESTING

- A. Operate each switch and verify that the load is turned on and off.
- B. Test each receptacle with a circuit tester that checks voltage, polarity, and grounded conditions. Repair or replace defective receptacles and repeat the test.
- C. GFI receptacles shall be tested with the circuits energized. Devices shall be tested with a portable GFI receptacle tester capable of circulating 7.5 mA of current, when plugged in, between the "hot" line and "ground" to produce tripping of the receptacle. Resetting and tripping shall be checked at least twice at each GFI receptacle.

END OF SECTION

SECTION 26 42 00 – CATHODIC PROTECTION

PART 1 – GENERAL

1.1 WORK OF THIS SECTION

- A. The Contractor shall provide all labor, materials, tools, and incidentals to install a cathodic protection system for the new 16-inch and 24-inch dielectrically coated steel pipe associated with the Imperial Avenue Pressure Reducing Station (PRS). The cathodic protection system shall include all electrical connections, anodes, test stations, insulators, and all accessories required for a complete and operable system.
- B. The Contractor shall provide all labor, materials, tools, and incidentals to install a cathodic protection test stations on the new 48-inch CML&TCMC Steel Otay 2nd Phase I Pipeline. The existing impressed current cathodic protection (ICCP) rectifiers located at the 65th and Herrick Pump Station and the Cielo and Woodman Pump station will provide cathodic protection to the new pipeline. The Contractor is responsible for installing new negative leads between the new Otay 2nd Pipeline and the existing rectifier at the Cielo and Woodman Pump Station.
- B. The Contractor shall retain a qualified Corrosion Engineer to direct the construction of facilities specified herein. The Corrosion Engineer shall test and certify that the corrosion control facilities for this project are constructed properly and as specified, and are fully functional.

1.2 DEFINITIONS

- A. Contractor: The licensed prime installer selected by the Owner to install the pipeline.
- B. Owner: The City of San Diego.
- C. Corrosion Engineer: A qualified Corrosion Engineer retained by the Contractor who is either a Registered Professional Corrosion Engineer or NACE-International Certified Cathodic Protection Specialist or Corrosion Specialist.
- D. Engineer: The City of San Diego's Resident Engineer or designated representative.
- E. City's Corrosion Engineer: The Engineer's appointed representative from the City's Corrosion Section.

1.3 CONTRACTOR QUALIFICATIONS

- A. All work must be conducted by qualified, experienced personnel working under continuous, competent supervision. Cathodic protection installation and testing shall be done under the direct supervision of a Corrosion Engineer.

1.4 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. Commercial Standards:

SECTION 26 42 00 – CATHODIC PROTECTION

1. AWWA C217 - Wax Coating Systems for Underground Piping Systems
2. Green Book - Standard Specifications for Public Works Construction, latest edition
3. NACE SP0169 - Standard Practice, Control of External Corrosion on Underground or Submerged Metallic Piping Systems
4. NACE SP0286 - Electrical Isolation of Cathodically Protected Pipelines
5. NEC 70 – National Electrical Code
6. NEMA LE - Cotton Phenolic Resin – Electrical Grade
7. NEMA CE - Canvas Phenolic Resin - General Purpose Grade
8. NEMA G10 – Glass Reinforced Epoxy
9. Standard Specifications of Public Works Construction City Supplement (White Book) latest edition
10. Standard Drawings for Public Works Construction latest edition.

1.5 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish the following documents (Submittals) AS ONE SUBMITTAL PACKAGE:
 1. Catalog cuts and other information for products to be used including:
 - a. Wire, Leads, and Cable
 - b. Anode Shunts
 - c. Ready Mix Concrete
 - d. Plastic Warning Tape
 - e. Exothermic Weld Kits
 - f. Elastomeric Weld Caps
 - g. Exothermic Weld Coating
 - h. At-Grade Concrete Test Box
 - i. Phenolic Test Board and Lugs
 - j. Flange Isolation Kits
 - k. Wax Tape Coating System
 - l. Standard Potential Galvanic Anodes
- B. Qualifications: The Contractor shall submit documentation of the qualifications of the Corrosion Engineer.
- C. As-Built Drawings: The Contractor shall maintain as-built drawings showing the exact locations of test stations, insulators, and wire trenching runs. Location changes shall be clearly indicated in red on a copy of the design drawings.

SECTION 26 42 00 – CATHODIC PROTECTION

These drawings shall be submitted to the Engineer before the work is considered complete. Provide sub-foot GPS coordinates for all test stations.

- D. The Contractor shall provide a written report, prepared by the Corrosion Engineer, documenting the results of the testing, including all field data, and recommending corrective work, as required to comply with the Contract Documents. Any deficiencies of systems tested shall be repaired and re-tested by the Contractor at no additional cost to the Owner.
 - E. Certifications: The Contractor shall submit a notarized affidavit of compliance that all Work, materials and equipment required according to this Section were properly constructed and manufactured in full conformance with these Contract Documents. The Contractor shall submit the manufacturers' Certificates of Compliance.
 - F. Operations and Maintenance Information: The Contractor shall submit operation and maintenance related information, rectifier field test reports, parts list with part replacement numbers, and troubleshooting procedures.
 - G. Test and Inspection Reports: The Contractor shall submit field test and inspection reports, along with wiring diagrams of the installed system. Testing reports shall include at a minimum: native or baseline pipe-to-soil potentials; electrical isolation from casings, and insulating flange kits; electrical continuity for all metallic pipe sections containing non-welded joints or inline specials not intentionally electrically isolated; cathodic protection system activation; any deficiencies; and conclusions and recommendations. The final testing report issued for this project shall include all previous testing results, approved material submittals, and as-built drawings. The reports shall be submitted in an electronic PDF format. In addition all tabulated calculated data shall be submitted as a Microsoft Excel file format.
 - H. Qualifications: The Contractor shall submit documentation of the qualifications of the Corrosion Engineer.
- 1.6 PACKAGING AND SHIPPING
- A. The Contractor shall coil wires, secure and package anodes as required to prevent damage during shipment.
- 1.7 NOTIFICATION FOR TESTING AND INSPECTION
- A. The Contractor shall notify the Engineer at least seven days in advance of the installation of insulators, anodes, and test stations. The Engineer or the Owner's Representative shall witness all corrosion control installations at their discretion.
- 1.8 CORROSION ENGINEER QUALIFICATIONS SUBMITTAL
- A. Services of Corrosion Engineer: Obtain the services of a Corrosion Engineer to inspect, activate, adjust, and evaluate the effectiveness of the cathodic protection system. The Corrosion Engineer is herein defined as a registered Professional Engineer with certification or licensing that includes education and experience in

SECTION 26 42 00 – CATHODIC PROTECTION

cathodic protection of buried or submerged metal structures, or a person accredited or certified by NACE International at the level of Corrosion Specialist or Cathodic Protection Specialist (i.e. NACE International CP Level 4). The Corrosion Engineer shall directly oversee the Cathodic Protection Technician, review all specification related inspections and field measurements, and certify the accuracy and completeness of all cathodic protection submittals and reports.

- B. Services of Cathodic Protection Technician: Obtain the services of a Cathodic Protection Technician to inspect, activate, adjust, and evaluate the effectiveness of the cathodic protection system. The Cathodic Protection Technician is herein defined as a person accredited or certified by NACE International as a Cathodic Protection Level 2 Technician.

PART 2 – PRODUCTS

2.1 WIRES

- A. General: Conform to applicable requirements of NEMA WC 70. All wires shall be single conductor, unless otherwise specified. All wires shall be single conductor, stranded copper wire with 600-volt HMWPE insulation, unless otherwise specified.
- B. Joint Bonds: Two No. 2 AWG HMWPE.
- C. Negative Leads To Rectifier: Two No. 2 AWG HMWPE
- D. Test Station Pipeline Leads: Two No. 8 AWG HMWPE
- E. Casing Test Station Leads: Two No. 8 AWG HMWPE
- F. Galvanic Anode Leads: No. 12 AWG THWN (WHITE).

2.2 SHUNTS

- A. Galvanic Anode Test Stations: The shunt resistance shall be such that a 2-Amp current causes a voltage drop of 200-millivolts (i.e. 0.10-ohms). Shunts shall be flat manganin ribbon style as manufactured by Cott or approved equal.

2.3 CONCRETE

- A. Reinforcing steel: ASTM A615, Grade 60 deformed bars and welded wire fabric.
- B. Welded Wire Fabric: ASTM A497.
- C. Formwork: Plywood, earth cuts may be used.
- D. Concrete with minimum 3,000 psi compressive strength at 28 days.

SECTION 26 42 00 – CATHODIC PROTECTION

2.4 ANCILLARY MATERIALS

- A. Electrical Tape: Linerless rubber high-voltage splicing tape and vinyl electrical tape suitable for moist and wet environments. Use Scotch 130C and Scotch 88 as manufactured by 3M Products.
- B. Wire Connectors: One-piece, tin-plated crimp-on lug connector as manufactured by Burndy Co., Thomas and Betts.
- C. Insulating Resin: At Contractor's option, bitumastic coating (Koppers 50 or equal) may be used if allowed to dry completely before covering.

2.5 MARKING TAPE

- A. Inert polyethylene, impervious to known alkalis, acids, chemical reagents, and solvents likely to be encountered in soil.
- B. Thickness: Minimum 4-mils.
- C. Width: 6-inches.
- D. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
- E. Color: Red with black lettering as follows: "CAUTION CATHODIC PROTECTION CABLES BURIED BELOW."

2.6 EXOTHERMIC WELDS

- A. General: Wire sleeves, welders, and weld cartridges according to the weld manufacturer's recommendations for each wire size and pipe or fitting size and material. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers will not be accepted.
- B. Weld Caps: Exothermic welds shall be sealed with a pre-fabricated plastic cap filled with formable mastic compound on a base of elastomeric tape. Use Royston Handy Cap IP or approved equivalent.
- C. Weld Coating: All bare metal shall be coated. Exothermic welds and weld caps shall be coated with a cold-applied, fast-drying mastic consisting of bituminous resin and solvents per MIL-C-18480B. Use Royston R28, Royston R28 Zero VOC, Royston A51 Plus, Royston A51 Low VOC, Tapecoat TC Mastic or approved equal.

2.7 AT-GRADE TEST STATIONS

- A. At-Grade (Flush) Mounted:

SECTION 26 42 00 – CATHODIC PROTECTION

- B. Test Box: Concrete box of dimensions as shown on the Drawings. Use Brooks 3RT or Christy G5 with cast iron lid per South Bay Foundry Part Number B1160 or B6199 respectively. The cast iron lid shall be 11-1/16 inch diameter with the letters “City of San Diego Corrosion Test Station”.
- C. Each CP Test Box shall include a 5 inch x 5 inch cross-laminated phenolic terminal board with a minimum thickness of 1/4-inch. The phenolic material shall be NEMA type CE or LE or phenolic grade XX. The terminal board shall contain individual electrical lugs for each wire entering the test station or junction box.

2.8 PIPE FLANGE ISOLATION KIT

- A. For purposes of this specification, the terms “Pipe Flange Isolation Kit”, “Insulating Flange”, “Insulating Joint”, and “Dielectric Flange” are used synonymously.
- B. The Contractor shall over drill flange holes where insulating kits are to be used per AWWA C207 to accommodate insulating sleeves.
- C. The Pipe flange isolation kit materials shall be designated by the manufacturer as suitable for service at the operating temperatures and pressures specified on the Plans.
- D. Flange isolation kits shall consist of a one piece, full-face, insulating gasket, an insulating sleeve for each bolt, insulating washers, and steel washers. For nominal pipe diameters up to and including 36-inches, provide one insulating washer and one steel washer on each side of the flange for each flange bolt.
- E. Insulating Gasket: Insulating gasket retainers shall be full face, Type E, NEMA G-10 glass reinforced epoxy retainers with an Ethylene Propylene Diene Monomer (EPDM) rubber rectangular cross section O-ring seal. Minimum total gasket thickness shall not be less than 1/8-inch. The gasket shall have the same outside diameter as the pipe flange. For steel pipe the gasket’s inside diameter shall be equal to the inside diameter of the pipe’s steel cylinder. At valve to pipe connections where the inside diameters are not equal, the gasket’s inside diameter shall be equal to the smaller of the two inside diameters. Dielectric strength shall be not less than 550-volts per mil, and compressive strength shall be not less than 50,000-psi. The manufacturer’s name and date of manufacture shall be marked on both sides of the gasket with minimum two-inch tall block letters using a durable marking ink or paint. The gasket shall be installed within 12 months of its date of manufacture. Do not store insulated flange gaskets at jobsites under direct sunlight or at temperatures exceeding 110 degrees Fahrenheit. Use PSI Linebacker insulating gasket, or approved equal.
- F. Insulating Sleeves: Provide full length, one piece, NEMA G-10 glass reinforced epoxy insulating flange bolt sleeves. Dielectric strength shall be not less than 400-volts per mil. The length of the insulating sleeves shall provide an air gap between the end of the insulating sleeve and inside surface of the stud bolt nut with a tolerance of 1/32-inch minimum and 1/8-inch maximum. Insulating sleeve length must be adjusted for the actual thickness of the washers and insulating washer thickness.

SECTION 26 42 00 – CATHODIC PROTECTION

- G. Insulating Washers: Insulating washers shall be NEMA G-10 glass reinforced epoxy with a minimum thickness of 1/8-inch. Dielectric strength shall not be less than 550-volts per mil, and compressive strength shall not be less than 50,000-psi. The insulating washer's inside diameter shall be sized to fit over the insulating sleeve's outside diameter.
- H. Steel Washers: Provide hardened steel washers that conform to ASTM F436 for insulated flanges greater than 36 inches in nominal diameter. Double steel washers (4 steel washers per flange bolt) are required for insulated flanges greater than 36 inches in nominal diameter. The inside and outside diameter of the steel washers shall match those of the insulating washers. The steel washers must be able to freely rotate around the insulating sleeve. Attention must be paid to the fit between the steel washers and the insulating sleeve in order to avoid the washers twisting and cracking the sleeves when the flange bolts are torqued.
- I. Provide four extra insulating sleeves and eight extra insulating washers for each insulating flange upon successful inspection of the insulating flange by the Engineer.
- J. The Contractor shall caulk the inside of flange isolation kits with a non-sag, polyurethane elastomeric sealant. The sealant shall be flush with the inside of the pipe lining. Use Sika 2C-NS-EZ or approved equal.

2.9 WAX TAPE COATING FOR BURIED SURFACES AND BURIED ISOLATION FLANGES

- A. All buried pipe sections of pipe, specials, and fitting surfaces that are not tape wrapped or epoxy coated shall be wrapped with a petrolatum wax tape coating per AWWA C217 with plastic outer wrap. No bare metallic surfaces shall be buried, backfilled, or in contact with the soil.
- B. Apply a wax tape coating system which conforms to AWWA C217 and consists of three parts: surface primer, wax-tape, and outer covering.
- C. The primer shall be a blend of petrolatum, plasticizer, and corrosion inhibitors having a paste like consistency. It shall have a pour point of 100-degrees F to 110-degrees F and a flash point of 350-degrees. Use Trenton Wax-Tape Primer, or approved equal.
- D. The wax-tape shall consist of a synthetic-fiber felt, saturated with a blend of high melt microcrystalline wax, solvents, and corrosion inhibitors, forming a tape coating that is easily formable over irregular surfaces and which firms up after application. The tape shall have a saturant pour point between 125-degrees F and 130-degrees F and a dielectric strength equal to a minimum of 100-volts per mil. Tape thickness shall be 70-mils to 90-mils in 6-inch wide rolls. Use Trenton No. 1 wax-tape, or equal.
- E. The outer covering shall consist of two layers of a plastic wrapper. The plastic wrapper material shall consist of three 10-mil thick clear polyvinylidene chloride,

SECTION 26 42 00 – CATHODIC PROTECTION

high cling membranes wound together as a single sheet. Use Trenton Poly-Ply, or approved equal.

2.10 STANDARD POTENTIAL MAGNESIUM ANODES

A. CAPACITY. Standard potential magnesium anodes shall have a theoretical energy content of 1000 ampere-hours per pound and have a minimum useful output of 500 ampere-hours per pound.

B. CHEMICAL COMPOSITION (STANDARD POTENTIAL MAGNESIUM) ASTM B843

aluminum	5.30 to 6.70 percent
manganese	0.15 to 0.70 percent
zinc	2.50 to 3.50 percent
copper	0.02 percent max
nickel	0.002 percent max
iron	0.003 percent max
silicon	0.10 percent max
others, total	0.30 percent max
magnesium	remainder

C. OPEN CIRCUIT POTENTIAL. The open circuit potential of all anodes, buried in the soil, shall be between 1.45 and 1.55 volts dc versus a copper-copper sulfate reference electrode.

D. INGOT SIZE AND WEIGHT. Anodes shall be 17-pound pre-packaged, standard potential ingots with a trapezoidal cross section. Ingot length shall be 25.25 inches long. The total packaged weight shall be 45 lbs.

E. ANODE CONSTRUCTION. Anodes shall be cast magnesium with a galvanized steel core rod recessed on one end to provide access to the rod for connection of the lead wire. Silver braze the lead wire to the rod and make the connection mechanically secure. Insulate the connection to a 600 volt rating by filling the recess with epoxy and covering any exposed bare steel core or wire with heat shrinkable tubing. The insulating tubing shall extend over the lead wire insulation by not less than 1/2 inch. The anode lead wire shall be stranded copper and shall be connected directly to the anode steel core as described above. There shall be NO wire splices between the anode steel core and the tag end at the test station.

F. ANODE PRE-PACKAGED BACKFILL MATERIAL. The anodes shall be completely encased and centered within a permeable cloth bag in a special low resistivity backfill mix with the following composition:

Gypsum	75%
Powdered bentonite	20%
Anhydrous sodium sulfate	5%

G. Backfill grains shall be such that 100 percent is capable of passing through a

SECTION 26 42 00 – CATHODIC PROTECTION

screen of 100 mesh. Backfill shall be firmly packed around the anode such that the ingot is approximately in the center of the backfill. The resistivity of the backfill shall be no greater than 50 ohm-cm when tested wet in a soil box. Total prepackaged weight shall be approximately 45 pounds.

PART 3 – EXECUTION

3.1 GENERAL

- A. Work not specifically described herein shall conform to NACE SP0169, NACE SP0286, the Standard Specifications for Public Works Construction 2018 (Greenbook) and City Supplement White Book and Standard Drawings.

3.2 WIRE-TO-PIPE CONNECTIONS

- A. Exothermic Weld:
 - 1. Use exothermic weld method for electrical connection of copper wire to steel surfaces. Observe proper safety precautions, welding procedures, weld charge selection, and surface preparation recommended by the welder manufacturer. Assure that the pipe or fitting wall thickness is of sufficient thickness that the exothermic weld process will not damage the integrity of the pipe or fitting wall or protective lining. One exothermic weld shall be used for one wire only.
 - 2. Preparation of Metal: Remove all coating, dirt, grime, and grease from the metal surface by wire brushing and/or use of suitable safe solvents. Clean the surface to a bright, shiny surface free of all pits and flaws. The surface must be completely dry.
 - 3. Testing: After the weld connection has cooled, remove slag, visually inspect, and physically test wire connection by striking the weld with a 2-lb hammer while pulling firmly on the wire. All unsound welds shall be completely removed, the surface prepared again, and re-welded. All weld slag shall be removed from the weld before applying coating and weld cap.
- B. Protective Coating: The Contractor shall furnish all materials, clean surfaces and repair any damage to protective coatings and linings damaged as a result of the welding. A coating shall be applied to all exothermic weld locations. The coating for dielectrically coated steel shall be as described in Section 2.6 above. All surfaces must be clean and dry and free of oil, dirt, loose particles and all other foreign materials before application of the coating. The coating must cure per the manufacturer's recommendations prior to backfill. The mortar rockshield shall be repaired per the manufacturer's recommendations.

3.3 MAGNESIUM ANODES

- A. INSPECTION. All lead wires shall be inspected to ensure that the lead wire is securely connected to the anode core and that no damage has occurred to the

SECTION 26 42 00 – CATHODIC PROTECTION

lead wire. Lead wire failures shall require replacement of the complete anode and lead wire.

- B. PRE-PACKAGED ANODE INSPECTION. Each anode shall be inspected to ensure that the backfill material completely surrounds the anode and that the cloth bag containing the anode and backfill material is intact. If the prepackaged anodes are supplied in a waterproof container or covering, that container or covering shall be removed before installation. The CONTRACTOR shall notify the ENGINEER at least seven (7) days in advance of installing the anodes.
- C. LOCATION. Anodes are to be installed in augured holes as shown in the drawings. Anode positions can be adjusted slightly to avoid interference with existing structures. Alternate anode positions must be approved by the ENGINEER.
- D. HANDLING. Care shall be taken to ensure that the anode is never lifted, supported, transported, or handled by the lead wire. All anodes shall be lowered into the hole using a sling or a rope.
- E. ANODE HOLE SIZE AND DEPTH. Anodes shall be placed vertically at the bottom of a 12 feet deep augured hole, 12 inches in diameter (minimum).
- F. SOAKING REQUIREMENTS, PRE-PACKAGED ANODES. Once the prepackaged anodes are in the hole, water shall be poured into the hole so that the anodes are completely covered with water. Allow the anodes to soak for a minimum of 30 minutes before any soil backfill is added.
- G. SOIL BACKFILL. After the pre-packaged anodes are soaked, the hole is backfilled with stone-free, native soil. No voids shall exist around the anode bags and the anode lead wire shall not be damaged. The backfill shall be tamped and compacted in 18 inch lifts above the anode taking care not to damage the anode lead wire.

3.4 AT-GRADE TEST STATIONS

- A. LOCATION. At-grade corrosion monitoring test boxes shall be located behind the curb or sidewalk and NOT in traffic lanes or gutters. All test box locations shall be approved by the ENGINEER.
- B. TEST BOX BOTTOM. Test boxes shall be set in native soil.
- C. TEST LEAD ATTACHMENT. Test leads shall be attached to the pipe using the exothermic weld process. An 18-inch length of slack wire shall be coiled at each weld and inside each test box.
- D. CONCRETE PAD. A 24-inch square by 6-inch thick reinforced concrete pad is required around each at-grade test station. Test boxes and concrete pad shall be flush with the top of the median curb.

3.5 EXTERNAL COATING

SECTION 26 42 00 – CATHODIC PROTECTION

- A. All insulating couplings shall be covered with a 3-layer wax tape coating system per AWWA C217 with plastic outer wrap. Additionally, all in-line valves, flanges couplings, and adapters that are not coated with a bonded dielectric coating shall be wax tape coated per AWWA C217 with plastic outer wrap.
- B. Primer: Surfaces must be cleaned of all dirt, grime, and dust by using a wire brush and clean cloth. The surface shall be dry. Apply the primer by hand or brush. A thin coating of primer shall be applied to all surfaces and worked into all crevices. The primer shall be applied generously around bolts, nuts, and threads, and shall fully cover all exposed areas. The primer should overlap the pipe coating by a minimum of 3-inches.
- C. Petrolatum Saturated Tape: The wax tape can be applied immediately after the primer. Short lengths of tape shall be cut and carefully molded around each individual bolt, nut, and stud end. For long bolts (such as in couplings), short lengths of tape shall be cut and circumferentially wrapped around each individual bolt. After the bolts are covered, the tape shall be circumferentially wrapped around the flange with sufficient tension to provide continuous adhesion without stretching the tape. The tape shall be formed, by hand, into all voids and spaces. There shall be no voids or gaps under the tape. The tape shall be applied with a 1-inch minimum overlap. Wax tape coated sections of pipe shall overlap non-wax tape coated sections of pipe by 12 inches. Minimum thickness of 70 mils over flat surfaces. Minimum thickness of 140 mils over edges.
- D. Outer Covering: A plastic outer cover shall be applied over the petrolatum-saturated tape. The plastic shall be a minimum of 50-guage (10-mils) and shall have two layers applied.

3.6 INSTALLATION OF FLANGE ISOLATION MATERIALS

- A. Provide a minimum of five days advance notice to the Engineer before assembling insulated pipe flanges to allow for coordination and observance of its installation. The Engineer shall inspect the condition of the gasket's O-ring immediately before the gasket is installed to ensure it is free of cracks, dry rot, cuts, or other defects.
- B. Install pipe flange insulating materials at the locations shown on the Plans. Install pipe flange insulating materials in accordance with the manufacturer's recommendations and NACE recommended practice SP0286, "Electrical Isolation of Cathodically Protected Pipelines. Particular attention shall be paid to properly aligning the flanges prior to inserting the insulating sleeves around flange bolts.
- C. Prevent moisture, soil, or other foreign matter from contacting any portion of the insulated flange prior to or during installation. If moisture, soil, or other foreign matter contacts any portion of the insulated flange, disassemble it, clean with a suitable solvent and dry prior to reassembling. Follow the manufacturer's recommendations regarding the torque pattern of the bolts and the amount of torque to be used when installing the flange insulating kit. Do not use conductive

SECTION 26 42 00 – CATHODIC PROTECTION

grease on the flange bolts or any other flange components. Note: the following products have been tested for electrical conductivity and approved for use: Huskey 2000 Lubricating Paste & Anti-Seize compound, Triflow aerosol lubricant with Teflon additive, or approved equal.

- D. All insulating flange kits that will be buried must be tested and approved by the City's Corrosion Engineer before burial. Failure to have written approval by the City before burial may require the contractor to re-excavate the insulating flange assembly for proper testing at the contractor's expense.

3.7 WIRE CABLES AND CONDUCTORS

- A. Rectifier to Pipeline: Wire shall be single-conductor; No. 2 AWG stranded copper with 600-V High Molecular Weight Polyethylene (HMWPE) insulation 7/64-inch thick.
- B. Installation: Arrange conductors neatly in rectifier and ornamental enclosure. Cut to proper length, remove surplus wire, and attach terminal or connect to appropriate junction box or rectifier terminal.
- C. Below ground Seals: Seal below ground conduit to prevent intrusion of foreign material after wire is in place.
- D. Buried Wires, Cables and Leads: Buried rectifier, pipeline, test station, or anode leads and conduits shall be at a 36-inch deep, minimum, below finished grade. Wires shall be free of splices. The Contractor shall compact wire trenches and re-pave in accordance with the Greenbook/Whitebook Standards.
- E. AC Wiring Backfill: AC wire shall be installed and backfilled per SDG&E Service Guide (latest edition).
- F. Warning Tape: Bury warning tape in the trench 12-inches below grade and above underground conductors and conduits. Align parallel to and within 2-inches of the centerline of the conduit run.

3.8 CONDUITS

- A. Securing Conduits: Secure conduits entering test station boxes or ornamental enclosures with double locknuts, one on the outside and one on the inside.
- B. Insulation Fittings: Install insulated bushings and insulated throat connectors on the ends of rigid metallic conduit.
- C. Watertight Fittings: Use watertight couplings and connections. Install and equip boxes and fittings to prevent water from entering the conduit or box. Seal unused openings.

PART 4 – TESTING AND INSPECTION

4.1 General

- A. The CP system shall be activated by the Contractor's Corrosion Engineer. The Contractor is required to contact the City's Corrosion Section (phone number

SECTION 26 42 00 – CATHODIC PROTECTION

619-527-5439) at least 5 days in advance of all corrosion control/cathodic protection facility installations. The Engineer, City's Corrosion Engineer, or the Owner's Representative shall witness all testing and installations at their discretion. All test data shall be submitted to the City's Corrosion Engineer within seven (7) days of the completion of the testing. All testing shall be conducted under the supervision of a qualified Corrosion Engineer who is retained by the Contractor. All deficiencies found to be due to faulty materials or workmanship shall be repaired or replaced by the Contractor and at his/her expense.

4.2 TEST LEADS AND BOND WIRES

- A. Responsibility: The Contractor shall be responsible for testing and inspecting all test leads, bond wires, and exothermic welds.
- B. Test Method: All completed wire connections shall be tested by striking the weld with a 2-lb. Hammer while pulling firmly on the wire. Failed welds shall be completely removed, the surface re-prepared, and re-welded. Welds shall be spot tested by the Engineer. After backfilling, all test leads shall be tested using a standard ohmmeter.
- C. Acceptance: The resistance between each pair of test leads shall not exceed 120% of the total wire resistance as determined from published wire data.

4.3 TEST LEAD TRENCHING AND BACKFILL

- A. Responsibility: The Engineer, at his or her discretion, shall inspect wire trenches and backfill material and methods.
- B. Test Method: The depth, trench bottom padding, and backfill material shall be visually inspected before backfilling.
- C. Acceptance: Conformance with specifications.

4.4 FLANGE ISOLATION KIT TESTING

- A. Each buried insulating flange shall be tested for its electrical isolation effectiveness by and acceptable to the City's Corrosion Engineer prior to burial. The insulating flange shall be tested for electrical isolation before the wax tape coating is applied. Testing shall be performed and deemed as acceptable as described in the above grade testing procedure.
- B. Each above grade or insulating flange within a vault shall be tested for its electrical isolation effectiveness. This testing shall be performed by the Contractor's Cathodic Protection Technician and witnessed by the City's Corrosion Engineer. The Contractor shall provide written notice of this testing to the Engineer a minimum of two days in advance. If the insulated pipe flange will be buried, At the Engineer's option, the City of San Diego may repeat this testing during or immediately after the installation of the insulating flange. Replace or repair any insulated pipe flange that is determined to not meet the minimum electrical isolation requirements in this specification. The effectiveness of

SECTION 26 42 00 – CATHODIC PROTECTION

insulating flanges shall be determined using the following test techniques in the order shown until one of the criteria is achieved or as otherwise directed by the Engineer.

- C. **Electrical Potential Difference Test:** Electrically bond the pipe on the vault or unburied side of the insulating flange to an electrical ground with a maximum resistance to remote soil of 5-Ohms. If the pipe on both sides of the insulating flange is mechanically connected to a minimum 50-feet of buried pipe, then the pipe does not need to be bonded to an electrical ground for this test. Measure the CP Potential of the pipe on both sides of the insulating flange using a copper/copper sulfate reference electrode. If the difference in CP Potentials is greater than or equal to 500-millivolts, the insulating flange is providing adequate electrical isolation. This test must be performed with all cathodic protection systems and anodes disconnected from the pipeline. If this criterion is not met, perform the Nilsson 400 Meter Direct Resistance Test to verify the effectiveness of the insulating flange.
- D. **Direct Resistance Test:** Measure the electrical resistance across the insulated flange using a 97-Hertz square wave null balancing ohmmeter such as the Model 400 Miller Soil Resistance Meter and the four-wire resistance technique. A standard handheld digital multi-test meter's ohmmeter circuit (e.g. Fluke 97 or Beckman HD110) is not suitable for properly making these resistance measurements. Perform this test by connecting the meter's P1 and C1 terminals to one side of the insulating flange, using two wires, and then connecting the meter's P2 and C2 terminals to the other side of the insulating flange, using two additional wires. Use vise grips or temporary exothermic welds to make the wire connections to the flange or pipe. The criterion for a pipe filled with water is a minimum measurement of 5-Ohms. The criterion for a dry or a partially filled pipe is a minimum measurement of 100-Ohms. If none of the applicable criteria are met, perform the Inductive Ammeter Direct Resistance Test to verify the effectiveness of the insulating flange.
- E. **Inductive Ammeter Direct Resistance Test:** Connect two separate wires via two separate connections to the pipe on both sides of the insulating flange. Use vise grips or temporary exothermic welds to make the wire connections. Use two pairs of test wires, one for current flow, one for voltage measurement. Using the first set of test wires, apply a minimum 12-volt DC electrical current across the insulating flange. Using the second set of test wires, measure the voltage across the insulating flange developed by the DC current flow. Use an inductive ammeter hoop (e.g. Swain hoop) clamped around the pipe immediately adjacent to the insulating flange to measure the change in DC current flow in the pipe, through the insulated flange. Calculate the electrical resistance across the insulating flange in Ohms by dividing the change in DC Volts by the change in DC Amps (i.e. Ohm's Law). The criterion for a pipe filled with water is a minimum measurement of 5-Ohms. The criterion for a dry pipe is a minimum measurement of 100-Ohms. If either of the applicable criteria is not met, perform the NACE Insulating Flange Leakage Test, per NACE SP0286, to verify the effectiveness of the insulating flange.

SECTION 26 42 00 – CATHODIC PROTECTION

- F. NACE Insulating Flange Leakage Test: This test procedure shall conform to the "Leakage Test" described in the NACE Standard SP0286, Section 8, "Field Testing and Maintenance", Figure 12. The test current used shall be between 3 and 5 DC Amps. The criterion for a pipe filled with water is a maximum "electrical leakage value" of 10-percent of the test current. The criterion for a dry pipe is a maximum "electrical leakage value" of 5-percent of the test current.
- G. Individual Flange Bolt Testing: For all insulated flanges to be buried and for all other insulating flanges that do not meet any of the other criteria, measure the electrical resistance of each flange bolt to both sides of the insulated flange using a Nilsson Model 400 Soil Resistance Meter and four-wire resistance technique. The measured resistance value for each flange through-bolt shall be a minimum of 1,000-Ohms, as measured from each bolt to both flanges. This criterion applies to the flange through-bolts and does not apply to valve cap bolts which are threaded on one side. Remove, inspect, and replace all dielectric flange bolt sleeves and washers that do not meet the minimum resistance criterion.
- H. If an insulated flange with threaded cap bolts passes the resistance tests for all the "through-bolts" yet fails the other previous tests, remove all the threaded cap bolts, inspect and replace all imperfect dielectric flange bolt sleeve and washer materials and retest.
- I. In order to make an accurate resistance measurement that passes any of these criteria it may be necessary to disable the pipe inside a vault, flow control facility, or pump station on one side of the insulated flange (or temporarily remove any electrically grounded appurtenances) so that the pipe is not grounded on one side of the insulated flange. This temporary change may eliminate an electrical path which interferes with making an accurate resistance measurement.

4.5 CP TEST STATION WIRE INTEGRITY TESTING

- A. Testing of Completed Welds: Exothermically welded wire-to-pipeline connections shall be inspected by the Engineer prior to backfilling the pipeline. At the Engineer's direction, tests to verify the soundness of the welds shall be conducted by the Contractor. Tests for this purpose shall consist of striking the weld nugget with a 2-pound hammer while steadily pulling on the wire. Note that the wire near the weld shall not be unnecessarily cold worked during installation or testing. Remove and re-weld any welds that break loose or show signs of separating, as determined by the Engineer.
- B. Wire Identification: The Engineer shall be given two day's advance notice to verify that buried pipe lead wires and anode lead wires are properly identified prior to backfilling the wires.
- C. CP Test Wire Resistance Tests: After the pipeline is backfilled and the CP test wires are trenched to the CP Test Box or CP Monitoring Station, each pair of CP test wires shall be tested for integrity. The CP Technician shall measure the electrical resistance of one CP test wire to the pipeline and back on the second CP test wire. If more than twice the theoretical resistance of the total wire length installed is measured, the Contractor shall re-excavate the pipeline and replace

SECTION 26 42 00 – CATHODIC PROTECTION

or re-weld the CP test wires to the pipeline. Use the following copper wire unit resistance values to calculate the theoretical resistance of each pair of CP test wires.

1.	No. 2 AWG wire	0.162 Ohms / 1000 feet
2.	No. 4 AWG wire	0.258 Ohms / 1000 feet
3.	No. 6 AWG wire	0.411 Ohms / 1000 feet
4.	No. 8 AWG wire	0.653 Ohms / 1000 feet
5.	No. 10 AWG wire	1.038 Ohms / 1000 feet
6.	No. 12 AWG wire	1.650 Ohms / 1000 feet
7.	No. 14 AWG wire	2.624 Ohms / 1000 feet

4.6 ELECTRICAL ISOLATION TESTING BETWEEN PIPE AND STEEL REINFORCEMENT

- A. Prior to placing concrete, all pipe/wall/slab penetrations must be inspected by the City's Corrosion Engineer. Testing shall be performed and deemed acceptable as described herein. A seven-day notice is required before placing concrete.
- B. Conduct visual and electrical testing at all steel pipe penetrations through reinforced concrete structures before and after the concrete is placed. This testing is required to demonstrate that all buried steel pipe is not in contact with any metallic objects embedded in the concrete wall or concrete slab including all of the following:
 - rebar
 - rebar tie wire
 - snap ties
 - shebolts
 - tie rods
 - taper ties
 - dowels
- C. Perform this testing no more than 1 day before each concrete placement and no more than 1 day after each concrete placement. Correct all direct contacts detected between sections of pipe to be buried and concrete reinforcing components by trimming or repositioning the reinforcement components. If pipe to reinforcement contacts are detected after concrete is in place, use chipping hammers and other concrete demolition tools to remove as much concrete as is necessary to eliminate all metallic points of contact with the steel pipe. A representative from the City of San Diego, Water System Operations, Corrosion Section shall be notified a minimum of 7 days before the first pipe-vault penetration concrete is placed in order to witness and ensure proper electrical isolation. The failure for a new buried steel pipeline to pass this electrical isolation test may require concrete and reinforcing steel to be incrementally

SECTION 26 42 00 – CATHODIC PROTECTION

demolished by the contractor at no cost to the City of San Diego until the new pipeline passes the electrical isolation test.

- D. Perform all electrical resistance measurements for this test using a 97-Hertz square wave null balancing ohmmeter such as the Miller Model 400 Soil Resistance Meter or the MC Miller Model 400A and the four-wire resistance technique to compensate for the test wire and connection resistances. A standard handheld digital multi-test meter's ohmmeter circuit (e.g. Fluke 87) is not suitable for properly making these resistance measurements. Perform this test by connecting the meter's P1 and C1 terminals to the pipe, using two different wires and two different connections, and then connecting the meter's P2 and C2 terminals to the rebar, using two additional wires and connections. Use vise grips or temporary exothermic welds to make the wire connections to the pipe and rebar.
- E. Rebar Ground Cable Connections at Pipe Encasements and Vault Penetrations: Select two exposed pieces of rebar separated by at least 2 feet that are wire tied to a minimum of 6 other perpendicular pieces of rebar for use as electrical ground reference test points. Using temporary connections such as vice grips or other compression clamps measure the electrical resistance between the two different pieces of rebar to ensure that the rebar test points are electrically continuous with the bulk of the rebar in the concrete structure. If either piece of rebar is not securely wire tied to all the other rebar in the encasement or vault, then the electrical resistance measurement will yield erroneous or misleading data. A maximum resistance of 0.10 Ohm between the two rebar test points is required before continuing with the electrical isolation test. Connect two unspliced lengths of minimum size #6 AWG bare copper stranded grounding cable to two different pieces of rebar. Each ground cable connection to the rebar shall be made with a separate exothermic weld or a separate mechanical compression ground clamp.
- F. Direct Resistance Isolation Test: Testing shall first be performed using the Direct Resistance Test. Attach one pair of the resistance test leads to the pipe and one pair of resistance test leads to the rebar then measure the pipe to rebar resistance. If the resistance is 10 Ohms or more, the pipe is sufficiently electrically isolated from the rebar. If the test reading is less than 10 Ohms, proceed with the Steel Polarization Isolation Test described below.
- G. Steel Polarization Isolation Test:
- Step 1: Measure the baseline CP potentials of the buried pipeline and of the rebar using a stationary location for a copper sulfate reference electrode. Place the reference electrode in soil at an offset distance from the pipeline equal to approximately the length or width (whichever is greater) of the concrete structure under construction. If the difference between the readings of the pipe and rebar is 500 millivolts DC or more, that indicates sufficient electrical isolation. This test must be done with all nearby sources of cathodic protection electrical current turned off or disconnected, and with all welding equipment turned off. If the difference is less than 500 millivolts DC, record the baseline CP Potentials and proceed to the next step.

SECTION 26 42 00 – CATHODIC PROTECTION

Step 2: Set up a temporary DC power source such as a truck battery, a minimum 300 Watt, 2 to 4 Ohm, power rheostat, a calibrated electrical shunt, and two minimum #6 AWG test cables. Set up the DC power source with the positive cable connected to the rebar and the negative cable connected to the pipe. Initially adjust the rheostat for the largest resistance/smallest current and measure the current flow. Adjust the electrical power to a minimum current of 1 DC Amp, maximum of 10 DC Amps. Allow the DC current to flow for a minimum of 5 minutes then shut off the test current.

Step 3: Re-measure CP Potentials of the pipe and rebar using the same reference electrode in the same location with the test current off. These are called polarized CP potentials.

Step 4: Compare the polarized CP Potentials with the previously measured baseline CP Potentials. If the pipe is electrically isolated from the rebar, the test current will polarize the buried pipeline's steel cathodically (i.e. a more negative CP Potential) and shift the rebar anodically (i.e. a more positive CP Potential). If the difference between the polarized potentials of the pipeline and rebar is less than 300 millivolts DC there are one or more metallic contacts between the buried pipeline and the rebar. If the difference is 300 millivolts DC or greater the steel pipeline is sufficiently electrically isolated from the rebar.

- H. In no case shall an electrical resistance measurement made with a hand held volt-ohm multimeter be accepted as an accurate isolation test procedure. In the event of a question regarding the electrical isolation of the pipeline, the Engineer shall make the final determination.
- I. Electrical isolation tests shall be conducted for each pipeline encasement, each pipe to vault penetration, and any other reinforced concrete structure that a pipeline passes through. The electrical isolation tests must be performed by the City's Corrosion Engineer one day before concrete is placed, and the day after concrete is placed. The Engineer will witness the electrical isolation test conducted before the concrete is placed.
- J. After the pipeline passes the rebar isolation test, direct bury the two bare copper ground cables connected to the rebar to a flush-to-grade concrete ground box near the pipe-vault penetration. Provide a cover for the test box marked "GROUND". Provide a minimum of two (2) feet of extra ground cable inside the rebar ground test box. If there is a nearby cathodic protection test box, the rebar ground wires can be run into that box. If the rebar test wires are not long enough to reach the permanent test box, splice additional wire to them using two brass split bolts for each splice. No coating is required for the connections.

4.7 PIPELINE CONTINUITY THROUGH IN-LINE APPURTENANCES AND PIPE JOINTS

- A. The CONTRACTOR'S CORROSION ENGINEER shall measure the linear resistance of sections of pipe in which in-line valves, non-welded pipe joints, or other flanged mechanical joints have been installed. All testing shall be done by the CORROSION ENGINEER in the presence of the ENGINEER.

SECTION 26 42 00 – CATHODIC PROTECTION

- B. TEST METHOD. Resistance shall be measured by the linear resistance method. A direct current shall be impressed from one end of the test section to the other (test station to test station). A voltage drop is measured for a given current level. The measured resistance (R) is calculated using the equation $R=dV/I$, where dV is the voltage drop between the test span and I is the corresponding current. The resistance shall be measured at least three (3) times for accuracy.
- C. ALTERNATIVE METHODS. If other electrical continuity test methods are proposed, the CONTRACTOR shall prepare a written test procedure specifying the alternate method and equipment that will be used. A standard handheld digital multi-test meter's ohmmeter circuit (e.g. Fluke 87) is not suitable for properly making these electrical resistance measurements. Submit in writing the alternate proposed test method to the ENGINEER for approval a minimum of 30 days before the pipe laying begins. The alternative method must be acceptable to the City's Corrosion Engineer with written approval before being conducted by the Contractor.
- D. ACCEPTANCE. Acceptance is a comparison between the measured resistance (from the field test data) and the theoretical resistance. The theoretical resistance must consider the pipe (length and wall thickness) and the resistance of the bond wires. The measured resistance shall not exceed the theoretical resistance by more than 120% to determine electrical continuity. The CONTRACTOR'S CORROSION ENGINEER shall submit, within seven (7) days of the completion of the testing, and in a report format, to the ENGINEER, all calculations of the theoretical resistance and measured pipe resistance for each section tested.

4.8 CATHODIC PROTECTION PERFORMANCE

- A. Responsibility: The cathodic protection system shall be activated and tested by the Corrosion Engineer in the presence of the City's Corrosion Engineer. Upon completion of the performance testing, the Contractor shall measure the structure-to-electrolyte potential with respect to a saturated copper/copper sulfate (CSE) reference electrode. This potential may be either a direct measurement of the polarized potential or a current-applied potential. Interpretation of a current-applied measurement requires consideration of the significance of voltage drops in the earth and metallic paths.
- B. Test Method: Achievement of cathodic protection shall be accomplished by a pipe-to-soil potential survey at each test station of the pipeline. In the event that the full length of the pipeline has not been installed, then the extent of the survey shall be determined by the Engineer. Potential survey data shall include native pipe-to-soil potentials and instant-off pipe-to-soil potentials.
- C. Acceptance Criterion for Pipe With Dielectric Coating: The operation of the cathodic protection system for pipelines with a dielectric coating shall be tested to ensure that all portions of the buried pipeline are provided a full level of corrosion protection. The standard used to evaluate the CP potential measurements shall be as follows -0.850-Volt CP Instant Off POTENTIAL, a negative voltage of at

SECTION 26 42 00 – CATHODIC PROTECTION

least -0.850-Volt as measured between the buried pipeline and a copper sulfate reference electrode contacting the soil immediately over or adjacent to the pipeline in accordance with NACE SP0169. Determination of this voltage is to be made with the cathodic protection current momentarily interrupted. Voltage drops must be considered for valid interpretation of this voltage measurement.

4.9 COMPLIANCE WITH SPECIFICATIONS

- A. Deficiencies: Any deficiencies or omission in materials or workmanship shall be rectified by the Contractor and at his expense. Deficiencies shall include, but not limited to: anode failures, electrical discontinuities, lack of electrical isolation, broken or missing test leads or test boxes, improper or unclean trench backfill, and other deficiencies associated with the workmanship, installation, and non-functioning equipment.

****END OF SECTION****

SECTION 33 05 07.23 OPEN-SHIELD PIPEJACKING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the minimum requirements for the installation of steel casing pipe using open-shield pipejacking at the locations shown on the Drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 33 05 44 – Settlement Monitoring

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. The publications listed below form a part of this Specification to the extent referenced. Where conflicts between these Specifications and the referenced specification, code, or standard occur, the more restrictive specification shall govern. The latest edition available on the date of issue of Contract Documents shall be used.

1. Safety Codes:

- a. CAL/OSHA, State of California Administrative Code, Title 8, Industrial Relations, Chapter 4, Division of Industrial Safety, Subchapter 20, Tunnel Safety Orders
 - b. Occupational Safety and Health Administration (OSHA) Regulations and Standards for Underground Construction, 29 CFR Part 1926 Subpart P – Excavations, and Subpart S – Underground Construction
2. “Report of Geotechnical Investigation, Otay 2nd Pipeline Phase 1, City of San Diego”, Allied Geotechnical Engineers, Inc., September 12, 2016
3. 2018 Standard Specifications for Public Works Construction and “Whitebook” supplements.

1.04 DEFINITIONS

- A. Open-Shield Pipejacking: Open-shield pipejacking is a technique for installing pipe from a jacking shaft to a receiving shaft, using jacks. Soil/rock excavation is carried out within a shield in front of the lead pipe segment using hand-mining, mechanical methods such as a roadheader or digger-boom, or with mechanized equipment such as a rotary tunnel boring machine (TBM). The excavation method should be chosen to be compatible with the anticipated ground conditions. The open shield allows access to the excavation face from inside the bore. The shield is steerable using hydraulic or mechanical jacks to orient an articulated section of the shield, and guidance is provided using a laser, theodolite, or gyroscope system supplemented with a water level if necessary.

- B. Jacking Pipe: The pipe jacked behind the shield. The jacking pipe shall be specifically designed to be installed by pipejacking.
- C. Intermediate Jacking Station (IJS): A fabricated steel cylinder fitted with hydraulic jacks spaced around the circumference, which is incorporated into the pipeline between two specially fabricated pipe sections. The function of an intermediate jacking station is to distribute the jacking load along the pipe string during pipe installation. The hydraulic jacks are removed at the completion of a drive and the gap between adjacent pipe sections is fully closed by pushing the pipes together with the main shaft jacks or another IJS. The steel cylinder remains as an extended sleeve or coupling. The steel cylinder must be protected from corrosion, consistent with corrosion protection used for the jacking pipe and joints.
- D. Launch/Retrieval Seal or Entry/Exit Seal: A mechanical seal usually comprised of one or more rubber flanges attached to a steel housing that is mounted to the wall of the jacking/receiving shaft. The shield or jacking pipe distends the flange seal as it passes through, reducing water, lubrication, and soil/rock inflows into the shaft during pipejacking operations.
- E. Lubrication/Grout Port: A port located within the shield or in a jacking pipe segment, fitted with a one-way valve, for injection of lubrication material or grout into the annular space between the pipe and the ground. Lubrication ports within the pipe are typically threaded to accept lubrication/grout fittings. Pipe plugs are inserted after grouting is completed.
- F. Settlement Point: A point with elevation and spatial location established by survey prior to construction. The point is re-surveyed periodically to monitor ground movements. The point may be a nail, pin, subsurface settlement rod, borehole extensometer, or other device that can be readily located and surveyed.
- G. Obstruction: Objects located wholly or partially within the cross-sectional area of the shield that prevent the forward movement of the shield and pipe string.

1.05 DESIGN CRITERIA

- A. Pipejacking Equipment:
 - 1. The open-faced pipejacking shield shall be designed to support all ground loads which may be imposed upon it as well as any surcharge loads and loads imposed by the thrust jacks, steering mechanisms, and other appurtenances.
 - 2. The pipejacking shield, including the weight, dimensions, excavation method, steering capabilities, and other characteristics, shall be suitable for, and capable of, efficiently advancing through the conditions indicated in the Geotechnical Report.

3. The shield shall be continuous around its full perimeter and shall have suitable breast tables, sand shelves, breast jacks, closeable flood doors, or other such provisions as necessary to support the excavation face and prevent loss of ground.
4. The shield shall be capable of fully supporting the excavation face at all times, including periods of shutdown.
5. If a rotary-type cutterhead is used, the cutterhead shall have a reversible drive system so that it can rotate in either direction or other suitable provisions to minimize rotation or roll of the shield and/or pipe during installation.
6. Non-rotary type shields shall have a hood that covers the crown and projects not less than two (2) feet nor more than three (3) feet beyond the shield edge.
7. The pipejacking shield shall have an articulation joint between two segments of the shield, with a watertight joint. The shield shall be steerable in both the vertical and horizontal directions to allow the operator to maintain line and grade within the specified tolerances listed in Paragraph 3.04 G.
8. The shield shall be laser, theodolite, or gyroscope guided, and monitored continuously by the operator. A water level shall be used to supplement the guidance system as necessary.
9. The guidance system shall be designed to function at the maximum required drive length without loss of accuracy or reliability of function.
10. The shield shall have gaskets to prevent material from moving into the tunnel through the articulation joint, and the joint between the tail skin and the pipe.
11. The maximum radial overcut has been determined based on considerations for potential settlement above the tunnel, drive length, pipe diameter, and ground conditions. The maximum radial overcut shall be 0.75 inch. The minimum radial overcut shall be 0.5 inch. The radial overcut shall be determined as the difference between the maximum diameter created by the cutting teeth or overcut band on the shield (whichever is greater) and the outer diameter of the pipeline, divided by two.
12. The jacking system shall be capable of continuously monitoring the jacking pressure and the rate of advancement. The jacking system shall develop a uniform distribution of jacking forces on the end of the pipe.
13. A lubrication injection system shall be provided to inject pipe lubricant around the shield and jacking pipe to decrease frictional resistance.
 - a. Lubrication materials may include a mixture of bentonite and/or polymers and water.

- b. Lubrication ports shall be provided in the shield and jacking pipe to allow for lubrication along the pipe string at intervals not more than ten (10) feet. Lubrication ports shall be installed in the pipe by the manufacturer.
14. The spoil conveyance system shall be designed for the full range of ground conditions indicated in the Geotechnical Report.
- B. Methods and equipment used shall control surface settlement and heave above the pipeline to prevent damage to existing utilities, facilities, and improvements. Ground movements (settlement/heave) shall be limited to values that do not cause damage or distress to surface features, utilities, or improvements. The Contractor shall repair any damage caused by ground movements at no cost to the Owner. In no case shall settlements exceed the applicable values listed in Section 33 05 44 Settlement Monitoring.
- C. A thrust block shall be used to transfer jacking loads to the ground behind the jacking shaft.
1. The thrust block face shall be constructed perpendicular to the proposed pipe alignment.
 2. The thrust block shall be designed to withstand the maximum jacking forces developed by the main jacks, without excessive deflection or displacement.
 3. Forces applied to the ground shall not exceed the allowable passive earth pressure, with a minimum factor of safety of 1.5.
- D. Pipe design for jacking loads and acceptable fabrication tolerances is the responsibility of the Contractor. Maximum jacking loads applied to the jacking pipe shall not exceed 50% of the ultimate compressive strength of the pipe material, or the maximum allowable strength of the pipe as established by the manufacturer, whichever is lower.
- E. Intermediate Jacking Stations
1. The Contractor shall determine the need for, and required spacing of, intermediate jacking stations, based on the geotechnical conditions indicated in the Geotechnical Report, estimated jacking forces, and jacking load capacity of the pipe, jacking frame, and thrust block proposed by the Contractor.
 2. An IJS shall be installed and used if anticipated or actual jacking forces exceed 70% of the allowable design capacity of the jacking pipe, jacking frame, thrust block, or thrust capacity of the main jacks, whichever is the lowest.
 3. IJSs shall be fully gasketed between the interjack shell and each interjack pipe, with two (2) gaskets installed on each pipe.
- F. Provide launch and retrieval seals at all shaft exit and entry locations to prevent loss of ground and groundwater inflows into the shaft at entry and exit locations.

1.06 QUALITY ASSURANCE

- A. Failure to meet the qualification requirements is failure to fulfill the Contract and the Contractor will be required to obtain a subcontractor that meets the qualification requirements.
- B. The project superintendent shall have experience supervising open-shield pipejacking construction. The Contractor shall submit details of a referenced project including owner's name and contact information, project superintendent, and machine operators.
- C. The open-shield pipejacking operator(s) shall have technical training in the operation of the proposed open-shield pipejacking equipment. The Contractor shall submit details of a referenced project including owner's name and contact information, project superintendent, and machine operators.
- D. The site safety representative and personnel responsible for air quality monitoring shall have current certification by Cal/OSHA.
- E. The Contractor's surveyor responsible for line-and-grade control shall be a Licensed Surveyor registered in the State of California.
- F. The Contractor shall immediately notify the Engineer, in writing, when any problems are encountered with equipment or materials, or if the Contractor believes the conditions encountered are materially and significantly different from those represented within the Contract Documents.
- G. The Contractor shall allow access to the Engineer and shall furnish necessary assistance and cooperation to aid the Engineer in observations, measurements, data, and sample collection, including, but not limited to the following:
 - 1. The Engineer shall have full access to the pipejacking shield and jacking system pressure gauges prior to, during, and following all pipejacking operations. Additionally, the Contractor shall allow the Engineer reasonable access to the pipejacking shield for inspection of the excavation face.
 - 2. The Engineer shall have access to the jacking and reception shafts prior to, during, and following all jacking operations. This shall include, but not be limited to, visual inspection of installed pipes, launch and retrieval seals, and verification of line and grade. The Contractor shall provide safe access in accordance with all safety regulations.
 - 3. The Engineer shall have full access to spoils removed from the tunnel excavation prior to, during, and following all pipejacking operations. The Engineer shall be allowed to collect samples from the muck buckets or spoil piles a minimum of once per installed pipe section, or every ten (10) feet, whichever is more often, and at any time when changes in soil/rock conditions or obstructions are apparent or suspected.

4. The Engineer shall have full access to the bentonite lubrication plant prior to, during, and following all jacking operations. This shall include, but not be limited to, full access to visually inspect storage and mixing tanks, lubricant pressures and pumping rates, amount and type of lubricants on site.
- H. The Contractor shall provide written notice to the Engineer at least 72 hours in advance of the planned launch of the pipejacking shield. All work by the Contractor shall be done in the presence of the Engineer unless the Engineer grants prior written approval to perform such work in Engineer's absence.

1.07 SUBMITTALS

- A. Submittals shall be made in accordance with the requirements of these Specifications, and shall provide sufficient detail to allow the Engineer to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. All drawings shall be legible with dimensions accurately shown and clearly marked in English. Poor quality drawings and photographs will not be accepted. Review of submitted details and data will be based on consideration of requirements for the completed work, protection of existing utilities, and the possibility of unnecessary delays in the execution of the work to be constructed under this Contract. Review and acceptance of the Contractor's Submittals by the Engineer shall not be construed in any way as relieving the Contractor of its responsibilities under this Contract.
- B. Qualifications: Submit the names of the project superintendent, machine operators, and site safety representative. Submit personnel qualifications in accordance with Paragraphs 1.06 B-C. Provide qualifications and training records for site safety representative, personnel responsible for air quality monitoring, and licensed surveyor.
- C. Pipejacking Equipment: Submit the following describing the pipejacking equipment and construction methods:
 1. A detailed description of the methods and equipment to be used in completing each pipejacking drive.
 2. The excavation diameter based upon the outermost dimensions of the gauge cutters or shield. Also provide the radial overcut which shall be determined as the difference between the maximum excavation diameter and the outer diameter of the jacking pipe, divided by two.
 3. Manufacturer's literature describing the pipejacking system including the shield and all ancillary equipment. Provide a description of a project on which this system has been successfully used including names, current addresses, and telephone numbers of owner's representatives for this project as well as length, diameter, ground conditions, and pipe material used.
 4. Detailed information, including drawings, of the provisions for excavating in ground with cobbles, as described in the Geotechnical Report.

5. A description of the alignment control system.
 - a. Provide manufacturer’s literature and drawings, showing setup and support provisions, and other details for the laser, gyroscope, water level and/or theodolite system. Confirm that these systems can achieve the required line and grade within the specified tolerances.
 - b. Submit a description of surveying methods to set guidance system positions and a description of procedures to check and reset or realign guidance system during construction, including how the alignment system will be mounted so as not to be affected by jacking operations.
 - c. Submit a description of methods to ensure that thrust block, entry seal, and jacking frame are installed on proper line and grade.
 - d. Submit results of line and grade survey to ensure that the thrust block, jacking frame, and launch and retrieval seals are installed properly, prior to launch.
6. Capacity, number, and arrangement of main jacks. Provide details of:
 - a. Thrust block
 - b. Jacking frame and thrust ring
 - c. Jacking controls and pressure gages
 - d. Jack calibration data (i.e. hydraulic pressure vs. jacking force relationship for each stage of the jacks)
7. Details of pipe lubrication injection system and pipe lubricants to be used during pipejacking, including:
 - a. Manufacturer’s literature and MSDS sheets
 - b. A description of proposed lubrication procedures during jacking, including estimated volumes of lubricant that will be pumped
 - c. Confirm that sufficient volume of lubricant will be pumped at all times to completely fill the annular space outside the jacking pipe.
8. Detailed description of equipment and procedures for spoil removal, containment, transport, and off-site disposal. Provide written documentation from the disposal site(s) indicating that they will accept the spoil and are in compliance with applicable regulations.

9. Drawings and design details for intermediate jacking stations (where used), indicating number required, shell materials, proposed spacing, criteria for installing, and method of operation.
 10. Ventilation and air quality monitoring system, including monitors for shield or TBM deactivation and alarm activation.
- D. The Contractor shall confirm that all equipment and operations can fit within the allowable work area shown on the Drawings.
- E. Submit drawings and details of planned shoring methods for jacking and reception shafts. Include description of planned groundwater control means and methods.
- F. Submit means and methods for installation of carrier pipe in casing, including shims, blocking, and backfill.
- G. Calculations: Calculations shall be consistent with information provided in the Geotechnical Report. Calculations shall be prepared, stamped and signed by a California licensed Civil or Structural engineer.
1. Provide an estimate of the maximum jacking force expected to complete the drive, accounting for both face pressures and frictional resistance along the pipe string.
 2. Calculations demonstrating that the soils/rock behind the thrust block can transfer the maximum planned jacking forces exerted by the main jacks to the ground during pipe installation with an acceptable factor of safety of at least 1.5, without excessive deflection or displacement.
- H. Schedule:
1. Provide a schedule for all pipejacking work, identifying all major construction activities as independent items. The schedule shall include, at a minimum, the following activities: mobilization, shaft excavation and support, working slab construction, thrust wall construction, jacking equipment setup, entry/exit seal installation for launch/retrieval of shield, pipejacking, retrieval of the shield, installation of carrier pipe, annular space filling, shaft backfill, site restoration, cleanup, and demobilization.
 2. The schedule shall also include the work hours and workdays for each activity, and a written description of the construction activities.
 3. The schedule will be reviewed by the Engineer and shall be updated and resubmitted by the Contractor every week or more frequently if requested by the Engineer.

- I. Daily Records: The following daily records shall be submitted to the onsite Engineer for review, by noon on the day following the shift for which the data or records were taken:
1. Jacking Records: The Contractor shall provide complete written jacking records to the Engineer. These records shall include, at a minimum: date, time, name of operator, tunnel drive identification, installed pipe number and corresponding tunnel length, time required to jack each pipe, time required to set subsequent pipe, spoil volumes (for example: muck carts per pipe joint and estimated volume per cart), soil conditions (including occurrences of unstable soils/rock) and estimated groundwater inflow rates (if any), jacking forces, steering jack positions, line and grade offsets, any movement of the guidance system, shield roll, intermediate jacking station use and jacking forces, volume and location of lubricant pumped, problems encountered with the pipejacking shield or other components or equipment, and durations and reasons for delays.
 2. Manually recorded observations shall be made at intervals of not less than two times per pipe, as conditions change, and as directed by the Engineer.
 3. At least seven (7) days prior to the launch of the shield, the Contractor shall submit samples of the jacking logs or records to be used.
- J. Contingency Plans: The following list includes problem scenarios that may be encountered during the pipejacking operations. The Contractor shall submit contingency plans for dealing with each problem scenario while satisfying the specifications. These plans shall include the observations and measurements required to clearly identify the cause of the problems.
1. Shield unable to advance:
 - a. Possible obstructions (including old foundations, metallic debris, or reinforced concrete)
 - b. Insufficient jacking capacity
 - c. Shield malfunction
 2. Spoils becoming clogged on conveyor system
 3. Strong hydrocarbon smell is detected in the shield or in the shaft
 4. Guidance system distorted by heat, humidity, or physical disturbance
 5. Jacking forces:
 - a. Jacking forces increase dramatically or suddenly

- b. Jacking forces reach design capacity of pipe, jacking frame, or thrust wall (treat these scenarios as separate incidents)
- 6. Settlement and Subsidence:
 - a. Survey measurements indicate deformations exceed allowable limits
 - b. Excavated volumes significantly exceed pipe volume installed
 - c. Voids are encountered or created by overexcavation that may not be detectable by survey measurements
- 7. Steering difficulties result in line and grade tolerances being exceeded
- 8. Pipe has been damaged or has been found to be out of compliance with specifications:
 - a. Before installation
 - b. During, or after installation
- 9. Thrust block deforms excessively under jacking loads, or provides insufficient capacity to advance pipe
- 10. Severe storms or flooding predicted; shaft flooding possible
- K. Safety Plan. Submit a Safety Plan for the pipejacking operations including:
 - 1. Air monitoring equipment
 - 2. Procedures and provisions for lighting, ventilation, and electrical system safeguards
 - 3. Name of site safety representative responsible for implementing safety program.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Casing Pipe.
 - 1. Steel casing pipe dimensions and wall thickness shall be as shown on the Plans.
 - 2. Steel casing pipe connections shall be achieved by full penetration field butt welding or an integral machine press-fit connection (Permalok or equal) prior to installation of the pipe. Integral machined press-fit connections shall be installed in accordance with the manufacturer's installation procedures and recommendations.

3. Steel casing pipe shall be new, smooth-wall, carbon steel pipe conforming to ASTM Specification A139, Grade B.
4. Dimensional Tolerances: Contractor shall bear sole responsibility for furnishing and installing steel casing pipe with dimensional tolerances that are compatible with performance requirements.
5. Steel casing pipe shall be fabricated with longitudinal weld seams. All girth weld seams shall be ground flush.
6. Steel casing pipe shall be provided with grout/lubricant ports along the pipe at intervals of ten (10) feet or less. Ports and fittings shall be attached to the pipe in a manner that will not materially affect the strength of the pipe nor interfere with installation of carrier pipe. Plugs for sealing the fittings shall be provided by the Contractor and shall be capable of withstanding all external and internal pressures and loads without leaking.
7. Prior to delivery of the pipe, end/internal bracing shall be furnished and installed, as recommended by the manufacturer, for protection during shipping, storage, and installation.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Pipejacking shall not begin until the following tasks have been completed:
 1. All required submittals have been provided, reviewed, and accepted.
 2. The Contractor has provided written notice of the inception of pipejacking operations a minimum of 72 hours prior to start.
 3. Jacking and receiving shaft excavations and support systems have been completed in accordance with accepted submittals.
 4. The Contractor has confirmed that the ground has been stabilized to the extent that the ground will remain stable without movement of soil/rock or water while the entry/exit location shoring is removed and while the shield is being launched or received into a shaft or during jacking operations.
 5. For trenchless shaft penetrations, provide watertight gasketed seals and portal stabilization at all locations.
 6. The location, orientation and grade of the jacking frame or guide rails and entry/exit seals have been surveyed to ensure they are on the proper line and grade and to verify that they are properly supported.

7. Guide rails or jacking frame shall be securely attached to the concrete working slab, with supplementary braces, concrete, or grout if necessary, to prevent movement or shifting during the work.
8. A start-up inspection of all mechanical and hydraulic systems associated with the pipejacking operations has been completed.
 - a. The system shall be tested to ensure that the pipejacking shield and supporting equipment is functioning properly.
 - b. The Engineer shall be notified at least 72 hours prior to the start-up inspection and a site inspector representing the Owner shall be present during the start-up inspection.
 - c. Key shield performance data shall be measured and recorded by the Contractor during this inspection, including (if applicable) cutterhead rotational torque, correct functioning of main and steering jacks, guidance system, and other components.
 - d. The records of the start-up inspection shall be submitted to the Engineer within 24 hours of the completed inspection.
9. Site safety representative has prepared a code of safe practices and an emergency plan in accordance with Cal/OSHA and other applicable requirements. Provide the Engineer with a copy of each prior to starting pipejacking.
10. Hold safety meetings and provide safety instruction for new employees as required by Cal/OSHA.
11. Conduct a pre-construction safety conference in accordance with Cal/OSHA requirements. Arrange this conference and inform the Engineer of the time and place of the conference at least seven (7) days in advance.
12. All specified settlement monitoring instrumentation has been installed, approved, and baselined in accordance with Section 33 05 44 Settlement Monitoring.
13. The Contractor shall notify the California One Call system to request marking of utilities by utility owners/operators that subscribe to One Call, and shall individually notify all other known or suspected utilities to request marking of these utilities. The Contractor shall confirm that all requested locates are made prior to commencing tunneling operations. The Contractor shall visually confirm and stake all existing lines, cables, or other underground facilities including exposing all crossing utilities and utilities within ten (10) feet laterally of the designed tunnel.
14. The Contractor's attention is directed to the existence of a crossing sewer line near Station 2+20. The invert elevation is approximately 207.2 feet. The

Contractor shall use appropriate methods to confirm the sewer line's location and protect it from damage.

3.02 GENERAL REQUIREMENTS

- A. The Contractor shall furnish all necessary equipment, power, water, and utilities for pipejacking, pipe lubricant mixing and pumping, spoil removal and disposal, grouting, and other associated work required for the Contractor's methods of construction.
- B. The Contractor shall properly manage and dispose of groundwater, surface water, and construction water inflows to the shafts in accordance with jurisdictional agency requirements.
- C. Conduct all operations such that trucks and other vehicles do not interfere with traffic or create a mud, dust, or noise nuisance in the streets and to adjacent properties. Promptly clean up, remove, and dispose of mud or spoil spillage.
- D. All work shall be done so as not to disturb roadways, railroads, waterways, adjacent structures, landscaped areas, or existing utilities. Any damage shall be immediately repaired to original or better condition.
- E. Whenever there is a condition that is likely to endanger the stability of the excavation or adjacent structures, the Contractor shall operate with a full crew 24 hours a day, including weekends and holidays, without interruption, until those conditions no longer jeopardize the stability of the work.

3.03 PIPEJACKING

- A. Provide a suitable jacking frame and thrust block to carry out the work.
- B. Provide intermediate jacking stations as necessary to complete the pipejacking drive indicated on the Drawings. Intermediate jacking stations shall be installed and used if the total jacking force during a drive exceeds 70% of the capacity of the following: the main jacks, the maximum allowable jacking force on the pipe, or the maximum allowable jacking force on the thrust block, whichever is less. IJS's shall be installed and operated in accordance with approved submittals.
- C. Transport the jacking pipe from storage to jacking shaft without damage. Transport methods shall be acceptable to pipe manufacturer.
- D. Damaged jacking pipe, as determined by the Construction Manager, shall not be used in the work, unless permitted in writing by the Engineer.
- E. Set the pipe to be jacked on properly braced and supported guide rails or jacking frame.
- F. The axial forces from the thrust jacks shall be distributed to the jacking pipe uniformly through a properly designed thrust ring and cushion material to prevent damage to the

ends of the pipe. Jacking forces applied to the pipe shall not exceed the specified allowable compressive stresses.

- G. Jacking pipe sections shall be jacked into position following the design line and grade without damaging the pipe. In the event a section of pipe is damaged during the jacking operation, the Contractor, with written approval from the Engineer, shall make temporary repairs to the pipe and shall jack the pipe through to the next shaft for removal.
- H. Excavated Material:
1. The pipejacking shield shall be operated to restrict the excavation of the materials to a volume equal to the shield and pipe jacked, to prevent loss of ground and settlement or possible damage to overlying structures.
 2. The Contractor shall monitor excavated spoil volume. If excavated spoil volume exceeds the theoretical volume of the shield and pipe being installed, the Contractor shall notify the Engineer and promptly modify excavation and face support procedures to prevent further overexcavation.
 3. Pipejacking operations shall control surface settlement and heave above the pipeline to prevent damage to existing utilities, facilities, and improvements. In no case shall ground movements (settlement/heave) exceed the values specified in Section 33 05 44 Settlement Monitoring, and ground movements shall not cause damage to adjacent structures, roadways, or utilities. The Contractor shall repair any damage resulting from construction activities, at no additional cost to Owner and without extension of schedule for completion. The Contractor shall modify equipment and procedures as required to avoid recurrence of excessive settlements or damage.
- I. Pipe Lubrication:
1. Inject pipe lubricants through injection ports at the rear of the pipejacking shield and ports in the jacking pipe as necessary, to minimize pipe friction.
 2. Injection ports shall be installed by the manufacturer in the pipe at intervals not to exceed ten (10) feet along the pipe string.
 3. Pipe lubricants shall be injected continuously as the pipe is advanced.
 4. The volume injected shall not be less than that required to fill the annular void space outside the pipe. Inject greater volumes as required to minimize jacking forces.
- J. Completely contain, transport, and dispose of all excavated materials away from the construction site. Use only the disposal sites identified in approved submittals for spoil disposal. All costs for spoil disposal are the responsibility of the Contractor.

- K. Install carrier pipe within casing in accordance with approved submittals.

3.04 CONTROL OF LINE AND GRADE

- A. The District will establish two benchmarks on each side of the trenchless crossing. The Contractor shall verify these benchmarks by survey prior to the start of construction, and shall confirm positions or report any errors or discrepancies in writing to the Engineer.
- B. After confirming that all established survey benchmarks provided for the Contractor's use are accurate, the Contractor shall use these benchmarks to furnish and maintain all reference lines and grades for pipejacking.
- C. The Contractor shall use these lines and grades to establish the exact location of the jacking pipe using a laser, gyroscope, or theodolite guidance system supplemented with a water level, as necessary.
- D. Submit to the Engineer copies of field notes used to establish all lines and grades and Contractor shall check guidance system setup prior to beginning each pipejacking drive.
- E. Contractor shall perform survey checks of the guidance system on a daily basis during pipejacking operations.
- F. The Contractor is fully responsible for the accuracy of the work and the correction of it, as required.
- G. The Contractor shall install the jacking pipe in accordance with the following tolerances:
 - 1. Variations from design line (Horizontal): +/- three (3) inch maximum.
 - 2. Variations from design grade (Vertical): +/- three (3) inch maximum.
- H. The shield shall be steered to maintain line and grade within the tolerances specified. This shall be achieved by continuously monitoring and adjusting line, grade, roll, and steering attitude during the operation.
- I. If the installation is off of design line or grade, make the necessary corrections, and return to the design alignment and grade at a rate of not more than one (1) inch per twenty-five (25) feet.
- J. Guidance System:
 - 1. The guidance system shall be mounted independently from the thrust block and jacking frame and be independent of shaft shoring system to maintain alignment if there is movement of equipment during jacking.

2. Stop pipejacking operations and reset guidance system if its alignment shifts or is moved off design alignment and grade for any reason.
 3. Check guidance system setup at least once per shift. Guidance system shall only be reset by competent surveying personnel in accordance with acceptable procedures.
- K. Monitor line and grade continuously during pipejacking operations. Record deviation with respect to design line and grade once at each pipe joint and submit records to Engineer daily.
- L. If the pipe installation does not meet the specified tolerance, the Contractor shall correct the installation including any necessary redesign of the pipeline or structures and acquisition of necessary easements. All corrective work shall be performed by the Contractor at no additional cost to the Owner and without schedule extension, and is subject to the written approval of the Engineer.

3.05 OBSTRUCTIONS

- A. If the pipejacking operations should encounter an object or condition that impedes the forward progress of the shield, the Contractor shall notify the Engineer immediately. The Contractor shall correct the condition, and remove, clear, or otherwise make it possible for the pipejacking shield and jacked pipe to advance past any objects or obstructions that impede forward progress of the shield. The Contractor shall proceed with removal of the object or obstruction by methods submitted by the Contractor and accepted by the Engineer. The Contractor will receive compensation for removal of obstructions, which cannot be broken up by the cutting tools with diligent effort, and that are located partially or wholly within the cross-sectional area of the tunnel. Payment will be negotiated with the Contractor by the Engineer on a case-by-case basis. The Engineer shall be provided an opportunity to view any obstruction prior to removal. Any removal process that does not allow direct inspection of the nature and position of the obstruction will not be considered for payment. The Contractor will receive no additional compensation for removing, clearing, or otherwise making it possible for the pipejacking shield to advance past objects consisting of cobbles, boulders, wood, and other nonmetallic objects or debris with maximum lateral dimensions less than forty percent (40%) of the outer diameter of the shield or cutterhead, whichever is larger.

3.06 SAFETY

- A. The Contractor is responsible for safety on the job site.
- B. Methods of construction shall be such as to ensure the safety of the work, Contractor's and other employees on site, and the public.
- C. Perform all work in accordance with all current applicable regulations and safety requirements of Federal, State, and local agencies. Comply with all applicable provisions of Tunnel Safety Orders of the State of California and 29 CFR Part 1926,

Subpart S – Underground Construction and Subpart P – Excavations, by OSHA. In the event of conflict, comply with the more stringent requirements.

- D. When personnel are underground, furnish and operate a temporary ventilation system, and air monitoring system conforming to the requirements of Cal/OSHA and OSHA. Operate and maintain a ventilation system that provides a sufficient supply of fresh air and maintains an atmosphere free of toxic or flammable gasses in all underground work areas.
- E. All work shall conform to the requirements of Cal/OSHA and OSHA. Gas testing shall be performed by a certified gas tester in accordance with Cal/OSHA requirements.
- F. No gasoline-powered equipment shall be permitted in jacking and receiving shafts. Diesel, electrical, hydraulic, and air powered equipment is acceptable, subject to applicable local, State, and Federal regulations.
- G. Contractor shall obtain from the State of California, Industrial Relations Department, Division of Occupational Safety and Health Administration, an underground classification for the tunnel.
- H. Contractor shall obtain necessary tunneling permits it needs for its work.

3.07 CLEANUP AND RESTORATION

- A. After completion of pipejacking, all construction debris, spoils, oil, grease, and other materials shall be removed from the jacking pipe, jacking and receiving shafts, and all Contractor and project work areas.
- B. Restoration shall follow construction as the work progresses, and shall be completed as soon as possible. Restore and repair any damage resulting from surface settlement caused by shaft excavation, or pipejacking. Any property damaged or destroyed, shall be restored to a condition equal to or better than existing prior to construction as determined by the District. Restoration shall be completed no later than thirty (30) days after the pipejacking is complete. This provision for restoration shall include all property affected by the construction operations.

END OF SECTION

SECTION 33 05 24
CARBON STEEL PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
 - a. B16.9, Factory-Made Wrought Butt welding Fittings.
 - b. B36.10M, Welded and Seamless Wrought Steel Pipe.
 - c. BPVC SEC VIII, Div. 1, Rules for Construction of Pressure Vessels.
 - d. BPVC SEC IX, Welding and Brazing Qualifications.
 2. American Society for Nondestructive Testing Inc. (ASNT):
SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing.
 3. American Water Works Association (AWWA):
 - a. C200, Steel Water Pipe - 6 In. (150 mm) and Larger.
 - b. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied.
 - c. C206, Field Welding of Steel Water Pipe.
 - d. C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm).
 - e. C208, Dimensions for Fabricated Steel Water Pipe Fittings.
 - f. C209, Cold-Applied Tape Coatings for Steel Water Pipe
 - g. C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
 - h. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 - i. C214, Tape Coatings for Steel Water Pipelines
 - j. C217, Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines.
 - k. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
 - l. C602, Cement-Mortar Lining of Water Pipelines in Place - 4 In. (100 mm) and Larger.
 - m. M11, Steel Pipe - A Guide for Design and Installation.
 4. American Welding Society (AWS):
 - a. A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 - b. A3.0M/A3.0, Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying.
 - c. D1.1/D1.1M, Structural Welding Code – Steel.

- d. QC 1, Standard for AWS Certification of Welding Inspectors.
5. ASTM International (ASTM):
 - a. A20/A20M, Standard Specification for General Requirements for Steel Plates for Pressure Vessels.
 - b. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - c. A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
 - d. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - e. A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
 - f. A435/A435M, Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.
 - g. A516/A516M, Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.
 - h. A770/A770M, Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications.
 - i. A1018/A1018M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - j. E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
 - k. E1255, Standard Practice for Radioscopy.
6. International Organization for Standardization (ISO): 9001:2000, Quality Management Systems - Requirements.
7. Lloyd's Registry.
8. Steel Pipe Fabricators Association (SFPA).

1.02 DEFINITIONS

- A. Fittings: Including, but not limited to fittings, closure pieces, bends, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, wall sleeves, bulkheads, and other piping and appurtenances fabricated from steel plate, sheet, or coils as required to provide the Work, complete. Fittings shall include piping above ground or inside structures.
- B. Acronyms:
 1. CJP: Complete Joint Penetration
 2. CWI: Certified Welding Inspector
 3. MT: Magnetic Particle Testing
 4. NDE: Nondestructive Examination
 5. NDT: Nondestructive Testing

6. PJP: Partial Joint Penetration
7. PQR: Procedure Qualification Record
8. PT: Liquid Penetrant Testing
9. RT: Radiographic Testing
10. UT: Ultrasonic Testing
11. VT: Visual Testing
12. WPQ: Welder/Welding Operator Performance Qualification
13. WPS: Welding Procedure Specification

1.03 DESIGN REQUIREMENTS

A. Fittings:

1. Design reinforcement, unless otherwise shown.
2. Design in accordance with AWWA M11, AWWA C200, and AWWA C208 as modified herein, and this Specification.

B. Pipe Layout: Design in accordance with AWWA M11:

1. General:
 - a. Base stationing and elevation convention as shown on Drawings.
 - b. Maximum Laying Lengths:
 - 1) Not limited, unless specifically shown on Drawings.
 - 2) Select lengths to accommodate installation operation.
2. Include, as minimum:
 - a. Specific number, location, and direction of each pipe, joint, and fitting. Number each pipe in installation sequence.
 - b. Station and centerline elevation at changes in grade or horizontal alignment.
 - c. Station and centerline elevation to which bell end of each pipe will be laid.
 - d. Elements of curves and bends, both in horizontal and vertical alignment.
 - e. Location of mitered pipe sections, beveled ends for alignment conformance, butt straps, and deep bell lap joints for temperature stress control.
 - f. Location of closures, cutoff sections for length adjustment, temporary access manways, vents, and weld lead outlets for construction convenience.
 - 1) Provide for adjustment in pipe laying headings and to conform to indicated stationing.
 - 2) Changes in location or number will require Engineer approval.
 - g. Location of bulkheads, both those shown and as required, for hydrostatic testing of pipeline.

C. Welding Procedure Specification (WPS):

1. Qualified by testing in accordance with ASME BPVC SEC IX for shop welds and AWS D1.1/D1.1M for field welds.
2. PQRs conducted on unlisted base metal (most coil products are unlisted base metals) to be production welded as required in the referenced welding Code shall be traceable to heat lots.
3. Written WPS required for welds, both shop and field.
4. Notch-tough welding procedures that require heat input control shall be required:
 - a. AWS D1.1/D1.1.M prequalified welding procedures are not allowed.
 - b. WPS used to shop fabricate pipe shall be qualified in accordance with ASME BPVC SEC IX and shall include Supplementary Essential Variables.
 - c. WPS used to field install pipe shall be qualified for heat input control in accordance with AWS D1.1/D1.1M.
 - d. PQRs shall be qualified for notch tough welding with consideration for thickness of steel, test temperature, and Charpy V-notch CVN values. Refer to AWS D1.1/D1.1M, Table 4.6 PQR Supplementary Essential Variable Changes for CVN Testing Applications Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, and GTAW and Section 4, Part D Requirements for CVN Testing, Option A (three specimens). CVN test temperature and acceptance shall be same as pipe base metal specified herein.

- D. Stulling (Strutting): Design for pipe and fittings such that over-deflection and damage is avoided during handling, storage, and installation, including backfill and compaction.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings showing pipe layout.
2. Material list and steel reinforcement schedules for materials specified.
3. Fabrication Information:
 - a. Pipe and fitting details for temporary and permanent facilities indicating:
 - 1) Cylinder thickness.
 - 2) Manufacturing tolerances.
 - 3) Maximum angular deflection limitations of field joints.
 - 4) Closure sections and cutoffs for field length adjustment.
 - 5) Bulkheads, including details for removal of test bulkheads and repair of lining.

- 6) Weld lead outlets and plugs.
- 7) Stulling size, spacing, and layout.
- b. Welded joint details including:
 - 1) Butt joints.
 - 2) Miter-cut ends for alignment conformance.
 - 3) Lap joints.
 - 4) Special thermal control joints required for control of temperature stresses.
 - 5) Butt strap joints.
4. Welding Data (Shop and Field Welding):
 - a. Show on a weld map, complete information regarding base metal specification designation location, type, size, and extent of welds with reference called out for WPS and NDE numbers in tail of welding symbol.
 - b. Distinguish between shop and field welds.
 - c. Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal. Provide complete joint welding details showing bevels, groove angles, and root openings for all welds.
 - d. Welding and NDE symbols shall be in accordance with AWS A2.4.
 - e. Welding terms and definitions shall be in accordance with AWS A3.0M/A3.0.
 - f. Submit welding data together with Shop Drawings as a complete package.
 - g. Fittings: Provide a joint weld beveling diagram. Refer to AWS D1.1/D1.1M, Annex P Local Dihedral Angle that can be used to calculate bevels for weld joint details of intersecting pipes
5. Product data for the following:
 - a. Welded Steel Pipe and Fittings:
 - 1) Material data.
 - 2) Chemical and physical test reports showing data consistent with specified requirements for each heat of steel proposed for use.
 - b. Rubber Gasket Joint:
 - 1) Details with dimensions and fabrication tolerances for both bell and spigot ends.
 - 2) Materials.
 - 3) Performance history or test data.

B. Informational Submittals:

1. Certificates:
 - a. Manufacturer's Certificate of Compliance, in accordance with Common Product Requirements.

- b. Lining Materials: Certificate that lining system is currently approved for potable water contact in accordance with NSF 61. and satisfies current applicable governmental health and safety requirements for use in potable water.
2. Pipe Manufacturer's written Quality Assurance/Control Plan.
3. Statements of Qualification:
 - a. Pipe manufacturer.
 - b. Fittings fabricator.
 - c. Contractor's Shop Inspector.
 - d. Contractor's Field Inspector.
 - e. NDT Quality Control Personnel.
4. Procedures:
 - a. Shop and field welding information; at a minimum include complete welding code paper trail with linkage to Shop Drawings.
 - b. Welder Qualifications and Welding Procedure Specifications in accordance with Welding, and as specified below:
 - 1) Provide complete joint dimensions and details showing bevels, groove angles, root face, and root openings for all welds.
 - 2) Notch-tough welding procedures required. For shop welding, address supplementary essential variables in addition to essential variables as indicated in ASME Section IX, QW-251.2. For field welding, heat-input, control PQR essential variables as indicated in AWS D1.1/D1.1M, Table 4.6 shall be included. For shop and field welding, provide heat-input table on WPSs for welder guidance.
 - 3) PQRs for notch-tough welding shall document heat-input control by monitoring volts, amps, and travel speed or time-rate of change of weld metal volume as calculated by measuring change in electrode length over a period of time. Charpy V-notch tests shall be conducted on weld metal and heat affected zone. Test coupons shall be oriented transverse to final direction of rolling. Full size Charpy specimen test acceptance shall be same as base metal specified herein.
 - 4) Written NDT procedures.
 - 5) Written description of proposed sequencing of events or special techniques such as:
 - a) Controlling pipe wall temperature stress during installation.
 - b) Minimizing distortion of steel.
 - c) Shop-Applied Cement-Mortar Lining and Coating: Include description of machine to be used and list of similar projects where machine was used. Identify pipe size and total footage.

- d) Monitoring pipeline temperatures during installation.
 - c. Written weld repair procedures for the Work.
 - d. Field coating application and repair.
 - e. Field lining application and repair.
5. Reports:
- a. Source Quality Control Test Reports:
 - 1) Nondestructive weld testing.
 - 2) Steel impact testing using Charpy V-notch method.
 - b. Field Quality Control Test Reports:
 - 1) Weld tests, including re-examination of repaired welds, on each weld joint for the following tests, as applicable:
 - a) RT
 - b) UT
 - c. Cement-mortar lining compressive strength tests in accordance with AWWA C205.
 - d. Cement-mortar coating absorption tests in accordance with AWWA C205.
6. Field Testing Plan: Submit at least 15 days prior to testing and include following information at a minimum:
- a. Testing dates.
 - b. Piping system and sections to be tested.
 - c. Method of isolation.
 - d. Method of conveying water from source to system being tested.
 - e. Calculation of maximum allowable leakage for piping sections to be tested.
7. Design calculations prepared by a licensed professional engineer in the State of California for fittings, including opening reinforcement details of collars, wrappers, crotch plates; and harnessed joint assemblies.
8. Temperature Stress Control Plan: Submit at least 45 days prior to installing pipe and include at least the following information:
- a. Step by step installation procedures and sequencing to demonstrate compliance with temperature control requirements, including:
 - 1) Pipe installation.
 - 2) Joint welding of standard joints and temperature control joints.
 - 3) Pipe bedding and backfill.
 - b. Methods to ensure compliance with procedures by installation personnel.
 - c. Equipment to be used to monitor pipe wall temperature.
 - d. Time of day, climatic, or seasonal installation limits to be used to achieve compliance with temperature control requirements.
9. Pipe manufacturer's design engineer's certification of training of Contractor's pipe installation crews.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Pipe Manufacturer:
 - a. Experienced in fabricating pipe of similar diameters, lengths, and wall thickness required for the Work.
 - b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9001:2000 Certification.
 - c. Demonstrate current production capability for volume of work required for Project.
 - d. Experience shall include successful fabrication to AWWA C200 standards of at least 10000 linear feet of 36-inch diameter or larger pipe, with wall thickness of 1/2 inches or greater.
 - e. Experience shall be applicable to fabrication plant facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
2. Fittings Fabricator:
 - a. Experienced in fabricating fittings of similar diameters and wall thickness required for the Work.
 - b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9001:2000 Certification.
 - c. Demonstrate current production capability for volume of work required for this Project.
 - d. Experience shall include successful fabrication to AWWA C200 and AWWA C208 standards of at least 25 fittings of 36-inch or larger pipe, with wall thickness 1/2 inch or greater.
 - e. Experience shall include successful fabrication of crotch plate fittings requiring post weld heat treatment.
 - f. Experience shall be applicable to fabrication shop facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
3. Welders and Welding Operators:
 - a. Shop Welders: In accordance with ASME BPVC SEC IX.
 - b. Field Welders: In accordance with AWS D1.1/D1.1M.
4. Contractor's Inspector for Shop and Field Welding:
 - a. In accordance with AWS QC 1, with knowledge of welding code for the Work.
 - b. After receiving CWI qualification, at least one Shop CWI and one Field CWI shall have professional experience related to welding inspection similar to the Work.
5. NDT Quality Control Personnel:
 - a. In accordance with requirements of ASNT SNT-TC-1A, NDT Level II.

- b. After receiving NDT qualification, at least one NDT person shall have professional experience related to NDT inspection similar to the Work.

B. Contractor's Shop Inspector:

1. In accordance with AWWA C200.
2. Responsibilities:
 - a. Verify conformance to use of specified materials and their proper storage.
 - b. Monitor conformance to approved WPS.
 - c. Monitor conformance to approved NDT procedure specifications.
 - d. Monitor conformance of WPQ.
 - e. Provide 100 percent visual inspection before, during, and after shop welding.
 - f. Coordinate NDT work and review test results.
 - g. Maintain records and prepare report confirming results of inspection and testing.

C. Contractor's Field Inspector:

1. In accordance with AWWA C206 and AWS D1.1/D1.1M.
2. Responsibilities:
 - a. Verify conformance to use of specified materials and their proper storage.
 - b. Monitor conformance to approved WPS.
 - c. Monitor conformance to approved NDT procedure specifications.
 - d. Monitor conformance of WPQ.
 - e. Provide 100 percent VT before, during, and after field welding.
 - f. Coordinate NDT work and review test results.
 - g. Maintain records and prepare report confirming results of inspection and testing.

D. Prefabrication Meeting: Hold prior to fabrication of pipe and fittings between representatives of Owner, Contractor, Engineer, and pipe fabricator to review following:

1. Project scope.
2. Submittal requirements.
3. Testing.
4. Inspection responsibilities.
5. Shop welding requirements.
6. Field welding requirements.
7. Shop and field coating and lining requirements.
8. Production and delivery schedule.
9. Other issues pertinent to the Work.

- E. Inspection of Coating and Lining Application: Qualified manufacturer's technical representative shall visit pipe coating and lining shop and Site at beginning of application process to verify proper workmanship associated with coating and lining application and as may be required to resolve shop or field problems. Submit written report of visit to Engineer.

1.06 DELIVERY, HANDLING, AND STORAGE

A. Pipe Marking:

1. Legibly mark installation sequence number on pipe and fittings in accordance with piping layout. Standard pipe sections do not need sequence number labeled provided wall thickness is clearly marked.
2. Fittings shall be marked at each end with notation "TOP FIELD CENTERLINE".
3. The word "TOP" shall be painted or marked on outside top spigot of each fitting.
4. Mark "TOP MATCH POINT" for compound bends per AWWA C208 so end rotations can be easily oriented in field.

B. Delivery:

1. Securely bulkhead or otherwise seal ends of pipe and fittings prior to loading at manufacturing site.
2. Pipe ends shall remain sealed until installation.
3. Damage to pipe and fittings, including linings and coatings, found upon delivery to Site shall be repaired to Engineer's satisfaction or removed from Site and replaced.

C. Storage:

1. Support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
2. Support on sand or earth berms free of rock exceeding 3 inches in diameter.

D. Acceptance at Site:

1. Pipe delivered to the site that does not conform to the requirements of this specification shall be rejected for use at the discretion of the Owner Representative and Engineer.

1.07 SEQUENCING AND SCHEDULING

A. Notify Engineer in writing of the following:

1. Pipe Manufacturing: Not less than 14 days prior to starting.

2. Not less than 5 days prior to start of each of the following:
 - a. Welding.
 - b. Coating application.
 - c. Lining application.
 - d. Shop hydrostatic testing.

PART 2 PRODUCTS

2.01 GENERAL

A. Pipe Manufacturer:

1. Manufacturing of steel pipe and fittings shall be under direction of one pipe Supplier.
2. Responsibility shall include, at minimum, coordinating work of other suppliers for fittings.

B. Pipe Type:

1. Downstream of main pumps: Flanged and lap welded, rated for maximum working pressure of 250 psi, with AWWA C207 Class E flat-faced ring flanges.
2. Upstream of main pumps: Flanged and lap welded, rated for maximum working pressure of 150 psi with AWWA C207 Class D flat-faced ring flanges.

C. Lining and Coating Summary:

1. Buried carbon steel pipe shall have cement mortar lining with thickness meeting requirements of AWWA C205 and the cathodic protection specifications for this project. Buried carbon steel pipe shall be coated with a tapecoat rockshield system.
2. Exposed carbon steel pipe shall have cement mortar lining with thickness meeting requirements of AWWA C205 and the cathodic protection specifications for this product. Exposed carbon steel pipe shall be coated with and epoxy system meeting the requirements of AWWA C213.
3. Steel pipe must have an external tape coating under the cement mortar per AWWA C209 and C214 as called out on the plans.

D. Pipe Size:

1. Unless shown otherwise for pipe 24 inches in diameter and larger, the diameter shown shall be considered finished inside diameter after lining.
2. For pipe 30 inches in diameter and less, diameter shown shall be per ASME B36.10M.

- a. Pipe size shall be nominal outside diameter for 14-inch diameter pipe and larger.
 - b. Pipe size shall be nominal inside diameter for 12-inch diameter pipe and smaller.
- E. Steel pipe and fittings shall be manufactured, tested, inspected, and marked to comply with AWWA C200 and additional requirements of these Contract Documents.
- F. In lieu of collar reinforcement, pipe or fittings with outlets may be fabricated in their entirety of steel plate having thickness equal to sum of pipe wall plus required reinforcement.
- G. PIPE BARREL
- 1. Steel: Provide steel coils for spiral welded steel pipe or steel plate for straight seam welded steel pipe per AWWA C200 and as follows:
 - a. Steel Grade: ASTM A36, Grade 40.
 - b. Minimum Elongation in 2-inch Gauge Length: 21 percent.
 - c. Steel Quality as follows:
 - 1) Coils:
 - a) Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018/A1018M, SS Grade 36, Type 1.
 - b) Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018/A1018M, HSLAS Grade 50, Class 2 (modified). Measured yield strength shall not exceed 85 percent of measured tensile strength.
 - 2) Plate:
 - a) Fully-killed, conforming to ASTM A20/A20M, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A36, Grade 40.
 - b) Steel Chemistry: Conform to ASTM A36, Grade 40. Steel plates that are 3/4-inch thick or greater shall be normalized.
 - 3) Toughness:
 - a) Charpy V-notch Acceptance Criteria: Transverse specimen orientation, full size specimens, 25 foot-pounds energy at test temperature of 30 degrees F.
 - b) Frequency: See Paragraph Steel Toughness Testing for Thickness Equal to or Greater than 7/16 Inches.

2. Minimum nominal wall thickness as shown on Drawings. Maximum allowable thickness variation for plate, sheet, or coil shall be 0.010 inch less than ordered thickness.

2.02 FITTINGS

- A. Conform to the requirements of ASTM A36.
- B. Fabrication:
 1. Shop fabricate. No field fabrication will be allowed, unless approved by Engineer.
 2. Fabricate from materials or straight pipe in conformance with specified requirements and dimensions of AWWA C208, unless otherwise indicated.
- C. Crotch Plate: Fabricate from fully-killed, fine grain, pressure vessel steel conforming to ASTM A36 Grade 36 modified to have minimum yield strength of 40,000 psi, or equivalent., and as follows:
 1. Plates shall be normalized.
 2. Perform through-thickness tension testing of plates in accordance with ASTM A770/A770M.
 3. Charpy V-notch tests in direction transverse to final rolling shall be performed per ASTM A370 on full size specimens of coupons taken from each plate. Acceptance shall be 25 foot-pounds at 30 degrees.
- D. Wall Thickness:
 1. General:
 - a. Refer to ASME B36.10M for definitions of wall thickness for standard weight pipe and nominal pipe size (NPS).
 - b. Reinforce to withstand either internal pressures, both circumferential and longitudinal, or external loading conditions, whichever is greater.
 - c. Minimum Plate Thickness: The greater of adjacent mainline pipe, thickness shown or thickness calculated as hereinafter specified.
- E. Bends, Unless Otherwise Indicated:
 1. Minimum Radius: 1.0 times pipe diameter or as indicated on Drawings.
 2. Minimum Bend Wall Thickness: Greater of Table 1 above or as calculated for straight pipe under internal pressure multiplied by following bend stress intensities (tabulated below or calculated with the following bend stress intensity formula where “n” is the bend radius multiplier and SI=bend stress intensity). For “n” greater than, or equal

to, 2.5 the stress intensity factor may be ignored as indicated in AWWA M11.

$$SI = \frac{2 \cdot n - \frac{1}{3}}{2 \cdot n - 1}$$

Bend Radius Multiplier “n”	AWWA M11 Bend Stress Intensity “SI”
1.0	1.67
1.5	1.33
2.0	1.22

3. Maximum Miter Angle: 11-1/4 degrees on each section resulting in a maximum deflection angle of 22.5 degrees per miter weld as recommended in AWWA C208.
4. Bevels: Vary bevels on miters to provide a constant weld groove angle. For 11-1/4-degree miter, (22.5-degree miter weld) bevels must vary from 18.75 degrees on OD of bend to 41.25 degrees on ID of bend to provide a constant 60-degree groove angle for CJP welding.
5. Complete joint penetration (CJP) welds on miter welds.

F. Outlets:

1. 24 Inches and Smaller: Fabricate from ASTM A53/A53M, Type E or S, Grade B, standard weight steel pipe.
2. Larger than 24 Inches: Fabricate from ASTM A106/A106M, Grade B, standard weight pipe.
3. Fabricate collar or wrapper reinforcement using same steel as specified for main pipe barrel.

G. Steel Butt-Weld Fittings:

1. 24 Inches and Smaller: In accordance with ASME B16.9 conforming to ASTM A234/A234M.
2. Standard weight.
3. Taper pipe wall at welds at 4:1 for connection to pipe of different wall thickness.
4. Coordinate difference in diameter convention between fittings and AWWA C200 and AWWA C208 pipe and fittings to provide complete piping system as shown.

2.03 JOINTS

A. Shop Welded:

1. Fabricate in accordance with AWWA C200 as modified herein.
2. Complete joint penetration (CJP) butt joints shall be used for longitudinal, girth, and spiral welds, unless otherwise indicated.
3. Lengths of pipe shall not be shop-joined using lap joints.

B. Preparation of Joints for Field Welding:

1. Butt Joint Welded:
 - a. Plain ends beveled as required by AWWA C200 and Contractor's field WPS.
 - b. Provide protection for factory beveled pipe ends so ends are not damaged during transport.
2. Lap Joint Welded:
 - a. Double fillet lap joints in preparation for field welding shall be in accordance with AWWA C200.
 - b. For pipe 30 inches in diameter and larger, provide one of the following:
 - 1) Tack weld four metal tabs at equal intervals around inside circumference of bell ends to indicate location at which spigot end has reached maximum penetration into bell. Remove stops after welding of joint.
 - 2) Paint a 3/4-inch wide white stripe on outside circumference of spigot end of pipe. Side of stripe furthest from pipe end shall indicate location at which spigot end has reached maximum penetration into bell. Side of stripe closest to end of pipe will indicate limit of maximum joint pull.
 - c. Double welded lap joints and butt-strap joints shall be tapped and drilled for testing in accordance with AWWA C206.

C. Miter-End Cuts:

1. Welded Lap Joints:
 - a. As shown on Drawings.
 - b. Moderate deflections and long radius curves may be made using miter-end cuts.
 - c. Use only lap welded joints, unless specifically approved in writing by Engineer.
 - d. Maximum Total Allowable Angle: 3 degrees per pipe joint.
 - e. Provide miter-cut that is cold expanded square with face of miter-cut on bell ends only.
 - f. Mitering of spigot ends will not be permitted.
2. Welded Butt Joints:
 - a. Maximum Total Allowable Angle: 2.5 degrees per pipe joint.
 - b. Minimum Pipe Wall Thickness: 1/2 inch.
 - c. Welded Butt joints shall be CJP.

D. Special Temperature Control Joint:

1. Provide a special longer bell end (Special Temperature Control Joint) at a maximum spacing as indicated herein to account for movement on installed pipe as a result of temperature changes.
2. Pipe manufacturer shall determine length required for the longer bell.

2.04 FLANGES

- A. In accordance with AWWA C207.
- B. Flanges designated to receive insulating flange kits shall have bolt holes overdrilled by an additional 1/8 inch (1/4 inch greater than nominal bolt diameter) as allowed in AWWA C207 Section 4.2.3.

2.05 STULLING (STRUTTING)

- A. Materials:
 1. Shop-Lined Pipe: Wood stulls and wedges.
 2. Unlined Pipe: Steel or wood.
- B. Install stulling for pipe and fittings in accordance with approved submittal and as soon as practical after pipe is fabricated or, for shop-lined pipe, after lining has been applied.
- C. Install stulling in manner that will not harm lining.

2.06 TAPECOAT ROCKSHEILD SYSTEM

- A. General:
 1. Provide 25 mil. polyethylene backing and 375 mil. foam
 2. Provide perforations 1 1/4" on center
 3. Manufacturer: Chase Tapecoat or equal

2.07 CEMENT-MORTAR COATING

- A. General:
 1. Notify Engineer at least 10 days prior to application of coating products.
 2. Holdback of and coating from field-welded joints shall be as follows:
 - a. For lap welded joints and flex couplings, 8 inches.
 - b. For butt weld and butt strap joints, 6 inches.
 3. Unless otherwise indicated, coat exterior surfaces of pipe and fittings passing through structure walls from center of wall or from wall flange to end of underground portion.

B. Shop-Applied:

1. Cement-mortar coating shall conform to AWWA C205. Thickness shall conform to AWWA C205 and shall be 3/4 inch, minimum.
2. Steel wire or ribbon mesh reinforcement shall be in accordance with AWWA C205.
3. For cement-mortar coatings applied over dielectric coated pipe, ensure reinforcing metals in coating do not electrically contact pipe.
4. Coating system for field joints shall be cement mortar in accordance with AWWA C205. Mortar shall be retained with suitable water-impermeable bands or heavy-duty diapers of sufficient strength to hold fresh mortar and resist rodding.

2.08 CEMENT-MORTAR LINING

A. General:

1. Notify Engineer at least 10 days prior to application of lining products.
2. Holdback of lining from field-welded joints shall be as follows:
 - a. For lap-welded joints and flex couplings, 8 inches
 - b. For butt-weld and butt-strap joints, 6 inches.

B. Shop-Applied:

1. Applied centrifugally in conformance with AWWA C205. Thickness shall be in accordance with AWWA C205.
2. Lining machine type that has been used successfully for similar work and approved by Engineer.
3. Maintain pipe in round condition during lining operation and thereafter by suitable bracing or strutting.
4. Provide polyethylene or other suitable bulkhead on ends of pipe and on special openings to prevent drying out of lining. Bulkheads shall be substantial enough to remain intact during shipping and storage until pipe is installed.
5. Pipe shall be left bare where field joints occur.
6. Ends of lining shall be left square and uniform. Feathered or uneven edges will not be permitted.

C. Field-Applied:

1. Materials conforming to AWWA C602.
2. Do not use pozzolanic material in mortar mix.
3. Admixtures shall contain no calcium chloride.
4. Wire mesh conforming to AWWA C205.

2.09 CATHODIC PROTECTION

- A. Provide as shown on the Drawings.

2.10 SOURCE QUALITY CONTROL

- A. Steel Toughness Testing for Thickness Equal to or Greater than 7/16 Inches:

1. Include three impact specimens; conduct test in direction transverse to final direction of the coil rolling.
2. Coils:
 - a. Conduct Charpy Testing per ASTM A370 on an initial coil of each heat to establish uniformity of steel.
 - b. Take test coupons from an initial coil of each heat at locations of outer and inner wrap of coil.
 - c. For each coil that fails to meet acceptance criteria, conduct Charpy Testing on next two coils in that heat.
 - d. Do not use coils that do not qualify in production of pipe.
3. Plate:
 - a. Conduct Charpy Tests on each plate in accordance with ASTM A20/A20M.
 - b. Conduct on full-size (10 mm by 10 mm) specimens from each plate in accordance with ASTM A20/A20M.
 - c. Do not use plates that do not qualify in production of pipe.

- B. Crotch Plate:

1. Perform through-thickness tension testing with acceptance criteria per Article 5 of ASTM A770/A770M on each plate.
2. Conduct straight-beam ultrasonic examination with acceptance criteria per Article 6 of ASTM A435/A435M on each plate.
3. Plates that do not qualify shall not be used.

- C. Shop Hydrostatic Pressure Test: In accordance with AWWA C200 Section 5.2, except as follows:

1. General: Unless specified otherwise, testing of pipe and fittings shall be performed before lining and coating is applied.
2. Pipe: Maintain test pressure for minimum of 5 minutes.
3. Fittings:
 - a. Except as otherwise specified herein, no additional shop hydrostatic test will be required on fittings fabricated from successfully tested straight pipe.
 - b. Test with crotch plates, regardless of whether or not straight pipe sections used were previously tested.
 - c. Test Pressure: Field test pressure 120 percent of maximum rated working pressure.

- d. Maintain test pressure for a length of time as required to perform a visual inspection of welds.
 - e. No leakage is allowed.
- D. Joints, Lap-Welded:
- 1. Fit test minimum of 5 joints, selected by Engineer, of each pipe size used:
 - a. Join pipe ends with proposed adjacent pipe end.
 - b. Match-mark pipe ends.
 - c. Record Actual Annular Space:
 - 1) Maximum space at a point.
 - 2) Minimum space at a point.
 - 3) Space at 90-degree intervals; top, bottom, and spring line on both sides.
- E. Shop Nondestructive Testing:
- 1. Welds: 100 percent visually examined by Contractor's Shop Inspector to criteria in ASME BPVC SEC VIII, Division 1.
 - 2. CJP Welds: Spot radiographically or radioscopically examine pipe in accordance with ASME BPVC SEC VIII, Div. 1, Paragraph UW-52.] [B: 100 percent radioscopy examine in accordance with ASTM E1255. Acceptance criteria per ASME BPV Code, Section VIII, Division 1, Paragraph UW-51. Welds that, in opinion of Engineer, cannot readily be radiographed, shall be ultrasonically examined in accordance with paragraph UW-53.
 - 3. Fillet Welds: 100 percent examine using magnetic particle inspection method in accordance with ASME BPVC SEC VIII, Division 1, Appendix 6.
 - 4. Air test collars and wrappers in accordance with AWWA C206.
- F. Inspection of Pipe Fabrication Procedure: Select and provide independent testing agency to observe pipe fabrication. Agency staff shall have experience in observation of steel pipe fabrication in accordance with ASTM E329. Representative of agency shall be present while pipe is being fabricated and while protective coating and lining is applied. Provide a letter to Engineer certifying that pipe furnished meets requirements of this section.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General:
- 1. Joints and related work for field assembly of fittings shall conform to requirements for straight pipe, unless otherwise shown.

2. Inspect pipe and fittings before installation. Clean ends thoroughly, remove foreign matter and dirt from inside.
 3. Make minor field adjustments by pulling standard joints.
 - a. Maximum Allowable Angle: 75 percent of manufacturer's recommended or angle which results from 3/4-inch pull out from normal joint closure, whichever is less.
 - b. Maximum Allowable Gap: 1/8 inch between bell and spigot at weld location.
 4. Horizontal deflections or fabricated angles shall fall on alignment, as shown within tolerances below.
 5. Vertical deflections shall fall on alignment, and pipe angle point locations shall match those indicated on Drawings within tolerances below.
 6. For field-welded joints, pipe 30 Inches in Diameter and Larger:
 - a. Ensure maximum penetration of spigot end into bell end is achieved through use of shop-welded tabs on inside circumference of bell end or by use of a paint stripe.
 - b. If welded metal tabs are used, remove tabs prior to welding inside of joint.
 7. Stulling:
 - a. Maintain stulling in place until pipe is completely backfilled and compacted.
 - b. Reinstall stulls that were temporarily removed to facilitate interior welding prior to backfilling.
 8. Pipeline Alignment Tolerances:
 - a. Plan: 3 inches.
 - b. Elevation: 3 inches.
- B. Control of Temperature Stresses:
1. In accordance with AWWA C206, approved Temperature Stress Control Plan submittal, and this Specification.
 2. To control temperature stresses, shade unbackfilled special temperature control joint area of pipe from direct rays of sun by use of properly supported awnings, umbrellas, tarpaulins or other suitable materials until pipe is backfilled at least 1 foot over top of pipe. The special temperature control joint area is defined as the entire length of pipe left exposed. Shading materials shall not rest directly on pipe, but shall be supported to allow air circulation around pipe. Shading of special temperature control joints is not required when ambient air temperature is below 50 degrees F.
 3. Locate special temperature control joints at 300 foot intervals.
 4. Install special temperature control joints as indicated on Drawings.
 5. Design, furnish and install a pipeline temperature monitoring system consisting of thermocouple temperature gauges to monitor temperature of steel pipe wall in trench. Gauges shall be located at top inside surface

of pipe at intervals not exceeding 50 feet. Hand held portable temperature sensor devices may be used, provided temperature readings are taken at top of pipe at a frequency and spacing that demonstrates compliance with temperature control requirements.

6. Temperature Control Requirements:
 - a. Prior to and during placement of pipe backfill, pipeline steel temperature shall be at or below 90 degrees F. Monitor specified temperature and control for at least 3 hours after placement of pipe backfill. Provide supplemental cooling as required.
 - b. Place pipe backfill from a single heading starting at one special temperature control joint and proceed toward next special temperature control joint.
 - c. During period of pipe backfill placement, pipeline section that is partially backfilled shall be shaded as indicated in above. Temperature of partially backfilled pipe shall not be allowed to exceed 110 degrees F. Provide supplemental cooling as required.
 - d. Prior to welding special temperature control joints, pipeline extending 300 feet each direction from joint shall be maintained at or below 85 degrees F. Additionally, pipeline extending 300 feet each direction from joint shall be backfilled to at least 1 foot over top of pipe. Weld special temperature control joint at specified temperature of 90 degrees or below. Begin and complete weld during coolest time interval of the 24-hour day. Use pipeline temperature monitoring system data to demonstrate to Engineer coolest interval of the day.
 - e. After field welding of special temperature control joint, pipe temperature for 150 feet in each direction shall be maintained below 110 degrees F for a minimum of 24 hours after special temperature control joint area has been backfilled to at least 1 foot over top of pipe.

3.02 WELDING

- A. Perform welding only in presence of Contractor's Field Inspector.
- B. Conform to AWS D1.1/D1.1M, AWWA C206, approved welding procedures, and referenced welding codes. In case of conflict AWS D1.1/D1.1M shall govern.
- C. Preheat and Interpass temperature requirements for unlisted base metals shall be determined according to AWS D1.1/D1.1M, Annex XI Guideline on Alternative Methods for Determining Preheat.
- D. Rejectable weld defects shall be repaired or redone, and retested until sound weld metal has been deposited in accordance with appropriate welding codes.

3.03 REPAIR OF SHOP-APPLIED CEMENT-MORTAR COATINGS

- A. Exterior surfaces of steel pipe and fittings shall be inspected upon delivery to Site and just prior to backfilling trench.
- B. Repair of Cement Mortar Coating: Field repairs shall be made in accordance with AWWA C205.

3.04 REPAIR OF TAPE COATING

- A. For field repair of tape coating, power tool clean the bare pipe surface to be coated to a bright, shiny metal surface (to remove rust, mill scale, weld splatter or sharp edges). Cut and apply a patch with at least 2 inches of overlap over all adjacent unaffected tape coating. Cut a second piece of tape to cover the patch completely and wrap around the pipe at least 1.25 times the pipe circumference.

3.05 COATING OF FIELD-WELDED JOINTS

- A. Using Cement Mortar: Applied to joints in accordance with AWWA C205.
- B. For Field-Applied Tape Coating: Prior to applying tape coating to field welded joints, power tool clean the bare surface pipe to remove rust, mill scale, weld splatter, and sharp edges. The wrapping process shall start at a minimum of 4 inches beyond the cutback edge of the existing coating and start on the downside of the pipe. A minimum of two (2) layers of joint wrap tape coating shall be applied over the field joint. The joint coating system shall be applied under taught hand or machine tension that will result in a smooth, wrinkle free coating. Apply joint coating system in a spiral configuration. Perform holiday testing of all field joints.

3.06 CEMENT-MORTAR LINING APPLICATION AT JOINTS

- A. Cement-Mortar Lining: For pipe with shop-applied cement-mortar lining, place lining at joints in accordance with AWWA C205.

3.07 CATHODIC PROTECTION

- A. Apply to pipe as shown on the Drawings.

3.08 FIELD QUALITY CONTROL

- A. Field Welding:
 - 1. All welds, 100 percent inspection, shall be VT inspected by Contractor's Field Inspector and marked to indicate acceptance or rejection.

2. Test butt-strap or double-welded lap joint welds by pressurizing connection between the two fillet welds in accordance with AWWA C206.
 - a. Apply air or other Engineer-approved gas into connection between the two fillet welds.
 - b. Paint welds with soap solution.
 - c. Mark leaks indicated by escaping gas bubbles.
 - d. Close threaded openings with flush pipe plugs or by welding them.
3. CJP Welds:
 - a. Inspect 10percent of butt joint welds with full circumference RT.
 - b. Inspect 10 percent of other groove welds with UT.
4. Inspect 10 percent of lap joint welds with PT or MT
5. Weld Acceptance:
 - a. If, in the opinion of Engineer, inspections indicate inadequate quality of welds, percentage of welds inspected shall be increased.
 - b. Welds to be inspected, if less than 100 percent rate, shall be selected at random by Engineer.
 - c. VT: Perform VT per AWS D1.1/D1.1M Paragraph 6.9, Visual Inspection, Statically Loaded Nontubular Connections.
 - d. UT: Perform UT of CJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.13.1.
 - e. RT: Perform RT of CJP butt joint welds in accordance with AWS D1.1/D1.1M, Paragraph 6.12.1.
 - f. PT or MT:
 - 1) Perform on fillet and PJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.10.
 - 2) Acceptance shall be in accordance with VT standards specified above.
 - g. Remove in manner that permits proper and complete repair by welding.
 - h. Caulking or peening of defective welds is not permitted.
 - i. Retest unsatisfactory welds.
6. Verification Acceptance: Owner may conduct random nondestructive inspections of field-welded joints. Inspections will be of an appropriate type for weld being evaluated. Possible types of inspection include, but are not limited to, RT, UT, PT, and VT. Testing will be performed and evaluated per AWS D1.1/D1.1M. Provide Owner's Verification Inspector access to the Work.

3.09 MANUFACTURER'S SERVICES

- A. Manufacturer's representative available at Site for installation assistance and training of pipe installation crews.
 1. Coordinate pipe manufacturer's representative services.

2. Pipe manufacturer's representative shall visit Site and instruct, guide, and provide procedures for pipe handling, laying, and jointing at start of pipe installation by each crew.

END OF SECTION

SECTION 33 05 44 SETTLEMENT MONITORING

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes: Furnishing, installing, and monitoring settlement instrumentation for measuring ground movements around and above trenchless construction operations. The Work includes, but is not limited to: installing surface monitoring points, installing subsurface monitoring points, furnishing monitoring equipment, and recording observations and measurements from the monitoring points on a periodic basis before, during, and after trenchless construction.
- B. The Contractor is responsible for surveying the elevations of the surface and subsurface monitoring points, in accordance with the requirements herein. Elevations shall be determined before operations begin to establish a baseline, and during and after operations to monitor any movements related to the trenchless construction. All monitoring points shall be surveyed after trenchless construction has been completed to evaluate long-term settlements, as specified herein.
- C. Minimum instrumentation requirements are shown on the Plans and specified herein. Additionally, the Contractor shall install other instrumentation as necessary to control operations, monitor ground conditions and ground response to achieve specified project requirements and to prevent damage to existing structures and facilities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 33 05 23.17 – Open Shield Pipejacking

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. The publications listed below form a part of this Specification to the extent referenced. Where conflicts between these Specifications and the referenced specification, code or standard occur, the more restrictive specification shall govern. The latest edition available on the date of issue of Contract Documents shall be used.
- B. “Report of Geotechnical Investigation, Otay 2nd Pipeline Phase 1, City of San Diego”, Allied Geotechnical Engineers, Inc., September 12, 2016.

1.04 2018 Standard Specifications for Public Works Construction and “Whitebook” supplements.

1.05 DEFINITIONS

- A. Control Points: Survey points established outside the zone of influence that are tied to benchmarks used to lay out the Work. Control points are used as the baseline from which the monitoring points are measured.

- B. Settlement Monitoring Point: A point with elevation and spatial location established by survey prior to construction. The point is re-surveyed periodically to monitor ground movements. The point may be a nail, pin, subsurface settlement rod, borehole extensometer, or other device that can be readily located and surveyed.
- C. Subsurface Monitoring Point: A cased borehole settlement monitoring point located above the tunnel crown used for detecting settlement between the location of the settlement point and the tunnel excavation.
- D. Surface Monitoring Points: A marking established as a baseline for measuring elevation of the ground surface using optical survey methods.

1.06 DESIGN CRITERIA

- A. Any ground movements (settlement/heave) shall be limited to values that shall not cause damage to adjacent utilities and facilities. In no case shall settlements exceed the applicable values listed in Table 1 below.

Table 1 – Allowable Settlement / Heave		
Site Feature	Settlement/Heave	Response Level (50% of Allowable)
MTS tracks	0.50 inch	0.25 inch
City Streets	1.00 inch	0.50 inch
Underground Utilities	1.00 inch	0.50 inch
Unimproved Ground	3.00 inches	1.50 inches

- B. For the trenchless crossing, if settlements are observed at a monitoring point equal to or greater than 50 percent of the allowable limit for the given facility (as noted in Table 1) the “Response Level” is said to have been reached. The Contractor shall immediately notify the Owner, and a meeting shall be held to discuss the potential causes of the settlement and methods to prevent further settlement. If settlements continue to the maximum allowable limit, tunneling shall cease, a meeting shall be held to discuss mitigation measures and tunneling shall not resume until the mitigation plan has been implemented.

1.07 QUALITY ASSURANCE

- A. Surveyor Qualifications: All surveying shall be performed by a land surveyor licensed in the State of California.
- B. Install all monitoring points and instrumentation within one-half (0.5) foot of the horizontal and vertical location shown on the Plans or as directed by the Engineer. Other surface monitoring points shall be installed as directed by the Engineer.

- C. Should actual field conditions prevent installation of instruments at the location shown on the Plans or specified herein, obtain written acceptance from the Engineer for new instrument location and elevation.
- D. Surveying for monitoring settlement instrumentation shall be referenced to the same control points and benchmarks established for setting out the Work. Control points shall be tied to benchmarks and other monuments outside of the zone of influence of the excavation or trenchless construction.
- E. Installation of instrumentation shall, at all times, be performed in the presence of the Engineer.
- F. If subsurface monitoring point exhibit greater than 1.00 inch of ground movement, adjacent utilities must be inspected by CCTV to inspect for damage. Repair of settlement/heave damage to existing utilities is the responsibility of the Contractor.

1.08 SUBMITTALS

- A. Submittals shall be made in accordance with these Specifications. Provide sufficient detail to allow the Engineer to judge whether the proposed equipment, materials, and procedures will meet the Contract requirements. All drawings shall be legible with dimensions accurately shown and clearly marked in English. Drawings and photographs transmitted by a facsimile will not be accepted.
- B. Qualifications: Submit surveying personnel qualifications in accordance with the Paragraph 1.06 A.
- C. Submit the following, at least one (1) month before scheduled installation of monitoring points:
 - 1. Instrumentation Schedule: Submit the proposed schedule of locations for installing the surface and subsurface monitoring points.
 - 2. Description of methods and materials for installing and protecting surface and subsurface monitoring points.
 - 3. Drawings with locations of proposed monitoring points shown in plan and profile.
- D. Reports and Records:
 - 1. The Contractor shall submit all reports of monitoring data to the Engineer.
 - 2. Within 72 hours following installation of the instruments, submit drawings showing the actual as-built installed location, the instrument identification number, the instrument type, the installation date and time, and the tip elevation and instrument length. Include details of installed instruments,

accessories and protective measures including all dimensions and materials used.

3. Submit surveyed baseline measurements of all monitoring points at least fourteen (14) days prior to commencing excavation to establish baseline readings.
4. Submit surveyed measurements of monitoring points during and after construction in accordance with Part 3 of this Specification. Submit survey data to the Engineer within 24 hours of measurement. Any survey measurements that exceed the Response Values defined in Section 1.05 A must be reported immediately.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Surface Monitoring Points:

1. Surface monitoring points shall be established by an inscribed marking or approved surveyor's nail driven flush with the surface in asphalt or concrete paved areas.
2. In landscaped areas, surface monitoring points shall be established by driving a 2-inch by 2-inch timber stake flush with the ground. The stake shall be driven to a depth required to provide a stable monitoring point given the soil conditions.
3. Each monitoring point shall have a tag or marking indicating the station and offset from centerline.

B. Subsurface Monitoring Points:

1. Subsurface monitoring points shall be established and installed as indicated on the Drawings.
2. Each point shall consist of a #6 rebar settlement rod installed within and isolated from a PVC cased borehole. The settlement rod shall be driven 6 to 12 inches past the bottom of the borehole casing and the tips shall be located at five feet above the pipe crown centerline as noted on the Drawings, or as directed by the Engineer. The settlement rod shall be secured to the PVC casing with a 12-inch length of loose cable or chain to prevent the rod from falling more than approximately 12 inches.
3. The casing shall be flush with pavement or recessed, and capped and protected with a road box if installed within traffic lanes, shoulders, parking lots, or bike lanes and shall be in accordance with applicable permit requirements.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. All instrumentation shall remain the property of the Contractor following completion of the Work, and shall be removed or abandoned according to applicable codes and standards unless otherwise noted.
- B. Instrumentation shall be installed at the locations shown on the Drawings, and as approved by the Engineer. Instruments shall be installed in accordance with the approved installation schedule.
- C. The Contractor shall locate conduits and underground utilities in all areas where borings are to be drilled and instruments installed. Instrument locations shall be modified, as approved by the Engineer, to avoid interference with the existing conduit and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the Owner.
- D. Contractor shall install monitoring points and shall perform a baseline survey of all surface and subsurface settlement monitoring devices at least 14 days prior to excavation.
- E. Contractor shall provide access and assistance to the Engineer for obtaining supplemental monitoring data, as requested by Engineer.
- F. Provide data from readings of all monitoring points to the Engineer within 24 hours of reading.

3.02 MONITORING POINTS

- A. Establish a system of monitoring points. Minimum monitoring point locations are shown on the Drawings, and the locations of the remainder shall be determined jointly by the Engineer and Contractor in the field prior to construction.
- B. Surveying of monitoring points shall consist of determining the elevation of each monitoring point with respect to a benchmark selected by the Engineer to a precision of 0.01 foot.
- C. **Subsurface Monitoring Points**
 - 1. Notify the Engineer at least 3 days in advance of installing subsurface monitoring points.
 - 2. Subsurface monitoring point installations shall be completed at least 14 days in advance of commencing shaft construction, or trenchless construction.

3. Locate and confirm all utilities and protect utilities or relocate monitoring points as necessary to protect all utilities. Follow accepted industry procedures for one-call notification and visual confirmation of locations of all crossing or adjacent utilities.
4. The subsurface monitoring points shall be installed as close as practicable to the locations shown on the Drawings. The Engineer may modify subsurface monitoring point locations depending on field conditions, conflicting utilities and monitoring objectives.
5. Conduct drilling operations using appropriate methods that are consistent with anticipated geologic conditions. Use mud rotary wash methods or provide casing as required to hold drill hole open.
6. Subsurface monitoring rods shall move freely with the soil and shall be isolated from the soil surrounding the borehole by the casing.

3.03 INSTRUMENT PROTECTION, MAINTENANCE, AND REPAIR

- A. Protect the instruments and surface control points from damage. Damaged installations shall be replaced or repaired prior to continuing excavation, or trenchless construction, unless permitted otherwise in writing by the Engineer.
- B. Install protective housing with cap. Protective housing shall be installed within a flush-mounted precast concrete box or vault so as not to obstruct vehicle or foot traffic, and shall be in accordance with permit requirements.

3.04 MONITORING FREQUENCY

- A. Surface Monitoring Points: Measured daily after shaft excavation begins.
- B. Subsurface Monitoring Points: Once trenchless installation begins, subsurface monitoring points within 50 feet of the tunnel face or cutting shoe shall be surveyed once for every 10 feet of tunnel progress and at least once per day.
- C. Once trenchless operations are complete, all settlement monitoring devices shall be surveyed once per day for the first seven days, once at 14 days, and once at 30 days after completion of the trenchless work. If no settlement is detected, monitoring may be discontinued.

3.05 SETTLEMENT DAMAGE ASSESSMENT

- A. Contractor is responsible for conducting a settlement damage assessment near monitoring points that exceed the maximum allowable settlement as defined in Paragraph 1.05 A

- B. Regardless of actual settlement observed, the Contractor is responsible for conducting a post-construction CCTV inspection of the 15-inch sanitary sewer at Station 2+20. CCTV inspection should occur after contact grouting of the steel casing. It is the Contractor's responsibility to repair any damage observed during the CCTV inspection.

3.06 ABANDONMENT OF INSTRUMENTS

- A. Surface Monitoring Points: All surface monitoring points on public property shall remain in place at the completion of the Work. Remove all surface monitoring points on private property during the cleanup and restoration work, or as required by the Engineer.
- B. Subsurface monitoring points:
 - 1. Subsurface monitoring points shall be abandoned at the conclusion of the monitoring phase (See Section 3.04 C) or as required by the Engineer.
 - 2. Properly abandon all monitoring point boreholes, by grouting drilled holes with neat cement grout.
 - 3. Remove flush mounted surface boxes and restore surface to as found conditions.

END OF SECTION

SECTION 40 50 00 PROCESS CONTROL AND INSTRUMENTATION SYSTEM (PCIS) GENERAL REQUIREMENTS

PART 1 - GENERAL

A. Description

1. This section of the specifications includes materials, testing, and installation of process control and instrumentation system as specified herein and indicated on the drawings.
2. These specifications shall not be interpreted as permission or direction to violate any governing code or ordinance. Equipment, materials, and workmanship shall comply with the latest revisions of the following codes and standards:
 - a. Instrumentation: ISA - The International Society of Automation.
 - b. Wiring: National Electrical Code (NEC), ISA S5.3 and S5.4.
 - c. Control Panels: NEMA Standards Publication 250-2003.
 - d. Control Logic: NFPA 79.
 - e. Piping: ANSI B31.3 (instrumentation piping).

B. Related Work Specified Elsewhere

1. Refer to Appendix-1, 65th and Imperial Pressure Reducing Station Instrumentation & Control SCADA Requirements for the Otay 2nd Pipeline Phase I Replacement Project, DRAFT PROPOSAL - September 28, 2018.

C. Scope of Work

1. The work involves furnishing all hardware and software, PLC programming, installation, labor, material, equipment, and engineering in strict compliance with the contract documents for the City of San Diego.
2. The contractor is responsible for programming locally the PLC/PAC utilizing the most up-to-date version of Unity Pro XL application. The client will provide a sample standard PLC/PAC code and memory map address to interface the facility into the clients existing SCADA system.
3. Existing SCADA System Modifications
 - a. Existing SCADA System will be modified by Owner.
 - b. Coordinate with Owner or Owner designated integrator for communication and programming issues.

D. Submittals

1. PCIS Integrator Qualification Evidence
 - a. Submit PCIS Integrator Qualification Evidence per Section 405000 Part 1 Paragraph E.2 below.
 - b. Qualification Evidence shall be submitted prior to commencement of the work.
2. Detailed System Drawings and Data:
 - a. The submittal shall consist of six sets of detailed drawings and data prepared and organized by the Contractor. All drawings, schematics, layouts, and diagrams shall be done on 11" x 17" sheets utilizing AutoCAD.
 - b. Drawings shall contain only relevant simplified details using symbol approach. Photographic images of components depicting irrelevant details (screws, holes, logos, etc.) are not allowed.
 - c. Drawings prints shall not contain details and texts smaller than 3/64".
3. Two sets of submittals will be returned to the Contractor.
4. Submit these drawings and data as a complete package at the same time.
5. Submittals shall be in three-ring hardcover binders and arranged for convenient use including tab sheets, all indexed, and cross referenced with a separate index for each item.
6. Provide manufacturers cut sheets and manuals for all hardware to be provided.
7. Provide an Instrument Index.
8. Provide ISA type instrumentation data sheets for each component, together with a technical product brochure or bulletin. The data sheets, as a minimum, shall show:
 - a. Instrument tag designation.
 - b. Component name.
 - c. Manufacturer's model number.
 - d. Calibrated range.
 - e. Instrument location.
 - f. Input and output characteristics.
 - g. Scale range and units (if any) and multiplier (if any).
 - h. Requirements for electric supply.
9. Group the data sheets together in the submittal by type. Provide individual data sheets for each instrument with one brochure or bulletin to cover all identical uses of that component.

10. The detailed construction drawing submittal shall include, as a minimum, the following types of drawings and diagrams required for the construction of this project:
 - a. Legend, Symbols, and Index.
 - b. System Block Diagrams.
 - c. Power Distribution Diagrams.
 - d. Instrument Control Panel Layouts/Construction Drawings/Details. The drawings shall include the following:
 - (1) Dimensions
 - (2) Location of all components
 - (3) Identification of all components
 - (4) Bill of Materials
 - (5) Conduit entry area.
 - e. PLC/RTU Rack Elevation Drawing for each PLC/RTU.
 - f. Internal Panel Wiring Diagrams.
 - g. Digital I/O Module Wiring Diagrams.
 - h. Analog I/O Module Wiring Diagrams.
 - i. Detailed NFPA 79-style Ladder Diagrams (for discrete wiring) to meet the following minimum requirements:
 - (1) Each subassembly shall be shown as a rectangle in the diagram with all external terminals identified. Terminals unknown at the time of the submittal shall be left blank, to be filled later. Single contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.
 - (2) Where the internal wiring diagrams of subassemblies are furnished on separate sheets, they shall be shown as a rectangle in the schematic diagram with all external points identified and cross-referenced to the separate sheets of the control circuit. Coils and contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.
 - (3) Show unique rung numbers on left side of each rung. A cross-referencing system shall be used in conjunction with each relay coil so that associated contacts may be readily located on the diagram. The contacts shall be referenced to coils as well, so that associated coils may be readily located on the diagram. Where a relay contact appears on a sheet separate from the one on which the coil is shown, the purpose of the contact shall be described on the same sheet. Spare contacts shall be shown.

- (4) Limit, pressure, float, flow, temperature sensitive, and similar switch symbols shall be shown on the schematic (ladder) diagram with all utilities turned off (electric power, air, gas, oil, water, lubrication, etc.) and with the equipment at its normal starting position. If the equipment is shown in a specific position, the position shall be identified.
 - (5) Contacts of multiple contact devices, e.g., selector switches, shall be shown on the line of the schematic diagram where they are connected in a circuit. A mechanical connection between the multiple contacts shall be indicated by a dotted line or arrow. This does not apply to control relays, starters, or contactors. Additional charts or diagrams may be used to indicate the position of multiple contact devices such as drum, cam, and selector switches.
 - (6) The purpose or function of all switches shall be shown adjacent to the symbols. The purpose or function of controls such as relays, starters, contactors, solenoids, subassemblies, and timers on the diagram shall be shown adjacent to their respective symbols. The number of positions of the solenoid valve shall be shown adjacent to the valve solenoid symbol.
- j. Detailed Loop Interconnection Wiring Diagrams (per ISA S5.3 and S5.4) for the entire system showing all control equipment, instrumentation, electrical equipment, components, wiring, routing, boxes (pull, junction, and terminal junction), terminations, wire tags, and wire colors. The diagrams shall show the detailed interconnection of all electrical equipment, instrumentation, panels, enclosures, components and the like provided under this contract.
 - k. Arrangement and construction drawings for consoles, control panels, and for other special panels for field installation. These drawings shall include dimensions, location of all components, identification of all components, bill of materials, detailed schematics of all internal wiring, preparation and finish data, nameplates, and the like. These drawings also shall include enough other details to define the style and overall appearance of the assembly; include a finish sample for all panel surfaces.
 - l. Installation, mounting, and anchoring details for all field instruments and panel mounted components.
 - m. An instrument list including all instruments provided under this project.
 - n. An I/O List for each PLC/RTU in the project.
11. Detailed System Software Submittal: The submittal shall consist of six sets of the software system descriptions and diagrams. Two sets of submittals will be returned to the contractor. The software submittal can be made as a separate package to be inserted in the original submittal. The following items must be submitted at least eight weeks prior to the factory witness test orientation:
- a. Detailed PLC/RTU software logic diagram printouts for each PLC/RTU. Logic diagrams shall be fully annotated such that an individual unfamiliar with the diagram format can fully understand the process control logic presented.
 - b. An updated I/O List for each PLC/RTU in the project.
 - c. Narrative control descriptions for each analog and discrete control loop. Loop descriptions shall describe how each control loop will operate, the PLC control logic,

SCS control and monitoring capabilities and in general a job specific description of each control loop in the system.

- d. Sample color printouts of each Operator Interface display.
12. Complete detailed bills of material: Detailed bill of material for all components shall be provided including complete manufacturers name and model number, quantity to be provided, and cross references to data sheet sections.
13. Operation, Maintenance, and Repair Manuals (OMM):
- a. The organization of the initial submittal required above shall be compatible to eventual inclusion as one volume of the operation, maintenance, and repair manuals.
 - b. Operation manuals shall be prepared and submitted to the Owner's Representative for preliminary review in six copies. When the Owner's Representative is satisfied that these are complete and properly prepared, six final sets shall be delivered to the Owner's Representative.
 - c. The complete OMM shall contain the following:
 - (1) All the information included in the preliminary equipment submittal, the detailed installation submittal, and the additional information required herein, all bound in hard-cover binders and arranged for convenient use including tab sheets, all indexed and cross referenced with a separate index for each item.
 - (2) All final "as-built" drawings with the AutoCAD electronic files.
 - (3) Electronic files for all PLCs and Operator Interfaces programming.
 - (4) Calibration and maintenance instructions.
 - (5) Trouble-shooting instructions.
 - (6) Instructions for ordering replacement parts.

E. Qualifications and Responsibility of Contractor

- 1. The Contractor shall furnish and install all proposed hardware as shown on the drawings and as specified herein. The PLC system installation and wiring connections to peripheral equipment and instruments shall be the responsibility of the system supplier using qualified personnel possessing the necessary equipment and having experience in making similar installations. Evidence of such qualification, as well as notification of the system supplier assuming unit responsibility, shall be furnished to the Owner in writing for approval prior to commencement of the work.
- 2. Qualification Evidence: The qualification evidence shall include the following:
 - a. A list of a completed similar installation including name, address, and telephone number of the owner, name of project, and date of completion.
 - b. The name and qualifications of supervisory personnel to be directly responsible for the programming and installation of the control system.

3. Under this section, the Contractor shall furnish the following:
 - a. Instrumentation equipment.
 - b. PLC.
 - c. Control cabinets.
 - d. Spare parts.
 - e. Special tools and test equipment required by the supplier.
 - f. Installation, integration and testing.
 - g. Documentation.
 - h. Operator training.
 - i. Warranty (one year).
 - j. Shipping and receiving.
4. All calibration and final checkout of the process control and instrumentation system shall be witnessed by the Owner's Representative to determine if the system complies with the contract documents.
5. The Contractor shall be responsible for coordinating and interfacing with equipment supplied under these contract documents, which are an integral part of the system. Interfacing shall be incorporated in the detailed systems drawings and data section of the contract documents.
6. The system supplier shall be experienced in the design, programming, and service of this type of equipment. In the event of a dispute as to the acceptability of the system supplier, the Owner's Representative shall make the final determination.

F. Guarantee

1. The Contractor shall repair or replace defective components, rectify malfunctions, correct faulty workmanship, all at no additional cost to the Owner during the warranty period.
2. To fulfill this obligation, the Contractor shall utilize qualified technical service personnel designated by the Contractor who was originally assigned project responsibility. Services shall be performed within five calendar days after notification by the Owner's Representative.

G. Measurement and Payment

1. If a separate Bid item has not been provided for an item of the Work related to PCIS as described or shown in the Contract Documents, the payment shall be included in the Contract Price.

PART 2 - MATERIALS

A. Designations of Components

In these specifications and on the plans, all systems, and other elements are represented schematically and are designated by numbers, as derived from criteria in ISA standards. The nomenclature and numbers designated herein and on the plans shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

B. Instrument Tagging

Attach a stainless-steel tag to the instrument at the factory. Permanently mark the stainless-steel tag with the instrument tag number and the instrument calibration range. The manufacturer's standard metal nameplate as a minimum shall denote model number, serial number, operating electrical voltage and amperage (when applicable), and date of manufacture.

C. Instrument System Power

1. Power provided for the instrument system at the facility shall be 120-volt a-c, single phase, 60 Hz.
2. Where d-c power supplies are not furnished integral with any one instrument system loop, then provide separate solid-state power supplies.

D. Matching Style, Appearance, and Type

All display instruments of each type shall represent the same outward appearance, having the same physical size and shape and the same size and style of numbers and pointers.

PART 3 - EXECUTION

A. Uniformity of Components

Components, which perform the same or similar functions, shall, to the greatest degree possible, be of the same or similar type, the same manufacture, the same grade of construction, the same size, and the same appearance.

B. Mounting of Equipment and Accessories

Mount equipment in accordance with the installation detail drawings as prepared by the Contractor and reviewed by the Owner's Representative. Mount equipment so that they are rigidly supported, level and plumb, and in such a manner as to provide accessibility; protection from damage; isolation from heat, shock, and vibration; and freedom from interference with other equipment, piping, and electrical work. Do not install consoles, cabinets, and panels until heavy construction work adjacent to computer and telemetry equipment has been completed to the extent that there shall be no damage to the equipment.

1. Locate devices, including accessories, where they shall be accessible from grade, except as shown otherwise.
2. Mount local equipment in cabinets or existing panels as specified. Mount associated I/O terminals on a common panel or rack; mounting panels and rack shall be baked enamel.
3. Coordinate the installation of the electrical service to components related to the system to assure a compatible and functionally correct system. All accessories shall be coordinated and installation supervised by the Contractor.
4. Test the completed system after installation to assure that all components are operating with the specified range and all interlocks are functioning properly.
5. Tubing Valves, and Fittings: All instrument tubing manifolds shall be Type 316 stainless steel, unless otherwise specified elsewhere in these specifications. Tubing runs to transmitters shall be installed with a positive slope in one direction. Fittings and valves shall be Type 316 stainless steel. Block/bleed valves shall be as manufactured by Hex Valve Series HB59, or equal.

C. Calibration

1. Each instrument requiring factory calibration shall be furnished with calibration data. The calibration data shall be factory certified.
2. Calibrate systems after installation in conformance with the component manufacturer's instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation and that the components and/or systems are within the specified limits of accuracy. Defective elements, which cannot achieve proper calibration or accuracy, either individually or within a system, shall be replaced. Accomplish this calibration work by a technical field representative of the single instrument supplier. He shall certify in writing to the Owner's Representative that all calibrations have been made and that all systems are ready to operate.

D. Factory Testing

1. The fully configured Instrument Control Panel shall be successfully submitted to a witnessed factory acceptance test before shipment to the jobsite.
2. For testing purposes SCADA system shall reside on a laptop or desktop provided by the Owner.
3. Instrument Control Panel(s) shall be fully assembled and wired.
4. Factory testing shall take place at the PCIS Integrator's facility located in California.
5. The factory test will be for a minimum of one (1) day. Allow additional time for setup, breakdown and pre-testing.
6. Prior to factory system testing, submit a written detailed test procedure for review by the Owner. Notify the Owner in writing four weeks in advance of the scheduled testing.
7. Factory witness tests shall demonstrate that the system will perform each operation required for all specified conditions, including both normal and emergency operations and conditions. Provide a certification and log of all tests to the Owner for review and comment.

8. Check panel wiring against approved submittal drawings. Record any changes made during testing of the equipment on the record drawings.
9. The system shall be exercised through operational tests, under factory-simulated conditions to demonstrate that the system is fully configured to perform all control, logic, monitoring, reporting, logging, archiving and communications functions as specified and that the system is ready for field installation. All test equipment required to simulate actual field conditions shall be provided by the control system contractor.
10. The factory witness test shall take as long as necessary to demonstrate to the Owner and the Owner's Representative that the system performs each operation.
11. A return visit to the Contractor's facility for re-testing will be at the total expense of the Contractor.

E. Field Testing

1. Exercise systems through field tests in the presence of the Owner in order to demonstrate achievement of the specified performance.
2. Coordinate field tests dependent upon completion of work specified elsewhere. Schedule tests among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.

F. 5-day Acceptance Test

1. When systems are assessed to have been successfully carried through a complete operational test and the Owner concurs in this assessment, a date to start the system acceptance test involving the Owner's operating personnel will be agreed upon.
2. Recheck the systems at this time to verify proper operation, and make final adjustments. The system testing shall consist of five (5) consecutive days (Monday – Friday) of continuous testing utilizing the Owner's day shift working hours. The Contractor shall be on call ready to respond to the site within two hours after day shift working hours and on weekends. The Owner's representative will determine the severity of the problem to the best of his ability and contact the Contractor for disposition. This arrangement will in no way relieve the system supplier of responding within 2 hours and resolving the problem in a mutually agreed upon time frame not greater than 48 hours.
3. The acceptance tests shall have a success factor of 95% system uptime. If the system should fail below the 95% factor, correct the system problems. System start-up shall start over again from day one. This will continue until the system functions for five consecutive days with a 95% uptime success factor.

END OF SECTION

Appendix 1



**City Of San Diego
Public Utilities Department**

65th and Imperial Pressure Reducing Station
Instrumentation & Control SCADA Requirements for the
Otay Phase I Pipeline Replacement Project

DRAFT PROPOSAL - September 28, 2018

INTRODUCTION

In an effort to reduce operational blind areas affecting the productivity and reliability of the water distribution system in the communities of Encanto and Skyline, the water operations team is requesting design and scope addendums to the propose Otay phase I pipeline replacement project. The additional scope and design will address obsolescence, functionality and interconnectivity limitations within existing facilities along the Otay Phase I pipeline. Current obsolescence and functionality issues are preventing the water operations teams from actively monitoring the condition of pressure zones and interagency connections within the communities mentioned above.

PRESSURE ZONES

- a) Alvarado 536
- b) Bonita UH 390
- c) Paradise Mesa 610
- d) Redwood village 645
- e) CWA 740 and CWA connection 19

It is the intent of this request that the water operations team will leverage the Otay phase I project to rehabilitate nonfunctional instrumentation at water facilities along the Otay Phase I project. These project additions will reduce the operational blind areas. This will also eliminate rework and retrenching of the street after pipeline commissioning similar to the design and scope additions of the Otay Phase II project. Two additional PVC conduits for interfacing the water facilities reliably and securely were included on the contract documents of Otay phase II. In summary, an equal number of conduits and instrumentation is being requested for inclusion into the design of the Otay phase I project. The driving force of this scope addendum is the operability and sustainability of the water distribution system in the areas defined above. The two PVC conduits will be utilized for future Fiber Optic (FO) cable interfaces between the water facilities along the pipeline.

BACKGROUND

Five existing facilities are within route of the Otay phase I project. 65th & HERRICK WATER PUMP STATION, 65th & IMPERIAL PRESSURE REDUCING STATIONS, WOODMAN & IMPERIAL PRESSURE REDUCING STATIONS, CIELO & WOODMAN WATER PUMP STATION and SKYLINE & WOODMAN PRESSURE REDUCING STATIONS.

Each of these facilities provide specific functions within each of the pressure zones above of the water distribution system. The condition of these facilities varies from functional to nonfunctional. The equipment at each of these facilities is not limited to pressure reducing, pressure sustaining, flow monitoring, and pumping. Permitting scope addendum approval leveraging this project construction effort, it is recommended that nonfunctional facilities be rehabilitated to resume operation and monitoring within the pressure zones above. It is understood that the rehabilitation of the facilities was not accounted for in the current scope of the Otay phase I project. For your consideration, please include scope and design addendums as suggested herein standard Instrumentation for water facilities within the Otay phase I project.

65th & IMPERIAL PRESSURE REDUCING STATION

VAULT FIELD SENSOR AND INSTRUMENTATION

Provide instrumentation design and scope for facility monitoring and control of vault and valve(s) as defined in Table 1.

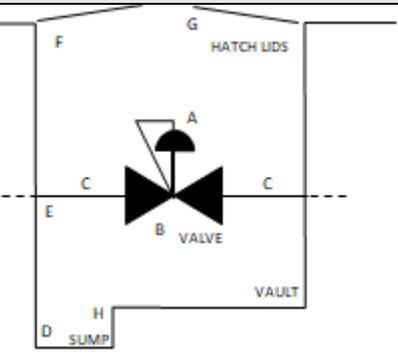
EQUIPMENT	ITEM	SENSOR TYPE	TYPE (AI=Analog Input) (DI=Digital Input)	QTY
	A	POSITION TRANSMITTER	AI	1
	B	FLOW TRANSMITTER	AI	1
	C	PRESSURE TRANSMITTER	AI	2
	D	FLOAT SWITCH (SUMP FLOODED)	DI	1
	E	FLOAT SWITCH (VAULT FLOODED)	DI	1
	F	FLOAT SWITCH (VAULT SUBMERGED)	DI	1
	G	HATCH INTRUSION (Motion type)	DI	2
	H	SUMP PUMP	NA	1

Table 1 - Vault Instrumentation

REMOTE CONTROL PANEL (RCP) HARDWARE

- a. Provide design and scope for control and monitoring hardware as described in Table 2 and Figure 2. The internal components of the RCP should be currently supported by manufacturers. Each device should be a current release and with up-to-date hardware. All the RCP devices should be 24VDC and rail mountable technologies suitable for harsh environments typical of industrial control applications. Antenna quantity and location to be determined at a later date.

ITEM	DESCRIPTION	MANUFACTURER	MODEL	QTY
1	Network Router	CISCO	C1111-8P-LTEEA/LA	1
2	Network Firewall	CISCO	ISA 3000	1
3	Network switch	CISCO	IE-2000-8TC-G-E	1
4	Programmable Logic Controller	Schneider Elec.	171 CBU 980 91	1
5	Analog Input module	Schneider Elec.	170 AAI 030 00	1
6	Discrete Input/Output Module	Schneider Elec.	170 ADM 350 10	1
7	Discrete input cable fast	Phoenix Contact	TBD	TBD
8	Analog input cable fast	Phoenix Contact	TBD	TBD
9	Lithium ion battery pack	Phoenix Contact	TBD	TBD
10	24Vdc Power supply	Phoenix Contact	TBD	1
11	Fiber Optic patch panel (WIC)	CORNING	SC six strand FO terminal (2) single mode	1
12	Stainless Steel Enclosure	HOFFMAN	Not to exceed 5ft height	1
13	Stainless Steel stands	HOFFMAN	TBD	2
14	Motion Sensor Intrusion Detection	TBD	TBD	2

Table 2 - Pressure Reducing Station RCP Hardware BOM

- b. The RCP should comply with the most current technical requirements to remotely control and monitor the Pressure Reducing Station (PRS). The hardware should consist of Programmable Logic Controllers (PLCs)

WSO Instrumentation & Control SCADA requirements for the Otay phase I Pipeline replacement projects and submodules to interface the PRS remotely to the SCADA control center with the client's choice of cellular carrier via a commercial wireless solution. See Figure 1.

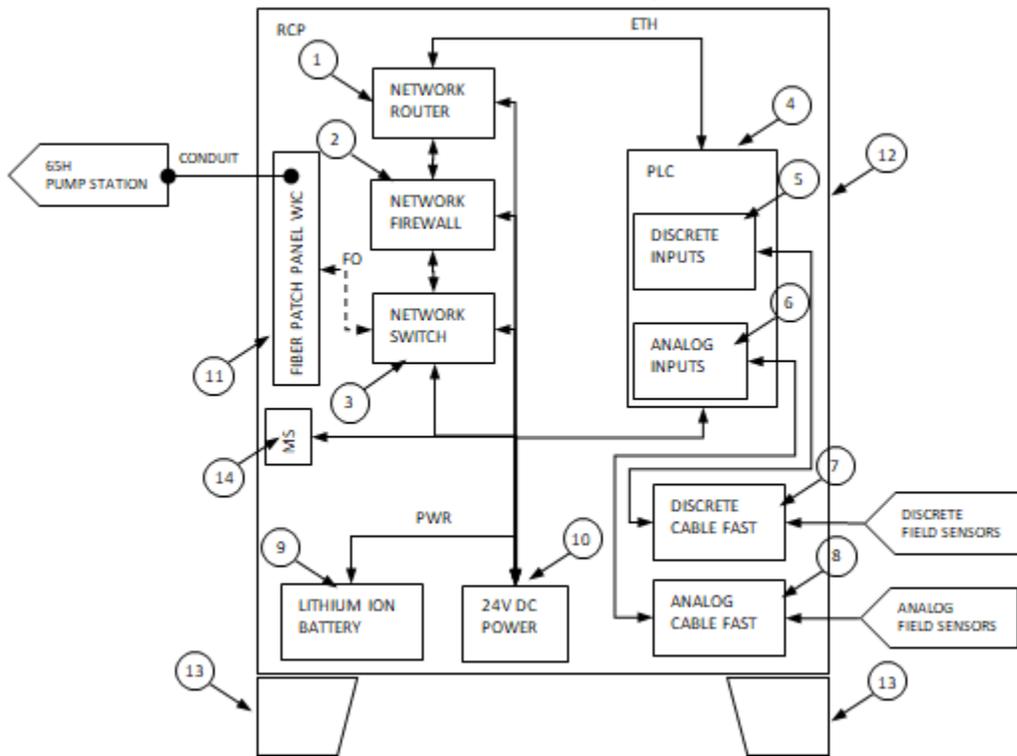


Figure 1 - Pressure Reducing Station RCP Hardware.

PRESSURE REDUCING STATION PROGRAMMING AND CONFIGURATIONS

- a. The RCP panel devices shall be programmed and configured by the contractor. The owner will provide IP addressing schemes including hard and soft PLC I/O memory maps for the contractor to interpret and use as reference to code the PLC. The design consultant should calculate the instrument ranges, thresholds and coordinate these values with the contractor. The project Input/Output schedule as shown in Table 3 field I/O should be the starting minimal design.

ITEM	DESCRIPTION	LOCATION	I/O TYPE (AI=Analog Input) (DI=Digital Input)	SENSOR TYPE
1	RCP AC Power fail	RCP	DI	Auxiliary contact
2	RCP DC Power fail	RCP	DI	Auxiliary contact
3	RCP Intrusion Detection	RCP	DI	Motion switch
4	Flow meter	VALVE 1	AI	Insertion vortex flow
5	Valve position indicator	VALVE 1	AI	Mechanical link
6	Insertion Flow meter	VALVE 2	AI	Insertion vortex flow
7	Valve position indicator	VALVE 2	AI	Mechanical link
8	Downstream pressure transmitter	PIPE HEADER	AI	Water tight sensor
9	Upstream pressure transmitter	PIPE HEADER	AI	Water tight sensor
10	Vault submerged	VAULT	DI	Float switch
11	Vault flood	VAULT	DI	Float switch
12	Vault sump flood	SUMP	DI	Float switch
13	Vault intrusion detection	VAULT	DI	Motion switch

Table 3 - Vault Field I/O

- b. The PLC should be programmed in Unity Pro XL application in accordance with IEC 61131-3 function block. The PLC program shall be divided into specific purpose segments each with unique names. The owner should provide existing PLC project templates for the contractor to use as reference as necessary. The contractor should enhance the functionality of the PLC program to include hardware health. All the hard field I/O and sensors will need to be processed in the PLC code and moved into holding registers. The PLC program should be well documented in a software manual. As a minimum, the following PLC program segments should include the following:
- PLC system health
 - PLC Clock Read/Write
 - PLC Program version (Change control)
 - Analog input hysteresis
 - Analog loop health
 - Discrete inputs
 - Power monitor
 - Remote I/O Read/Write

SECTION 40 50 20 INSTRUMENTATION EQUIPMENT

PART 1 - GENERAL

1.01 Designations of Components

In these specifications and on the plans, all systems, meters, instruments, and other elements are represented schematically and are designated by numbers, as derived from criteria in ISA standards. The nomenclature and numbers designated herein and on the plans shall be employed exclusively throughout shop drawings, data sheets, and the like. Any other symbols, designations, and nomenclature unique to a manufacturer's standard methods shall not replace those prescribed above, as used herein, and on the plans.

1.02 Signal Characteristics

Wherever possible and feasible, components shall be of electronic solid-state design and systems shall utilize the same signal characteristics throughout each and all of the several systems; transmission signals shall be 4 mA to 20 mA. The combined power supply and transmitter loops shall, when tested with appropriate precision resistors, present a voltage signal of 1- to 5-volt DC. Signal isolators shall be provided where required.

PART 2 - MATERIALS

2.01 Pressure Transmitter

- A. The pressure transmitter shall be of the microprocessor-based type 2-wire system. The transmitter shall operate from a 24 V dc source. The output signal shall be 4 mA to 20 mA dc. The transmitter shall be housed in a NEMA 4X enclosure.
- B. Configuration data shall be stored in nonvolatile EEPROM memory in the transmitter electronics module. This data shall be retained in the transmitter when power is interrupted, so the transmitter shall be functional immediately upon power up. The transmitter shall perform continuous self-tests. In the event of a problem, the transmitter shall activate the user-selected analog output warning. A HART Communicator or other HART-based communications device shall be able to interrogate the transmitter to determine the problem. The transmitter shall output specific information to the communicator identifying the problem for fast and easy corrective action.
- C. The pressure transmitter shall provide an electronic signal proportional to the calibrated pressure range. The pressure-sensing element shall be silicone oil filled with a process media operating temperature range of -40 °F to 250 °F. An integral stainless steel block/bleed manifold (pre-assembled to the transmitter and leak checked) shall be provided for each transmitter. The manifold shall have a block and a vent/test valves.
- D. Provide the pressure transmitter with the following features:
 1. Independent external zero and span adjustments.
 2. Overrange protection.

- 3. Integral digital indicator, calibrated in engineering units.
- E. Accuracy of the pressure transmitter shall be $\pm 0.2\%$ of calibrated span.
- F. Calibrate pressure transmitter for 0-100 psi (4-20 mA dc output to RTU) or as advised by California Water Services staff.
- G. Connection size shall be 1/2 inch NPT.
- H. The pressure transmitter shall be manufactured by Rosemount, Model 2088 with Model 306RT1 Block-and-Bleed Manifold.

2.02 Hatch Intrusion Switch

- A. Provide a heavy-duty, precision turret-head type limit switch with one normally open and one normally closed contact along with an adjustable lever arm with oil-impregnated sintered iron roller.
- B. The switches shall be interfaced with PLCs.
- C. Mount switch on access door inside doorframe such that when the door is at least 15° opened, the normally open switch contact shall close; and when the door is closed, the normally open switch contacts shall open.
- D. Provide a Square D, Class 9007, Type C switch, or equal.

2.03 Flood Level Switch, Float Type

- A. The switch shall be float-actuated type with contact ratings not less than 100 mA at 120-volt ac. Housing shall be watertight construction with non-corrosive materials for wetted components. Float actuator shall be enclosed in an envelope to provide slosh shielding.
- B. The flood level switch shall be Gems Model LS-270, or equal.

END OF SECTION

APPENDIX I
SAMPLE OF PUBLIC NOTICE



CONSTRUCTION NOTICE

PROJECT TITLE

Work on your street will begin within one week to replace the existing water mains servicing your community.

The work will consist of:

- Saw-cutting and trench work on Ingulf Street from Morena Boulevard to Galveston Street to install new water mains, water laterals and fire hydrants.
• Streets where trenching takes place will be resurfaced and curb ramps will be upgraded to facilitate access for persons with disabilities where required.
• This work is anticipated to be complete in your community by December 2016.

How your neighborhood may be impacted:

- Water service to some properties during construction will be provided by a two-inch highline pipe that will run along the curb. To report a highline leak call 619-515-3525.
• Temporary water service disruptions are planned. If planned disruptions impact your property, you will receive advance notice.
• Parking restrictions will exist because of the presence of construction equipment and materials.
• "No Parking" signs will be displayed 72 hours in advance of the work.
• Cars parked in violation of signs will be TOWED.

Hours and Days of Operation:

Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX



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Monday through Friday X:XX AM to X:XX PM.

City of San Diego Contractor:

Company Name, XXX-XXX-XXXX

To contact the City of San Diego: SD Public Works 619-533-4207 | engineering@sandiego.gov | sandiego.gov/CIP

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APPENDIX J

ADVANCED METERING INFRASTRUCTURE (AMI) DEVICE PROTECTION

Protecting AMI Devices in Meter Boxes and on Street Lights

The Public Utilities Department (PUD) has begun the installation of the Advanced Metering Infrastructure (AMI) technology as a new tool to enhance water meter reading accuracy and efficiency, customer service and billing, and to be used by individual accounts to better manage the efficient use of water. **All AMI devices shall be protected per Section 5-2, "Protection", of the 2015 Whitebook.**

AMI technology allows water meters to be read electronically rather than through direct visual inspection by PUD field staff. This will assist PUD staff and customers in managing unusual consumption patterns which could indicate leaks or meter tampering on a customer's property.

Three of the main components of an AMI system are the:

- A. Endpoints, see Photo 1:

Photo 1



B. AMI Antenna attached to Endpoint (antenna not always required), see Photo 2:

Photo 2



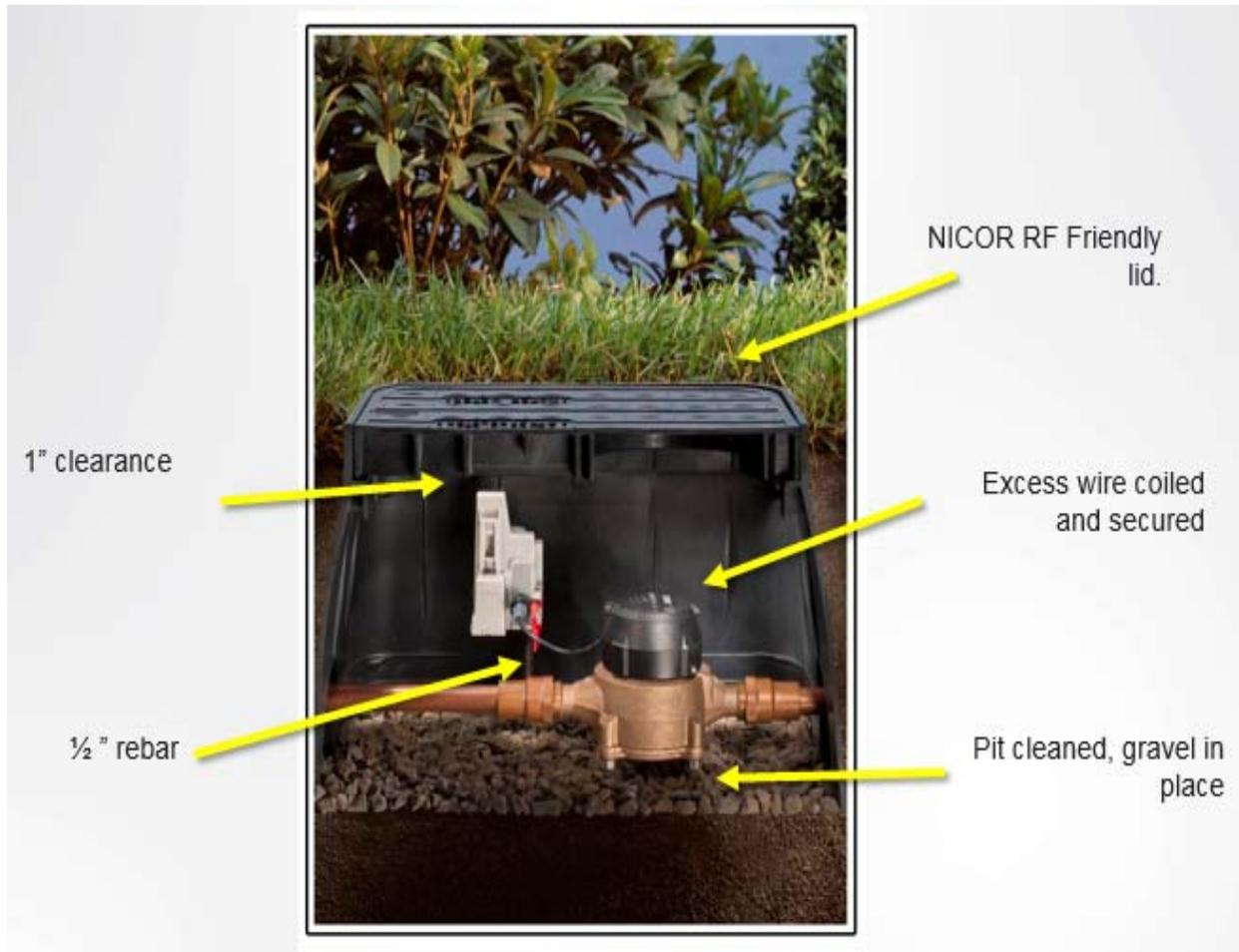
Network Devices, see Photo 3:

Photo 3



AMI endpoints transmit meter information to the AMI system and will soon be on the vast majority of meters in San Diego. These AMI devices provide interval consumption data to the PUD's Customer Support Division. If these devices are damaged or communication is interrupted, this Division will be alerted of the situation. The endpoints are installed in water meter boxes, coffins, and vaults adjacent to the meter. A separate flat round antenna may also be installed through the meter box lid. This antenna is connected to the endpoint via cable. The following proper installation shall be implemented when removing the lid to avoid damaging the antenna, cable, and/or endpoint. Photo 4 below demonstrates a diagram of the connection:

Photo 4



The AMI device ERT/Endpoint/Transmitter shall be positioned and installed as discussed in this Appendix. If the ERT/Endpoint/Transmitter is disturbed, it shall be re-installed and returned to its original installation with the end points pointed upwards as shown below in Photo 5.

The PUD's code compliance staff will issue citations and invoices to you for any damaged AMI devices that are not re-installed as discussed in the Contract Document

Photo 5 below shows a typical installation of an AMI endpoint on a water meter.

Photo 5

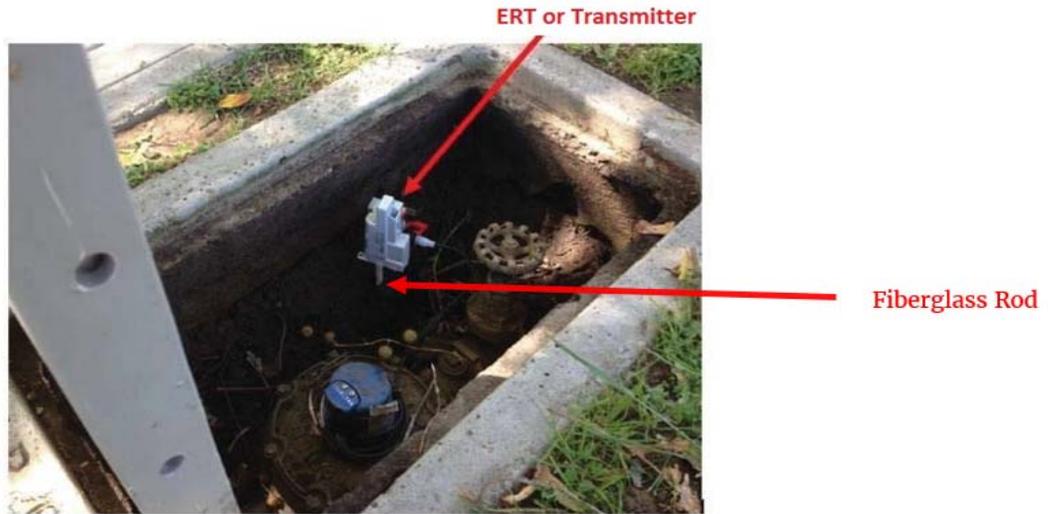


Photo 6 below is an example of disturbance that shall be avoided:

Photo 6



You are responsible when working in and around meter boxes. If you encounter these endpoints, use proper care and do not disconnect them from the registers on top of the water meter. If the lid has an antenna drilled through, do not change or tamper with the lid and inform the Resident Engineer immediately about the location of that lid. Refer to Photo 7 below:

Photo 7



Another component of the AMI system are the Network Devices. The Network Devices are strategically placed units (mainly on street light poles) that collect interval meter reading data from multiple meters for transmission to the Department Control Computer. **If you come across any of these devices on street lights that will be removed or replaced (refer to Photos 8 and 9 below), notify AMI Project Manager Arwa Sayed at (619) 362-0121 immediately.**

Photo 8 shows an installed network device on a street light. On the back of each Network Device is a sticker with contact information. See Photo 9. **Call PUD Water Emergency Repairs at 619-515-3525 if your work will impact these street lights.** These are assets that belong to the City of San Diego and you shall be responsible for any costs of disruption of this network.

Photo 8



Network Device

Photo 9



If you encounter any bad installations, disconnected/broken/buried endpoints, or inadvertently damage any AMI devices or cables, notify the Resident Engineer immediately. The Resident Engineer will then immediately contact the AMI Project Manager, Arwa Sayed, at (619) 362-0121.

APPENDIX K

MTS SDA AND E EXCAVATION SUPPORT SYSTEMS REQUIREMENTS

MTS/SDA&E EXCAVATION SUPPORT SYSTEMS REQUIREMENTS

A-1 GENERAL

This Section specifies procedures, performance criteria and requirements for providing safe and stable excavations throughout construction. Provide temporary sheeting, shoring and bracing systems as required by the Work. Meet all codes, regulations, and requirements of agencies having jurisdiction over this Work. Obtain all required Federal OSHA, Cal/ OSHA and local jurisdiction permits.

Work under this Section, shall include but shall not be limited to:

- A. Design of the temporary support systems
- B. Construction of temporary sheeting, shoring, and bracing systems
- C. Employing acceptable side slope layback methods for excavations
- D. Maintenance of bracing systems and removal
- E. All associated design Work

A-2 SUBMITTALS

General Excavation Support Procedure: Submit an outline of intended excavation support systems and associated installation and removal procedures as required for the Work. This submittal is for the Engineer's general information and in no way relieves the Contractor of complete responsibility for the successful performance of his intended excavation methods.

Sheeting and/or Shoring Drawings: Required for sheeting, shoring and other excavation support systems, and conforming to the following requirements:

- 1. Drawings shall be prepared, signed and sealed by a Professional Engineer licensed to practice in the State of California.
- 2. Include plan views indicating the extents of all proposed shoring relative to the nearest track centerline.
- 3. Include cross-sections of all proposed shoring.
- 4. Include cross-sections cut perpendicular to the track; indicate the track location relative to the support system and use equal horizontal and vertical scales.
- 5. Vertical dimensions shall be relative to top of rail and horizontal elevations shall be relative to the nearest track centerline.
- 6. Drawings shall also indicate details of all structural members, connection details, and embedment depths.
- 7. Indicate construction access locations.

Design Calculations: Required for sheeting, shoring and other excavation support systems; prepared, signed, and sealed by a Professional Engineer licensed to practice in the State of California.

A-3 DESIGN CRITERIA

Design the excavation support in accordance with AASHTO and AREMA requirements, to support all loads including: earth pressures, AASHTO HS20 traffic loading, AREMA Cooper E-80 Railroad Loading, utility loads, loads from adjacent structures, ground water pressure, and equipment and construction loads. No increases in allowable stresses or reductions of safety factors shall be allowed.

The excavation support shall allow safe and expeditious construction of the permanent structure without movement or settlement of adjacent buildings, structures, utilities, or track work.

Excavations and shoring systems shall be such that AREMA Cooper E-80 Loading can be accommodated at all times during the shoring construction. Shoring construction shall be performed without affecting railroad operations unless otherwise approved in advance by the Engineer.

Temporary sheeting and shoring for support of adjacent tracks during construction shall not be closer than 8'-6" from the nearest track centerline (refer to CPUC G026-D and 118).

Excavation and Shoring requirements within the Sheet Piling Zone: The Sheet Piling Zone shall be defined as the area between the following boundaries:

A vertical line offset 8'-6" from the nearest track centerline

A 1:1 projection beginning at a point located 8'-6" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1:1 projection shall slope down and away from the nearest track.

Un-shored excavations within the Sheet Piling Zone shall not be allowed. Shoring within the Sheet Piling Zone shall be of a type where the shoring is installed in place prior to any excavation being performed, and where the excavation can be made with no possibility of disturbance or loss of soil material retained between the shoring and the track. Common shoring types fulfilling this requirement are interlocking-edge sheet piling, tongue and groove edge precast concrete sheet piling, which are driven or vibrated in position prior to starting any excavation. Unless otherwise indicated in the Project Specific Specifications, on the plans, or as approved by the Engineer, shoring within the Sheet Piling Zone shall be abandoned in place, except for the top 2 feet, which shall be removed, and backfilled in accordance with these specifications. Shoring types using lagging elements, which are placed as excavation proceeds, are not permitted within the Sheet Piling Zone. Shoring within the Sheet Piling Zone shall be designed for AREMA Cooper E-80 Loading.

Excavation and Shoring requirements within the Shoring Zone: The Shoring Zone shall be defined as the area between the following boundaries:

A 1:1 projection beginning at a point located 8'-6" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1:1 projection shall slope down and away from the nearest track.

A 1.5:1 projection beginning at a point located 11'-0" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1.5:1 projection shall slope down and away from the nearest track.

Un-shored excavations within the Shoring Zone shall not be allowed. Shoring types using lagging elements, which are placed, as excavation proceeds are allowable within the Shoring Zone. Shoring within the Shoring Zone shall be designed for AREMA Cooper E-80 Loading.

Excavation and Shoring requirements within the Excavation Zone: The Excavation Zone shall be defined as the area that is located beyond (i.e. in a direction away from the nearest track) the following boundary:

A 1.5:1 projection beginning at a point located 11'-0" from the nearest track centerline and 2 feet below top of rail of the nearest track. Said 1.5:1 projection shall slope down and away from the nearest track.

Sloping cuts are allowed within the Excavation Zone. Excavations and shoring within the Excavation Zone are not required to be designed for railroad live loading.

Provide handrails in accordance with Cal-OSHA and CPUC General Order 26-D.

Tiebacks or any other excavation support mechanisms that are installed under the track structure shall be at least 24 inches clear below top of rail.

Hello,

MTS has concluded the plan review for the City of San Diego's Otay 2ND Pipeline project.

The attached file contains a plan review acceptance (PRA) letter for the project files. Once the project is ready to start construction the work will be authorize via a right of entry (ROE) permit. The contractor will need to apply for a ROE permit and reference the attached PRA letter. Also, prior to issuing any ROE permits the City will need to resolve all entitlement matters for new right of way facilities prior to a permit being issued. ROE submittal requirements can be found by visiting the link below.

Link to MTS Submittal Requirements

<https://www.sdmts.com/business-center-permits/right-entry>

If you and your team have any questions do not hesitate to contact me. For all entitlement related matters please contact MTS Manager of Real Estate Assets, Tim Allison at Tim.Allison@sdmts.com.



PLAN REVIEW / RIGHT OF ENTRY APPLICATION

1255 Imperial Avenue, Suite 1000
San Diego, CA 92101-7490
Telephone: 619.557.4501
Fax: 619.230.6878

Submittal Date:

FOR MTS USE ONLY

MTS Doc. No.	<input type="text"/>
Application No.	<input type="text"/>
Date MTS recd	<input type="text"/>
Milepost Limits	<input type="text"/>

APPLICANT INSTRUCTIONS

Complete all applicable boxes below (click in boxes to type & then print) and return with submittal requirements (as noted below).

Submittal Requirements:

- 1) 8½ X 11 vicinity map
- 2) 3 full- & 3 half-size sets of plans, drawings, exhibits
- 3) 3 sets of reports, specs, & calculations if applicable
- 4) Nonrefundable application fee of \$750
- 5) Electronic submittal of plans and exhibits

- * Make checks payable to *Metropolitan Transit System*
- * Additional permit fees, copies, and information may be required upon request to the Metropolitan Transit System

Applicant Name & Company (Owner/Project Manager)	Permittee Name & Company (Contractor/Engineer/Firm)
<input type="text" value="City of San Diego / Mike Bajoua, P.E."/>	<input type="text"/>

Applicant Mailing Address	Permittee Mailing Address
<input type="text" value="Public Works Dept./AEP Division
9192 Topaz Way
San Diego, CA 92123"/>	<input type="text"/>

Contact person: <input type="text" value="Mike Bajoua, P.E."/>	Contact person: <input type="text"/>
Telephone: <input type="text" value="619-533-4628"/>	Telephone: <input type="text"/>
Fax: <input type="text"/>	Fax: <input type="text"/>
E-mail: <input type="text" value="mbajoua@sandiego.gov"/>	E-mail: <input type="text"/>

Project Location (street address and nearest cross street)
<input type="text" value="65th Street and Akins Avenue, San Diego"/>

Project Description
<input type="text" value="A 60-inch diameter steel casing will convey a 48-inch diameter water main in a trenchless crossing of Imperial Avenue, Akins Avenue, a concrete-line drainage channel and the SDTI/MTS trolley lines. The proposed crossing will be approximately 155-foot- long and approximately 20-foot-deep under the trolley tracks."/>

Anticipated Dates -	Begin work: <input type="text" value="2/2019"/>	End work: <input type="text" value="9/2019"/>
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Authorizing Agencies / Jurisdictions (i.e., MTS, NCTD, local cities & counties, government agencies, etc.)
<input type="text" value="City of San Diego, MTS."/>

ATTACHMENT F
RESERVED

ATTACHMENT G
CONTRACT AGREEMENT

CONTRACT AGREEMENT

CONSTRUCTION CONTRACT

This Phase-Funded contract is made and entered into between THE CITY OF SAN DIEGO, a municipal corporation, herein called "City", and Cass Construction, Inc., herein called "Contractor" for construction of **Otay 2nd Pipeline Phase I**; Bid No. **K-19-1832-DBB-3**; in the total amount of Ten Million Seven Hundred Seventy Thousand Fifty Four Dollars and Zero Cents (\$10,770,054.00), which is comprised of the Base Bid, consisting of an amount not to exceed \$5,000,000.00 for Phase I and \$5,770,054 for Phase II.

IN CONSIDERATION of the payments to be made hereunder and the mutual undertakings of the parties hereto, City and Contractor agree as follows:

1. The following are incorporated into this contract as though fully set forth herein:
 - (a) The attached Faithful Performance and Payment Bonds.
 - (b) The attached Proposal included in the Bid documents by the Contractor.
 - (c) Reference Standards listed in the Instruction to Bidders and the Supplementary Special Provisions (SSP).
 - (d) Phased Funding Schedule Agreement.
 - (e) That certain documents entitled **Otay 2nd Pipeline Phase I**, on file in the office of the Public Works Department as Document No. **B-14092**, as well as all matters referenced therein.
2. The Contractor shall perform and be bound by all the terms and conditions of this contract and in strict conformity therewith shall perform and complete in a good and workmanlike manner **Otay 2nd Pipeline Phase I**, Bid Number **K-19-1832-DBB-3**, San Diego, California.
3. For such performances, the City shall pay to Contractor the amounts set forth at the times and in the manner and with such additions or deductions as are provided for in this contract, and the Contractor shall accept such payment in full satisfaction of all claims incident to such performances (See WHITEBOOK, Section 7-3.10, Phased Funding Compensation).
4. No claim or suit whatsoever shall be made or brought by Contractor against any officer, agent, or employee of the City for or on account of anything done or omitted to be done in connection with this contract, nor shall any such officer, agent, or employee be liable hereunder.
5. This contract is effective as of the date that the Mayor or designee signs the agreement, and is approved by the City Attorney in accordance with San Diego Charter Section 90.

CONTRACT AGREEMENT (continued)

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

APPROVED AS TO FORM

Mara W. Elliott, City Attorney

By [Signature]

By [Signature]

Print Name: James Nagelvoort
Director
Public Works Department

Print Name: Mark H. Mercer
Deputy City Attorney

Date: 11/20/19

Date: 11/22/19

CONTRACTOR

By [Signature]

Print Name: Wes Wise

Title: President

Date: 11/15/19

City of San Diego License No.: B1974017184

State Contractor's License No.: 298336

DEPARTMENT OF INDUSTRIAL RELATIONS (DIR) REGISTRATION NUMBER: 1000010675

CERTIFICATIONS AND FORMS

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

BIDDER'S GENERAL INFORMATION

To the City of San Diego:

Pursuant to "Notice Inviting Bids", specifications, and requirements on file with the City Clerk, and subject to all provisions of the Charter and Ordinances of the City of San Diego and applicable laws and regulations of the United States and the State of California, the undersigned hereby proposes to furnish to the City of San Diego, complete at the prices stated herein, the items or services hereinafter mentioned. The undersigned further warrants that this bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

The undersigned bidder(s) further warrants that bidder(s) has thoroughly examined and understands the entire Contract Documents (plans and specifications) and the Bidding Documents therefore, and that by submitting said Bidding Documents as its bid proposal, bidder(s) acknowledges and is bound by the entire Contract Documents, including any addenda issued thereto, as such Contract Documents incorporated by reference in the Bidding Documents.

NON-COLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID UNDER 23 UNITED STATES CODE 112 AND PUBLIC CONTRACT CODE 7106

State of California

County of San Diego

The bidder, being first duly sworn, deposes and says that he or she is authorized by the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

CONTRACTOR CERTIFICATION

DRUG-FREE WORKPLACE

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-17 regarding Drug-Free Workplace as outlined in the WHITEBOOK, Section 5-1.3, "Drug-Free Workplace", of the project specifications, and that;

This company_has in place a drug-free workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of subdivisions a) through c) of the policy as outlined.

CONTRACTOR CERTIFICATION

AMERICANS WITH DISABILITIES ACT (ADA) COMPLIANCE CERTIFICATION

I hereby certify that I am familiar with the requirements of San Diego City Council Policy No. 100-4 regarding the Americans With Disabilities Act (ADA) outlined in the WHITEBOOK, Section 5-1.2, "Americans With Disabilities Act", of the project specifications, and that:

This company has in place workplace program that complies with said policy. I further certify that each subcontract agreement for this project contains language which indicates the subcontractor's agreement to abide by the provisions of the policy as outlined.

CONTRACTOR CERTIFICATION

CONTRACTOR STANDARDS – PLEDGE OF COMPLIANCE

I declare under penalty of perjury that I am authorized to make this certification on behalf of the company submitting this bid/proposal, that as Contractor, I am familiar with the requirements of City of San Diego Municipal Code § 22.3004 regarding Contractor Standards as outlined in the WHITEBOOK, Section 5-1.4, ("Contractor Standards"), of the project specifications, and that Contractor has complied with those requirements.

I further certify that each of the Contractor's subcontractors has completed a Pledge of Compliance attesting under penalty of perjury of having complied with City of San Diego Municipal Code § 22.3004.

CONTRACTOR CERTIFICATION

EQUAL BENEFITS ORDINANCE CERTIFICATION

I declare under penalty of perjury that I am familiar with the requirements of and in compliance with the City of San Diego Municipal Code § 22.4300 regarding Equal Benefits Ordinance.

CONTRACTOR CERTIFICATION

EQUAL PAY ORDINANCE CERTIFICATION

Contractor shall comply with the Equal Pay Ordinance (EPO) codified in the San Diego Municipal Code (SDMC) at section 22.4801 through 22.4809, unless compliance is not required based on an exception listed in SDMC section 22.4804.

Contractor shall require all of its subcontractors to certify compliance with the EPO in their written subcontracts.

Contractor must post a notice informing its employees of their rights under the EPO in the workplace or job site.

By signing this Contract with the City of San Diego, Contractor acknowledges the EPO requirements and pledges ongoing compliance with the requirements of SDMC Division 48, section 22.4801 et seq., throughout the duration of this Contract.

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:

Otay 2nd Pipeline Phase I
(Project Title)

as particularly described in said contract and identified as Bid No. **K-19-1832-DBB-3**; SAP No. **B-14092**; and **WHEREAS**, the specification of said contract requires the Contractor to affirm that "all brush, trash, debris, and surplus materials resulting from this project have been disposed of in a legal manner"; and **WHEREAS**, said contract has been completed and all surplus materials disposed of:

NOW, THEREFORE, in consideration of the final payment by the City of San Diego to said Contractor under the terms of said contract, the undersigned Contractor, does hereby affirm that all surplus materials as described in said contract have been disposed of at the following location(s)

and that they have been disposed of according to all applicable laws and regulations.

Dated this _____ DAY OF _____, _____.

By: _____
Contractor

ATTEST:

State of _____ County of _____

On this _____ DAY OF _____, 2____, before the undersigned, a Notary Public in and for said County and State, duly commissioned and sworn, personally appeared _____ known to me to be the _____ Contractor named in the foregoing Release, and whose name is subscribed thereto, and acknowledged to me that said Contractor executed the said Release. Notary Public in and for said County and State.

LIST OF SUBCONTRACTORS

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY *** SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION**

In accordance with the requirements of the "Subletting and Subcontracting Fair Practices Act", Section 4100, of the California Public Contract Code (PCC), the Bidder is to list below the name, address and license number of each Subcontractor who will perform work, labor, render services or specially fabricate and install a portion [type] of the work or improvement, in an amount of or in excess of 0.5% of the Contractor's total Bid. Failure to comply with this requirement may result in the Bid being rejected as non-responsive. The Contractor is to list only one Subcontractor for each portion of the Work. The Bidder's attention is directed to the Special Provisions - Section 3-2, "SELF-PERFORMANCE", which stipulates the percentage of the Work to be performed with the Bidder's own forces. The Bidder is to also list all SLBE, ELBE, DBE, DVBE, MBE, WBE, OBE, SDB, WoSB, HUBZone, and SDVOSB Subcontractors for which the Bidders are seeking recognition towards achieving any mandatory, voluntary, or both subcontracting participation percentages.

NAME, ADDRESS AND TELEPHONE NUMBER OF SUBCONTRACTOR	CONSTRUCTOR OR DESIGNER	SUBCONTRACTOR LICENSE NUMBER	TYPE OF WORK	DOLLAR VALUE OF SUBCONTRACT	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB [ⓐ]	WHERE CERTIFIED [ⓑ]	CHECK IF JOINT VENTURE PARTNERSHIP
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____							

- ⓐ 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.

NAMED EQUIPMENT/MATERIAL SUPPLIER LIST

***** PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY *** TO BE SUBMITTED IN ELECTRONIC FORMAT ONLY *** SEE INSTRUCTIONS TO BIDDERS FOR FURTHER INFORMATION**

NAME, ADDRESS AND TELEPHONE NUMBER OF VENDOR/SUPPLIER	MATERIALS OR SUPPLIES	DOLLAR VALUE OF MATERIAL OR SUPPLIES	SUPPLIER (Yes/No)	MANUFACTURER (Yes/No)	MBE, WBE, DBE, DVBE, OBE, ELBE, SLBE, SDB, WoSB, HUBZone, OR SDVOSB ^①	WHERE CERTIFIED ^②
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						
Name: _____ Address: _____ City: _____ State: _____ Zip: _____ Phone: _____ Email: _____						

- ① As appropriate, Bidder shall identify Vendor/Supplier as one of the following and shall include a valid proof of certification (except for OBE, SLBE and ELBE):
- | | | | |
|---|--------|--|---------|
| Certified Minority Business Enterprise | MBE | Certified Woman Business Enterprise | WBE |
| Certified Disadvantaged Business Enterprise | DBE | Certified Disabled Veteran Business Enterprise | DVBE |
| Other Business Enterprise | OBE | Certified Emerging Local Business Enterprise | ELBE |
| Certified Small Local Business Enterprise | SLBE | Small Disadvantaged Business | SDB |
| Woman-Owned Small Business | WoSB | HUBZone Business | HUBZone |
| Service-Disabled Veteran Owned Small Business | SDVOSB | | |
- ② As appropriate, Bidder shall indicate if Vendor/Supplier is certified by:
- | | | | |
|--|--------|--|----------|
| City of San Diego | CITY | State of California Department of Transportation | CALTRANS |
| California Public Utilities Commission | CPUC | | |
| State of California's Department of General Services | CADoGS | City of Los Angeles | LA |
| State of California | CA | U.S. Small Business Administration | SBA |

The Bidder will not receive any subcontracting participation percentages if the Bidder fails to submit the required proof of certification.

ELECTRONICALLY SUBMITTED FORMS

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**
- C. MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM**
- D. SUBCONTRACTOR LISTING (OTHER THAN FIRST TIER)**

Bids will not be accepted until ALL the above-named 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 Cass Construction, Inc. dba Cass Arrieta as Principal,
and Liberty Mutual Insurance Company as Surety, are held
and firmly bound unto The City of San Diego hereinafter called "OWNER," in the sum
of **10% OF THE TOTAL BID AMOUNT** for the payment of which sum, well and truly to be made, we
bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally,
firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under
the bidding schedule(s) of the OWNER's Contract Documents entitled

Otay 2nd Pipeline Phase I; Bid Number K-19-1823-DBB-3

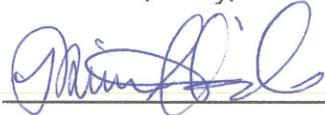
NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in
the manner required in the "Notice Inviting Bids" enters into a written Agreement on the form of
agreement bound with said Contract Documents, furnishes the required certificates of insurance, and
furnishes the required Performance Bond and Payment Bond, then this obligation shall be null and
void, otherwise it shall remain in full force and effect. In the event suit is brought upon this bond by
said OWNER and OWNER prevails, said Surety shall pay all costs incurred by said OWNER in such suit,
including a reasonable attorney's fee to be fixed by the court.

SIGNED AND SEALED, this 9th day of May, 2019

Cass Construction, Inc. dba Cass Arrieta (SEAL)
(Principal)

Liberty Mutual Insurance Company (SEAL)
(Surety)

By: 
(Signature)
Wes Wise, President

By: 
(Signature)
Minna Huovila, Attorney-in-Fact

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

CALIFORNIA ACKNOWLEDGMENT

CIVIL CODE § 1189

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

State of California }
County of San Diego }

On May 10th, 2019 before me, Azalea Nunez, Notary Public
Date Here Insert Name and Title of the Officer

personally appeared Wes Wise
Name(s) of Signer(s)

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



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

WITNESS my hand and official seal.

Signature *Azalea Nunez*
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

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

Description of Attached Document

Title or Type of Document: Bid Bond

Document Date: 05/09/19 Number of Pages: 1

Signer(s) Other Than Named Above: No other signers

Capacity(ies) Claimed by Signer(s)

Signer's Name: Wes Wise

Corporate Officer – Title(s): President

Partner – Limited General

Individual Attorney in Fact

Trustee Guardian or Conservator

Other: _____

Signer is Representing: _____

Signer's Name: _____

Corporate Officer – Title(s): _____

Partner – Limited General

Individual Attorney in Fact

Trustee Guardian or Conservator

Other: _____

Signer is Representing: _____

CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT

CIVIL CODE § 1189

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

State of California
County of San Diego)

On May 9, 2019 before me, Maria Hallmark, Notary Public
(insert name and title of the officer)

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

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

WITNESS my hand and official seal.

Signature 

(Seal)





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

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

Certificate No: 8196955 - 969522

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Tara Bacon, Dale G. Harshaw, Minna Huovila, Kyle King, John R. Qualin, Geoffrey Shelton

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

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 5th day of October, 2018.



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

By: [Signature]
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 5th day of October, 2018 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

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



COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Upper Merion Twp., Montgomery County
My Commission Expires March 28, 2021
Member, Pennsylvania Association of Notaries

By: [Signature]
Teresa Pastella, Notary Public

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

ARTICLE IV - OFFICERS: Section 12. Power of Attorney.

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

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

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

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

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

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

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 9th day of May, 2019.



By: [Signature]
Renee C. Llewellyn, Assistant Secretary

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

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

CONTRACTOR'S CERTIFICATION OF PENDING ACTIONS

As part of its bid or proposal (Non-Price Proposal in the case of Design-Build contracts), the Bidder shall provide to the City a list of all instances within the past 10 years where a complaint was filed or pending against the Bidder in a legal or administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers, and a description of the status or resolution of that complaint, including any remedial action taken.

CHECK ONE BOX ONLY.

- The undersigned certifies that within the past 10 years the Bidder has NOT been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers.
- The undersigned certifies that within the past 10 years the Bidder has been the subject of a complaint or pending action in a legal administrative proceeding alleging that Bidder discriminated against its employees, subcontractors, vendors or suppliers. A description of the status or resolution of that complaint, including any remedial action taken and the applicable dates is as follows:

DATE OF CLAIM	LOCATION	DESCRIPTION OF CLAIM	LITIGATION (Y/N)	STATUS	RESOLUTION/REMEDIAL ACTION TAKEN

Contractor Name: Cass Construction, Inc. dba Cass Arrieta

Certified By Wes Wise Title President

Name



Signature

Date 05/10/19

USE ADDITIONAL FORMS AS NECESSARY

Mandatory Disclosure of Business Interests Form

BIDDER/PROPOSER INFORMATION

Legal Name Cass Construction, Inc.	DBA Cass Arrieta
Street Address 1105 N. Marshall Ave.	City El Cajon
Contact Person, Title Wes Wise, President	State CA
	Zip 92020
	Phone 619-590-0929
	Fax 619-590-1202

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:

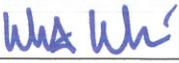
- communicating or negotiating with City officers or employees,
- submitting or preparing applications, bids, proposals or other documents for purposes of contracting with the City, or
- directing or supervising the actions of persons engaged in the above activity.

<u>Wes Wise</u>	<u>President</u>
Name	Title/Position
<u>El Cajon, CA</u>	<u>N/A</u>
City and State of Residence	Employer (if different than Bidder/Proposer)
<u>100% Ownership Interest</u>	
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.

<u>Wes Wise, President</u>		<u>05/10/19</u>
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: _____				
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: Ronald McMinn, Jr., Contract Specialist, Email: RMcMinn@sandiego.gov
Phone No. (619) 533-4618

ADDENDUM A



FOR

OTAY 2ND PIPELINE PHASE I

BID NO.:	<u>K-19-1832-DBB-3</u>
SAP NO. (WBS/IO/CC):	<u>B-14092</u>
CLIENT DEPARTMENT:	<u>2112</u>
COUNCIL DISTRICT:	<u>4</u>
PROJECT TYPE:	<u>KA</u>

BID DUE DATE:

**2:00 PM
MAY 27, 2019**

CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

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

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.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

James Nagelvoort, Director
Public Works Department

Dated: *April 23, 2019*
San Diego, California

JN /MJN / br

ENGINEER OF WORK

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

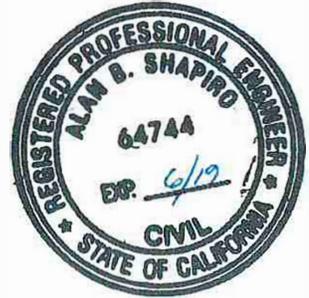


1) Registered Engineer

5/3/19

Date

Seal:





2) FOR CITY ENGINEER

5/3/19

DATE

SERIAL:



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.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

B. BIDDER'S QUESTIONS

Q1. Is this project exempt from monitoring (Archaeo, NAM, Paleo, Bio, etc.)?

A1. Yes, please refer to the RFP.

Q2. Is the intent to take the existing pipeline out of service while the new mainline is constructed? Callout 4 on C-05 shows a cut and cap ahead of mainline construction and the existing 36" from sta 32+00 to 47+00 is being replaced in the same trench. This would substantiate the ex. 36" being out of service for the project's new mainline construction.

A2. The existing 36" Otay 2nd Pipeline will be taken out of service (de-energized) prior to the commencement of construction activities. The Contractor Note 4 on C-05 pertains solely to the abandonment procedure (cutting and plugging) for the portion of pipeline to remain within the easement, while the continuation of the alignment will be to replace in place insofar as the existing pipeline depth allows (see CONTRACTOR'S NOTE same sheet).

Q3. Bid item #46 shows an amount of \$850,000...is this supposed to be related to bid item #47 instead?

A3. Yes. The bid list has been revised.

Q4. Project documents notify contractor this project is to be a phased funded project. Please clarify for bidding purposes how the city intends to break out the stations or sections of the project.

A4. The City does not intend to break out sections of this project. Phase funding should not have an influence on the overall bid of the project.

C. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Section 1 – General, Terms, Definitions, Abbreviations, Units of Measure, and Symbols, Subsection 1-2, Terms and Definitions, **ADD** the following:

To the “WHITEBOOK”, item 43, DELETE in its entirety and SUBSTITUTE with the following:

Field Order - A Field Order is a written agreement by the Engineer to compensate you for Work items in accordance with 2-8, “EXTRA WORK” or 2-9, “CHANGED CONDITIONS”. A Field Order does not change the Contract Price, Contract Time, or the scope intent of the Contract.

2. To Section 7 – Measurement and Payment, **ADD** the following:

7-3.9 Field Orders. To the “WHITEBOOK”, DELETE in its entirety and SUBSTITUTE with the following:

1. If the cumulative total of Field Order items of Work does not exceed the “Field Orders” Bid Item, the City shall pay those Field Orders as shown below:

**TABLE 7-3.9
FIELD ORDER LIMITS**

Contract Price	Maximum Field Order Work Amount
Less than \$100,001	\$2,500
\$100,001 to \$1,000,000	\$5,000
\$1,000,001 to \$5,000,000	\$10,000
\$5,000,001 to \$15,000,000	\$20,000
\$15,000,001 to \$30,000,000	\$40,000
Greater than \$30,000,000	\$50,000

2. Field Order items of Work for contracts greater than \$15,000,000 will require additional approvals from the City prior to its approval by the Resident Engineer.

3. The City will issue a Field Order only after the City's acceptance of the cost of the field order amount.
4. Field Orders shall not be used to add scope or to include extensions of time related to changes in work.
5. If in the event there is a change related to the critical path on the project which necessitates an extension of time and the change amount is within the Field Order limits shown on Table 7-3.9, then a Field Order can be issued to compensate you for the approved costs. Any extensions of time associated with the change shall be included in a subsequent Change Order and no additional compensation shall be granted as part of the change order for the extension of time.
6. The unused portions of Field Orders Bid item shall revert to the City upon Acceptance.

D. ADDITIONAL CHANGES

1. The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **~~Stricken out.~~**

Section	Item Code	Description	UoM	Quantity	Payment Reference	Unit Price
Main Bid	237310	Removal and Replacement of Existing Thermoplastic Striping and Markings	LS	1	314-4.4.6	850000
Main Bid		Field Orders (EOC Type II)	AL	1	7-3.9	<u>850000</u>
Main Bid	237110	Butterfly Valve (16 Inch, Class 150B)	EA	3 <u>6</u>	306-15.5	
<u>Main Bid</u>	<u>237110</u>	<u>Water Main (16 Inch PVC, Class)</u>	<u>LF</u>	<u>22</u>	<u>306-15.1</u>	
<u>Main Bid</u>	<u>237110</u>	<u>Water Main (12-inch PVC, Class)</u>	<u>LF</u>	<u>36</u>	<u>306-15.1</u>	

Section	Item Code	Description	UoM	Quantity	Payment Reference	Unit Price
<u>Main Bid</u>	<u>237110</u>	<u>Butterfly Valve (12 Inch, Class 150B)</u>	<u>EA</u>	<u>1</u>	<u>306-15.5</u>	
<u>Main Bid</u>	<u>237110</u>	<u>Cut-in Tee by Contractor (16"x 12" Inch)</u>	<u>EA</u>	<u>1</u>	<u>901-2.5</u>	

E. PLANS

1. To Drawing Number 40351-01-D , **DELETE** in its entirety and **REPLACE** with page 7 of 8 of this Addendum.
2. To Drawing Number 40351-D, **ADD** Sheet 40351-48-D, page 8 of 8 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *May 6, 2019*
San Diego, California

JN/MJN/br

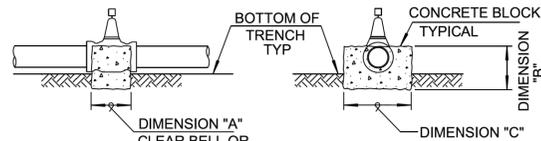
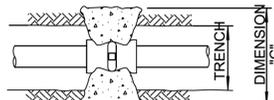
THRUST/ANCHOR TABLE FOR 16" AND LARGER WATER MAINS

SHEET NO.	PIPE STATIONING	TYPE OF BLOCK	TYPE OF APPURTENANCE	DESIGN PRESSURE	TOTAL THRUST (lb)	ASSUMED SOIL CAPACITY	MINIMUM BEARING AREA (sq. ft.), SEE NOTE 3 BELOW OR VOLUME OF BLOCK (cu. ft.)
48	11+00.05	THRUST	16" x 16" TEE	200 LB/SQ. IN.	47,600	2000 LB/SQ. FT.	24 SQ. FT.
48	11+00.05	ANCHOR	16" BFV (TYP OF 3)	200 LB/SQ. IN.	47,600	2000 LB/SQ. FT.	24 SQ. FT.

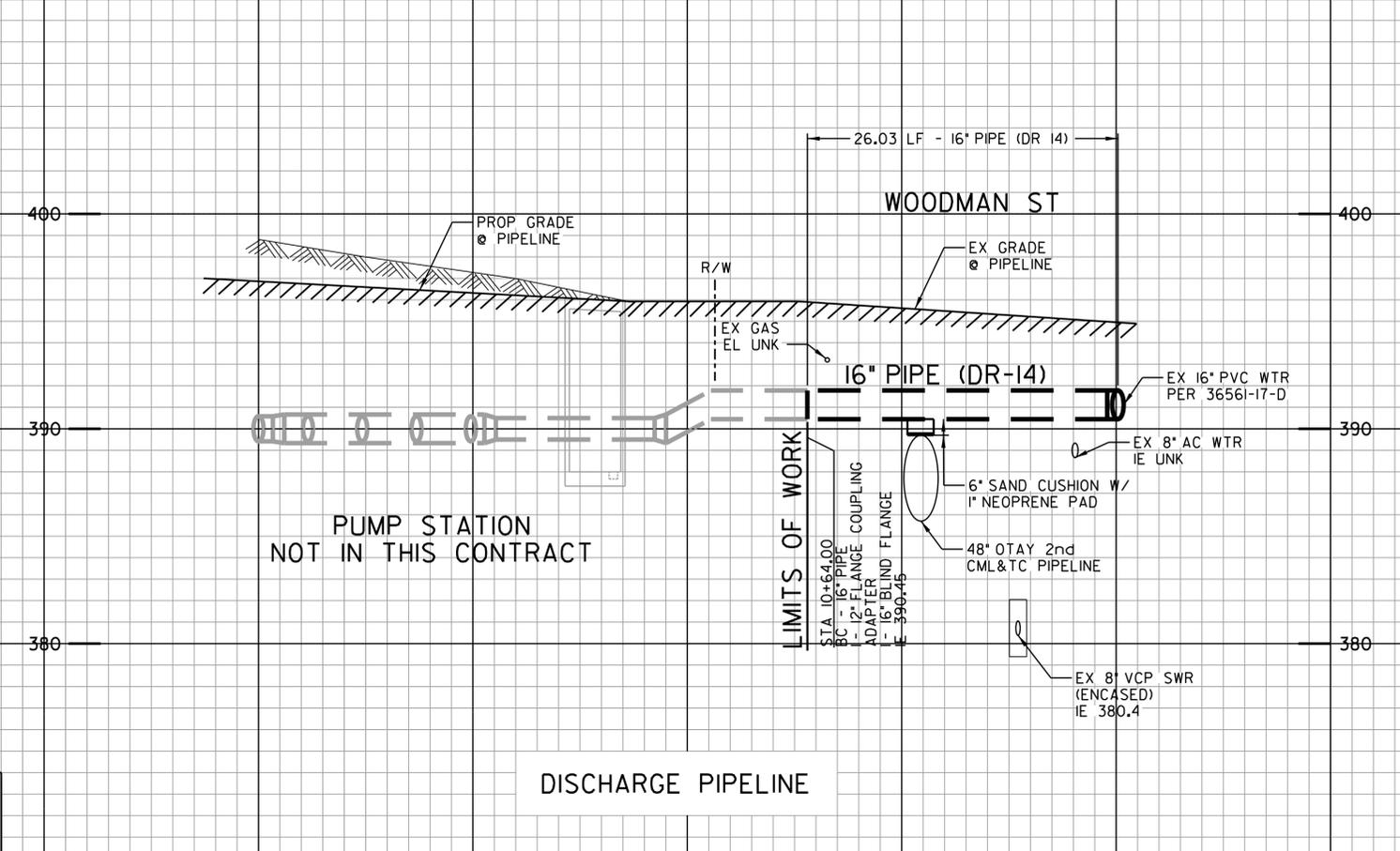
• THE SPECIFIC WEIGHT OF CONCRETE IS 140LB/CU.FT. SAFETY FACTOR = 1.5

NOTES:

- FOR ANCHOR BLOCKS, SEE DETAIL BELOW. ANCHOR BLOCK DIMENSIONS: A = 5-INCHES, B = 28-INCHES, C = 64-INCHES
- REFER TO SPECIFICATIONS SECTION 306-L2.14 FOR ADDITIONAL REQUIREMENTS.
- FOR ESTIMATING THE CY QUANTITY FOR THRUST BLOCKS, THE DEPTH OF THE THRUST BLOCKS SHALL BE HALF OF THE TRENCH WIDTH PLUS 12" EMBEDMENT.
- CONCRETE SHALL BE PLACED SO THAT THE FITTINGS AND VALVES WILL BE ACCESSIBLE FOR REPAIR OR REPLACEMENT

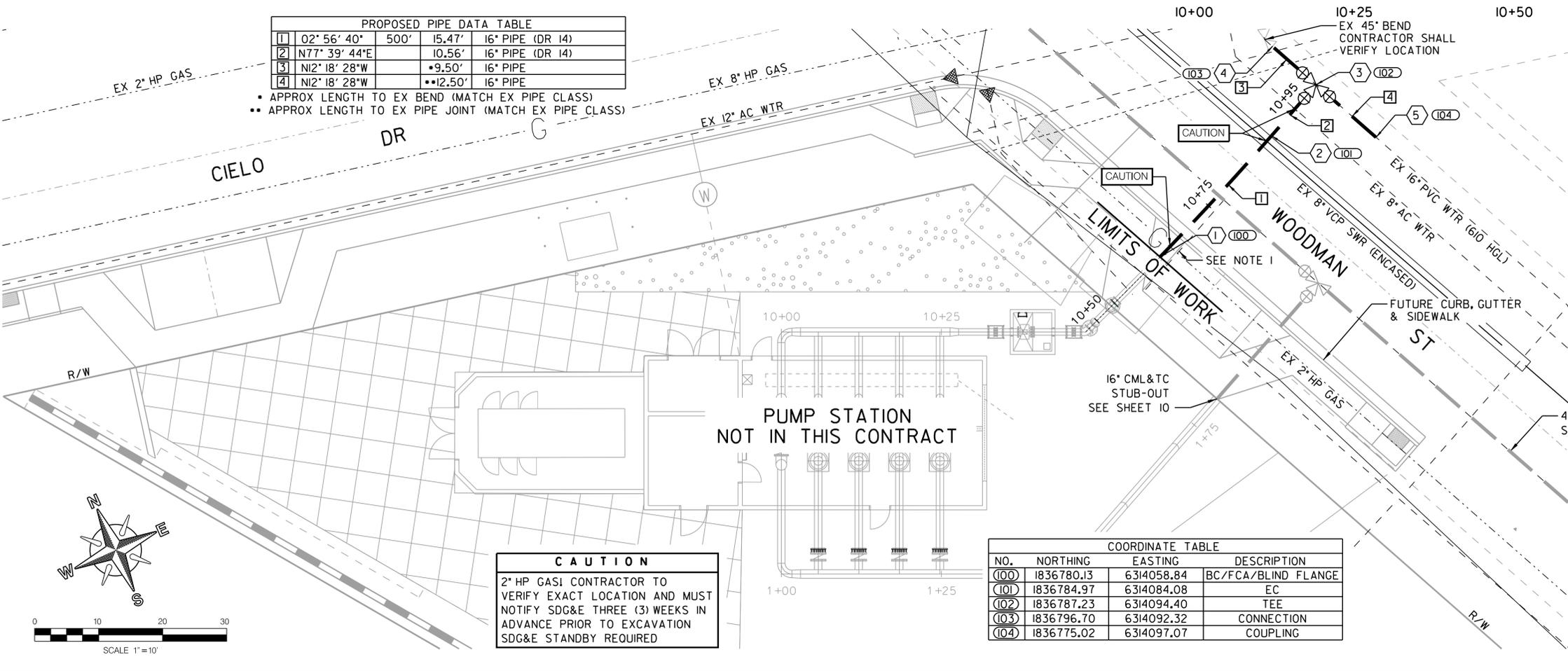


SCALE
1"=10' HORIZ.
1"=4' VERT.



PROPOSED PIPE DATA TABLE				
1	02° 56' 40"	500'	15.47'	16" PIPE (DR 14)
2	N77° 39' 44"E		10.56'	16" PIPE (DR 14)
3	N12° 18' 28"W		9.50'	16" PIPE
4	N12° 18' 28"W		12.50'	16" PIPE

- APPROX LENGTH TO EX BEND (MATCH EX PIPE CLASS)
- APPROX LENGTH TO EX PIPE JOINT (MATCH EX PIPE CLASS)



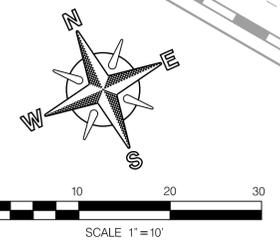
- | | | |
|---|--|--|
| <p>① (100) BY CONTRACTOR FURNISH AND INSTALL STA 10+64.00 BC - 16" PIPE 1- 16" FLANGE COUPLING ADAPTER (F, MJ) 1- 16" BLIND FLANGE (F) 1- THRUST BLOCK (FOR TESTING)</p> <p>③ (102) BY CITY FORCES AND OF CONTRACTOR STA 11+00.05 ISOLATE EX 16" PVC WTR BY CONTRACTOR FURNISH AND INSTALL</p> <p>CUT IN:
1- 16" x 16" TEE (F)
3- 16" BFV (F, MJ) BK,LT,RT
1- THRUST BLOCK
TEST PIPE, CONNECT TO 16" BFV (CLOSED)
DISINFECTION SHALL BE PERFORMED BY 4105-D REENERGIZE EX 16" WTR</p> | <p>② (101) BY CONTRACTOR FURNISH AND INSTALL STA 10+79.47 EC - 16" PIPE</p> <p>④ (103) BY CONTRACTOR FURNISH AND INSTALL STA 11+00.05 - 9.50' LT 1- 16" FLANGE COUPLING ADAPTER (F, MJ) CONNECT TO EX BEND</p> <p>⑤ (104) BY CONTRACTOR FURNISH AND INSTALL STA 11+00.05 - 12.50' RT 1- 16" REPAIR COUPLING CONNECT TO EX 16" PIPE</p> | <p>REFERENCE:
WATER: 36561-D
SEWER: 36561-D
STORM DRAIN: 36561-D
GAS: 36561-D
ELECTRIC: 36561-D
CABLE TV: 36561-D
TELEPHONE: 36561-D
HGL: 610</p> <p>RETIREMENTS:
NONE</p> |
|---|--|--|

CAUTION
2" HP GAS CONTRACTOR TO VERIFY EXACT LOCATION AND MUST NOTIFY SDG&E THREE (3) WEEKS IN ADVANCE PRIOR TO EXCAVATION SDG&E STANDBY REQUIRED

COORDINATE TABLE			
NO.	NORTHING	EASTING	DESCRIPTION
(100)	1836780.13	6314058.84	BC/FCA/BLIND FLANGE
(101)	1836784.97	6314084.08	EC
(102)	1836787.23	6314094.40	TEE
(103)	1836796.70	6314092.32	CONNECTION
(104)	1836775.02	6314097.07	COUPLING

**OTAY 2nd PIPELINE - PHASE 1
DISCHARGE PIPELINE - WOODMAN ST
PLAN & PROFILE**

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 48 OF 48 SHEETS		WATER WBS - B-14092
APPROVED: <i>Brian Welle</i> FOR CITY ENGINEER BRIAN WELLE PRINT DCE NAME	DATE: 03/13/2019 C27039 RCEP	SUBMITTED BY: MIKE BAJOUA PROJECT MANAGER FRANCISCO BORDON PROJECT ENGINEER
DESCRIPTION ORIGINAL	BY AECOM-RR	APPROVED DATE FILMED
ADDENDUM B	AECOM-RR	194-1749 CCS27 COORDINATE 6310407-183444 CCS83 COORDINATE
CONTRACTOR INSPECTOR		DATE STARTED DATE COMPLETED 40351-48-D



City of San Diego

CITY CONTACT: Ronald McMinn, Jr., Contract Specialist, Email: RMcMinn@sandiego.gov
Phone No. (619) 533-4618

ADDENDUM C



FOR

OTAY 2ND PIPELINE PHASE I

BID NO.:	<u>K-19-1832-DBB-3</u>
SAP NO. (WBS/IO/CC):	<u>B-14092</u>
CLIENT DEPARTMENT:	<u>2112</u>
COUNCIL DISTRICT:	<u>4</u>
PROJECT TYPE:	<u>KA</u>

BID DUE DATE:

**2:00 PM
JUNE 5, 2019**

CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

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

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.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

James Nagelvoort, Director
Public Works Department

Dated: *May 21, 2019*
San Diego, California

JN /MJN / br

City of San Diego

CITY CONTACT: Ronald McMinn, Jr., Contract Specialist, Email: RMcMinn@sandiego.gov
Phone No. (619) 533-4618

ADDENDUM D



FOR

OTAY 2ND PIPELINE PHASE I

BID NO.:	<u>K-19-1832-DBB-3</u>
SAP NO. (WBS/IO/CC):	<u>B-14092</u>
CLIENT DEPARTMENT:	<u>2112</u>
COUNCIL DISTRICT:	<u>4</u>
PROJECT TYPE:	<u>KA</u>

BID DUE DATE:

**2:00 PM
JUNE 21, 2019**

CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

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

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.

THE SUBMITTAL DATE FOR THIS PROJECT HAS BEEN **EXTENDED AS STATED ON THE COVER PAGE.**

James Nagelvoort, Director
Public Works Department

Dated: *May 30, 2019*
San Diego, California

JN /MJN / br

City of San Diego

CITY CONTACT: Ronald McMinn, Jr., Contract Specialist, Email: RMcMinn@sandiego.gov
Phone No. (619) 533-4618

ADDENDUM E



FOR

OTAY 2ND PIPELINE PHASE I

BID NO.:	<u>K-19-1832-DBB-3</u>
SAP NO. (WBS/IO/CC):	<u>B-14092</u>
CLIENT DEPARTMENT:	<u>2112</u>
COUNCIL DISTRICT:	<u>4</u>
PROJECT TYPE:	<u>KA</u>

BID DUE DATE:

**2:00 PM
JUNE 21, 2019**

CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

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

ENGINEER OF WORK

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

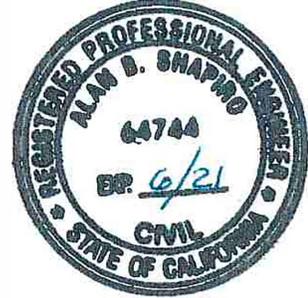


1) Registered Engineer

6-7-19

Date

Seal:





2) For City Engineer

6/10/19

Date

Seal:



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. Reference Project Drawing Sheet 07, the vertical elbow at Station 19+26.05, horizontal elbow at Station 19+27.83 and vertical elbow at Station 19+30.15 are too close together. Please realign to provide additional clearance between these deflection points to allow for fabricated elbows, or provide a specific design to accommodate the proximity of these elbows.

A1. Design can be constructed as shown, the use of combination horizontal and vertical bends is an option.

Q2. Reference Detail A on Sheet 19 regarding the 4" Blow Off Piping. Keyed Note # 7 indicates the 4" Pipe is Ductile Iron pipe. Keyed Note # 8 references City of San Diego Standard Detail SDW-145; which has a note (#5) on it that states for steel and DI mains, Blow Off pipe material and coatings shall be the same as the mainline. Please confirm the blow off pipe material for this location.

A2. Blow off pipe material shall confirm to Note #5 on SDW-145.

Q3. Also please confirm whether the other blow off pipe assemblies on this project will be Ductile Iron or Steel pipe (e.g. STA 3 +20 shows blow off per SDW-145).

A3. Blow off pipe material shall confirm to Note #5 on SDW-145.

Q4. Reference Detail A & B on Sheet 19 regarding the 48"Ø x 90° elbows at the shafts. The details indicate that these elbows are to have a 3'-6" radius. This will increase the wall thickness for these elbows, and given the clear ID requirement will increase the Outside Diameter as well. Regarding these elbows we have the following items to address:

Please Confirm the Radius of 3'-6" is correct. Based on the nominal diameter of 48" it would make it a radius of 0.875 x the Diameter.

Since the ends through the shafts and casing are ID butt-weld ends per detail 3 on sheet 20 the change in diameter and wall thickness will create a gap at the OD. Would it be acceptable to bump the end of the lighter gauge material to match the OD of thicker gauge so that the OD's would align for the butt-weld joint? If not please clarify how these joints should connect.

- A4. Please disregard Radii dimensions shown on sheet 19, construct 90 Degree bends as shown in Details A&B, sheet 19. Please see Section E of this Addendum for revised drawing of sheet C-15 (sheet 19).
- Q5. Reference Project Detail A on Sheet 19 (48" Tee at the top of the shaft), Detail 3 on Sheet 16 (48" x 16" Outlet), and Detail 4 on Sheet 16 (48" x 36" Outlet). All of these outlets reference Project Detail 9 on Sheet 15 for crotch plate reinforcement. Detail 9 on Sheet 15 has only one crotch plate detail. Please confirm that all three of these outlets of varying size will require the same crotch plate design.
- A5. Detail 9, Drawing Sheet 15 details crotch plate design for all three outlets.
- Q6. Reference Drawing Sheet 13 and Project Specification Section 33 05 24 Part 2.01.B. The specification describes the pressure of pipe "Downstream of main pumps" as 250 psi and the pipe "Upstream of the main pumps" as 150 psi. Based on the flow direction shown on Project Drawing Sheet 13 it appears that the 48" pipe that feeds into the 36" pipe going into the pressure reducing station (which would typically be designated as the Upstream pipe) has a higher HGL and would be classified as a higher pressure than the pipe after the Pressure Reducing Valves (which would typically be designated as the Downstream pipe). Please confirm that the 48"Ø, 36"Ø and 20"Ø pipe feeding into the pressure reducing valves are all classified as having a 250 psi working pressure; and that all pipe after the valves will be classified as having a 150 psi working pressure.

Note: for the 48" Pipe, if the pressure is confirmed at 250 psi working pressure, the wall thickness will need to be increased to 0.313".

- A6. Specification Section 33 05 24, Part 2.01 B has been revised as follows:
Flanged and lap welded, rated for maximum working pressure of 150

psi with AWWA C207 Class D flat-faced ring flanges. Please see Section C, item 2.

- Q7. Reference spec Section 33 05 24 part 1.03.A.2 however the City of San Diego standard details (SDW-101) requires reinforcement beyond M11 reinforcement calculations. Please clarify if the reinforcement requirements of City of San Diego Standard Drawing SDW-101 are applicable to this project. (e.g.: a 36" manway outlet on 48" pipe would result in a ratio of 0.75 which would require a 2-plate crotch plate reinforcement).
- A7. SDW-101 shows 1-plate crotch reinforcement for a 0.75 ID IN/OUT ratio and SDW-101 Note 10 mentions crotch plate design shall conform to M-11. Please conform to the specifications and project drawings.
- Q8. Reference Project Detail 6 on Sheet 15, the Cement Mortar Coating is shown with Welded Wire Fabric. AWWA C205 allows for spiral wound wire reinforcement. Would spiral wound wire reinforcement be an acceptable Cement Mortar Coating reinforcement for this project? We are asking to allow spiral wound per AWWA C205.
- A8. Cement Mortar Coating specifications are discussed in Spec 33 05 24, Section 2.07. Please see Section C, item 2.
- Q9. Reference Whitebook Part 209-2.2.1 that has thicknesses that exceed AWWA C205 requirements. Reference project specification section 33 05 24 part 2.01.C: the spec requires Lining and Coating thicknesses in accordance with AWWA C205. Please clarify the Cement Mortar Lining and Coating thickness requirements.
- A9. Please refer to Drawing Sheet 15, Detail 6.
- Q10. Reference Specification Section 33 05 24 Part 2.01.C.1: The specification states carbon steel pipe is to be coated with tapecoat rockshield system. However, Specification Section 33 05 24 Part 2.01.C.3 states that Steel Pipe is to have an external tape coating under the cement mortar per C214. This is very different from what is described in Part 2.06 of the same specification where the "Tapecoat Rockshield System" is described to consists of a 25 mil polyethylene backing and 375 mil foam wrap with perforations. That is not in line with AWWA C214, which would consist of a 2 or 3 layer tape system which could then be armor coated

with Cement Mortar per AWWA C205. Please confirm that shop applied coatings for buried pipe should consist of tape per AWWA C214 with a Cement Mortar Overcoat per AWWA C205.

- A10. Coatings shall meet or exceed the requirements of 33 05 24, Part 2.01.C. Please see Section C, item 2.
- Q11. Reference Specification Section 33 05 24 Part 2.01.C.3: The specification references AWWA C214, however there is no tape coating thickness specified. Project Detail 6 on Sheet 15 appears to have a 3-layer system (which would be 80 mils), please clarify if this is the thickness that is to be used on the pipe for this project.
- A11. Tape coating shall comply with Specifications 33 05 24 and 26 42 00. Please see Section C, item 2.
- Q12. Reference Project Specification 33 05 24 Part 2.01.C.2: The specification requires Fusion Bonded Epoxy Coating for exposed pipe per AWWA C213. We request that an alternate coating be allowed for exposed pipe. Perhaps Epoxy Coating per AWWA C210 (which is listed in the Greenbook under Table 209-2.2.1 "Liquid Epoxy Interior Lining and Exterior Coating of Above-Ground Pipe").
- A12. An alternate coating may be submitted for review and approval by the Engineer.
- Q13. Reference Whitebook part 209-2.2.1. this specification requires a Clear ID after lining for all pipe 6" and larger. Reference project specification section 33 05 24 part 2.01.D.1 this requires all pipe 24" and larger to have a clear ID after lining. However part 2.01.D.2 of the same specification states pipe 30" and less shall be per ASME B36.10M. Please clarify which pipe require a clear ID after lining, and which are to be provided with diameters noted in ASME B36.10.
- A13. Specification section 33 05 24 part 2.01.D is incorrect, refer to 2018 Green Book Table 209-2.2.1. for pipe sizing.
- Q14. Reference Project specification Section 33 05 24 part 2.01.G.1.c.1)a): steel coil listed under this paragraph is ASTM A1018 SS Grade 36, Type 1, which would have a minimum yield of 36ksi. However paragraph 2.01.G.1.a of the same section requires a Grade 40 for the plate material. Please confirm that the minimum yield for coil and plate is to

be 40 ksi.

- A14. Section 33 05 24 part 2.01.G.1.c.1 has been revised to ASTM A1018 SS Grade 40.
- Q15. Reference Specification section 33 05 24 Part 2.02.E.2: for minimum bend wall thickness this paragraph references "Greater of Table 1 above or as calculated for straight pipe..." There is no "Table 1" shown in this specification. Please provide table referenced or amend specification to remove the reference.
- A15. Specification refers to Table 1 as shown in ASME B36.10M, referenced proprietary Table 1 cannot be provided.
- Q16. Reference Specification Section 33 05 24 Part 2.10.E.2: The paragraph here notes that CJP Welds are to be spot Radiographically or Radioscopically examined per UW-52; the paragraph then notes 100% Radioscopic per UW-51. Please clarify which inspection is required for this project.
- A16. Either radioscopic or ultrasonic testing is required. Additionally, Specification Section 33 05 24 Part 2.10 E.2. has been revised as follows: "A minimum of 10 percent radioscopic examine in accordance with ASTM E1255."
- Q17. We request that 100% RT inspection be allowed in lieu of hydro testing for fabricated pieces manufactured from pipe not previously hydro tested (i.e. Reducers).
- A17. Please refer to the contract documents. Please note Specification 33 05 24, Part 2.10 C.2 is revised as follows: "Maintain test pressure for minimum of 2 minutes." Please see Section C, item 2.
- Q18. Reference Project Profile Drawings on Sheets 05 through 11 show a wall thickness for the 48" pipe of 0.25" TK. However, using a 40ksi min yield at the 250 psi working pressure shown in specification Section 33 05 24 Part 2.01.B.1, the resulting wall thickness would need to be at least 0.312" TK. Please confirm the wall thickness requirements for the 48" pipe.

- A18. Specification Section 33 05 24, Part 2.01 B has been revised as follows:
- Flanged and lap welded, rated for maximum working pressure of 150 psi with AWWA C207 Class D flat-faced ring flanges. Please see Section C, item 2.
- Q19. The pits shown for the 60" bore are too small for open shield pipe jacking. The Tunnel Shield is about 21' long. Typically a 40' long jacking pit is required and a 24' long receiving pit for retrieval. Please advise.
- A19. Please refer to Note 1, Drawing Sheet 14 D. Dimension of the pits provided in the plans are approximate, and can be modified based on the methods and site constraints.
- Q20. Addendum B added sheet #40351-48-D. On this sheet, the data table shows line #1 and #2, which corresponds with the added bid item #22 for 22' of 16" PVC pipe. Here is the question, Data Table line #3 and #4 on sheet #48 dictate matching the pipe class of the existing pipe. The data table for these 2 items totals 26.03'; there is a bid item #21 for 16" CMLC, but that is for the pipe on Sheet #10. So, what Bid Item is the Line #3 and #4 to be under?
- A20. See this addendum which supersedes addendum B. Please see Section D, item 1.
- Q21. What sheet is the 12" pipe under bid item #23 located?
- A21. See bid item revisions in this addendum. 12-inch PVC is not used. Please see Section D, item 1.
- Q22. Sheet #13 (C-09) has a pipe data table that shows 114.41' of 20" Steel Pipe (CML&TC). What bid item is that pipe covered in?
- A22. The 20-inch CML&C is covered under the Pressure Reducing Station bid item (all-inclusive lump sum).
- Q23. Would you consider waiving specification Section 33 05 24 Part 1.05 A.1.d on page 147, or changing the wall thickness to 3/8"?
- A23. Section 33 05 24 Part 1.05 A.1.d has been revised to state a wall thickness of 3/8 inches or greater. Please see Section C, item 2.

- Q24. Could you also clarify specification Section 33 05 24 Part 2.10 E.2.? Do the spiral welds forming the pipe cylinder require spot x-ray testing, or 100% x-ray testing?
- A24. Specification Section 33 05 24 Part 2.10 E.2 has been revised as follows: "A minimum of 10 percent radioscopic examine in accordance with ASTM E1255." Please see Section C, item 2.
- Q25. Can Part 2.10 C.2 on page 157 be changed to the standard AWWA C200 pressure test time of 0.5 minutes? Our hydrotest machine was not design for an excessively long test time of 5 minutes. If that's not acceptable we could run two tests for 2.5 minutes each.
- A25. Specification 33 05 24, Part 2.10 C.2 is revised as follows: "Maintain test pressure for minimum of 2 minutes." Please see Section C, item 2.
- Q26. Can you provide, or indicate where Table 1 is located as referenced in specification Section 33 05 24 Part 2.02 E.2 on page 152?
- A26. Table 1 is located in ASME B36.10M, Welded and Seamless Wrought Steel Pipe. The proprietary table cannot be provided.
- Q27. Please provide the depth and locations on the plans for each of the Subsurface Monitoring Points per SECTION 33 05 44 SETTLEMENT MONITORING.
- A27. Monitoring locations are shown on contract drawing Sheet 14 (Sheet C-10).
- Q28. Plan sheet C-09 calls out 20" CML&TC in the pipe data table (which has no bid item currently) but is conflicting because plan sheet CP-02 calls out that the same pipe as 16" CML&TC which does have a bid item currently. Are we to assume the piping shown on plan sheet C-09 is 20" CML&TC (no bid item) or 16" CML&TC (existing bid item)?
- A28. The 16-inch CML&TC description on Sheet CP-2 is erroneous; Sheet C-09 shows the correct 20-inch diameter dimension. The 20-inch CML&C is covered under the Pressure Reducing Station bid item (all-inclusive lump sum). Please see Section E, item 3.

- Q29. Where is the 12" PVC that was an added bid item in Addendum B? Only 12" I have located is on sheet C-12 Connection Detail Sta. 50+00 but does not line up to the bid item. Also, this same bid item does not specify what the Class pipe is being bid.
- A29. 12-inch PVC is not used. See bid item revisions in this addendum. Please see Section D, item 1.
- Q30. Where is the 12" Butterfly Valve that was an added bid item in Addendum B? Only 12" valve I have located is on sheet C-12 Connection Detail Sta. 50+00 but does not line up to the bid item because the plans show a 12" Gate Valve but the bid item is for a 12" Butterfly Valve.
- A30. 12-inch Butterfly Valves are not used. See bid item revisions in this addendum. Please see Section D, item 1.
- Q31. Confirm new SCADA system improvements are by contractor; if so, please provide owner's SCADA system's representative to request for system improvements proposal.
- A31. Yes, the new SCADA system improvements are by contractor and paid by the PRS bid item (bid item # 9). Refer to section 40 50 00 and Appendix 1. A contractor shall use project documents for SCADA system components specifications and project scope.

C. SUPPLEMENTARY SPECIAL PROVISIONS

1. To Section 7, Measurement and Payment, Subsection 7-3.1., item 6, page 42, **DELETE** in its entirety and **SUBSTITUTE** with the following:
 6. The Lump Sum Bid item for "Construction of Pressure Reducing Station" shall include all the work including labor, material, and equipment's as specified in the Plans, Contract Documents, SDG&E permit process and fees shall be included in PRS bid item.
2. To Appendix H, Technical Specifications, Section 33 05 24, Carbon Steel Pipe and Fittings, page 140 through 163, **DELETE** in its entirety and **SUBSTITUTE** with pages 12 through 39 of this Addendum.

D. ADDITIONAL CHANGES

- The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **Stricken out**.

Section	Item Code	Description	UoM	Quantity	Payment Reference
Main Bid	237110	Water Main (16 Inch PVC, Class)	LF	22 48	306-15.1
Main Bid	237110	Water Main (12-Inch PVC, Class)	LF	36	306-15.1
Main Bid	237110	Butterfly Valve (12 Inch, Class 150B)	EA	4	306-15.5
Main Bid	237110	Cut-in Tee by Contractor (16" x 12" 16" Inch)	EA	1	901-2.5

E. PLANS

- To Drawing Sheet 40351-01-D (Sheet G-1) **DELETE** in its entirety and **REPLACE** with page 40 of this Addendum.
- To Drawing Sheet 40351-19-D (Sheet C-15) **DELETE** in its entirety and **REPLACE** with page 41 of this Addendum.
- To Drawing Sheet 40351-33-D (Sheet CP-02) **DELETE** in its entirety and **REPLACE** with page 42 of this Addendum.

James Nagelvoort, Director
Public Works Department

Dated: *June 12, 2019*
San Diego, California

JN /MJN / br

SECTION 33 05 24
CARBON STEEL PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
 - a. B16.9, Factory-Made Wrought Buttwelding Fittings.
 - b. B36.10M, Welded and Seamless Wrought Steel Pipe.
 - c. BPVC SEC VIII, Div. 1, Rules for Construction of Pressure Vessels.
 - d. BPVC SEC IX, Welding and Brazing Qualifications.
 2. American Society for Nondestructive Testing Inc. (ASNT):
SNT-TC-1A, Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing.
 3. American Water Works Association (AWWA):
 - a. C200, Steel Water Pipe - 6 In. (150 mm) and Larger.
 - b. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied.
 - c. C206, Field Welding of Steel Water Pipe.
 - d. C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm).
 - e. C208, Dimensions for Fabricated Steel Water Pipe Fittings.
 - f. C209, Cold-Applied Tape Coatings for Steel Water Pipe
 - g. C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
 - h. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 - i. C214, Tape Coatings for Steel Water Pipelines
 - j. C217, Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines.
 - k. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
 - l. C602, Cement-Mortar Lining of Water Pipelines in Place - 4 In. (100 mm) and Larger.
 - m. M11, Steel Pipe - A Guide for Design and Installation.

4. American Welding Society (AWS):
 - a. A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 - b. A3.0M/A3.0, Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying.
 - c. D1.1/D1.1M, Structural Welding Code – Steel.
 - d. QC 1, Standard for AWS Certification of Welding Inspectors.
5. ASTM International (ASTM):
 - a. A20/A20M, Standard Specification for General Requirements for Steel Plates for Pressure Vessels.
 - b. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - c. A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
 - d. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - e. A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
 - f. A435/A435M, Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.
 - g. A516/A516M, Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.
 - h. A770/A770M, Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications.
 - i. A1018/A1018M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - j. E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
 - k. E1255, Standard Practice for Radioscopy.
6. International Organization for Standardization (ISO): 9001:2000, Quality Management Systems - Requirements.
7. Lloyd's Registry.
8. Steel Pipe Fabricators Association (SFPA).

1.02 DEFINITIONS

- A. Fittings: Including, but not limited to fittings, closure pieces, bends, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, wall sleeves, bulkheads, and other piping and appurtenances fabricated from steel plate, sheet, or coils as required to provide the Work, complete. Fittings shall include piping above ground or inside structures.

- B. Acronyms:
 - 1. CJP: Complete Joint Penetration
 - 2. CWI: Certified Welding Inspector
 - 3. MT: Magnetic Particle Testing
 - 4. NDE: Nondestructive Examination
 - 5. NDT: Nondestructive Testing
 - 6. PJP: Partial Joint Penetration
 - 7. PQR: Procedure Qualification Record
 - 8. PT: Liquid Penetrant Testing
 - 9. RT: Radiographic Testing
 - 10. UT: Ultrasonic Testing
 - 11. VT: Visual Testing
 - 12. WPQ: Welder/Welding Operator Performance Qualification
 - 13. WPS: Welding Procedure Specification

1.03 DESIGN REQUIREMENTS

- A. Fittings:
 - 1. Design reinforcement, unless otherwise shown.
 - 2. Design in accordance with AWWA M11, AWWA C200, and AWWA C208 as modified herein, and this Specification.

- B. Pipe Layout: Design in accordance with AWWA M11:
 - 1. General:
 - a. Base stationing and elevation convention as shown on Drawings.
 - b. Maximum Laying Lengths:
 - 1) Not limited, unless specifically shown on Drawings.
 - 2) Select lengths to accommodate installation operation.

2. Include, as minimum:
 - a. Specific number, location, and direction of each pipe, joint, and fitting. Number each pipe in installation sequence.
 - b. Station and **centerline** elevation at changes in grade or horizontal alignment.
 - c. Station and **centerline** elevation to which bell end of each pipe will be laid.
 - d. Elements of curves and bends, both in horizontal and vertical alignment.
 - e. Location of mitered pipe sections, beveled ends for alignment conformance, butt straps, and deep bell lap joints for temperature stress control.
 - f. Location of closures, cutoff sections for length adjustment, temporary access manways, vents, and weld lead outlets for construction convenience.
 - 1) Provide for adjustment in pipe laying headings and to conform to indicated stationing.
 - 2) Changes in location or number will require Engineer approval.
 - g. Location of bulkheads, both those shown and as required, for hydrostatic testing of pipeline.

C. Welding Procedure Specification (WPS):

1. Qualified by testing in accordance with ASME BPVC SEC IX for shop welds and AWS D1.1/D1.1M for field welds.
2. PQRs conducted on unlisted base metal (most coil products are unlisted base metals) to be production welded as required in the referenced welding Code shall be traceable to heat lots.
3. Written WPS required for welds, both shop and field.
4. Notch-tough welding procedures that require heat input control shall be required:
 - a. AWS D1.1/D1.1.M prequalified welding procedures are not allowed.
 - b. WPS used to shop fabricate pipe shall be qualified in accordance with ASME BPVC SEC IX and shall include Supplementary Essential Variables.
 - c. WPS used to field install pipe shall be qualified for heat input control in accordance with AWS D1.1/D1.1M.

- d. PQRs shall be qualified for notch tough welding with consideration for thickness of steel, test temperature, and Charpy V-notch CVN values. Refer to AWS D1.1/D1.1M, Table 4.6 PQR Supplementary Essential Variable Changes for CVN Testing Applications Requiring WPS Requalification for SMAW, SAW, GMAW, FCAW, and GTAW and Section 4, Part D Requirements for CVN Testing, Option A (three specimens). CVN test temperature and acceptance shall be same as pipe base metal specified herein.
- D. Stulling (Strutting): Design for pipe and fittings such that over-deflection and damage is avoided during handling, storage, and installation, including backfill and compaction.

1.04 SUBMITTALS

A. Action Submittals:

1. Shop Drawings showing pipe layout.
2. Material list and steel reinforcement schedules for materials specified.
3. Fabrication Information:
 - a. Pipe and fitting details for temporary and permanent facilities indicating:
 - 1) Cylinder thickness.
 - 2) Manufacturing tolerances.
 - 3) Maximum angular deflection limitations of field joints.
 - 4) Closure sections and cutoffs for field length adjustment.
 - 5) Bulkheads, including details for removal of test bulkheads and repair of lining.
 - 6) Weld lead outlets and plugs.
 - 7) Stulling size, spacing, and layout.
 - b. Welded joint details including:
 - 1) Butt joints.
 - 2) Miter-cut ends for alignment conformance.
 - 3) Lap joints.
 - 4) Special thermal control joints required for control of temperature stresses.
 - 5) Butt strap joints.

4. Welding Data (Shop and Field Welding):
 - a. Show on a weld map, complete information regarding base metal specification designation location, type, size, and extent of welds with reference called out for WPS and NDE numbers in tail of welding symbol.
 - b. Distinguish between shop and field welds.
 - c. Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal. Provide complete joint welding details showing bevels, groove angles, and root openings for all welds.
 - d. Welding and NDE symbols shall be in accordance with AWS A2.4.
 - e. Welding terms and definitions shall be in accordance with AWS A3.0M/A3.0.
 - f. Submit welding data together with Shop Drawings as a complete package.
 - g. Fittings: Provide a joint weld beveling diagram. Refer to AWS D1.1/D1.1M, Annex P Local Dihedral Angle that can be used to calculate bevels for weld joint details of intersecting pipes
5. Product data for the following:
 - a. Welded Steel Pipe and Fittings:
 - 1) Material data.
 - 2) Chemical and physical test reports showing data consistent with specified requirements for each heat of steel proposed for use.
 - b. Rubber Gasket Joint:
 - 1) Details with dimensions and fabrication tolerances for both bell and spigot ends.
 - 2) Materials.
 - 3) Performance history or test data.

B. Informational Submittals:

1. Certificates:
 - a. Manufacturer's Certificate of Compliance, in accordance with Common Product Requirements.
 - b. Lining Materials: Certificate that lining system is currently approved for potable water contact in accordance with

- NSF 61. and satisfies current applicable governmental health and safety requirements for use in potable water.
2. Pipe Manufacturer's written Quality Assurance/Control Plan.
 3. Statements of Qualification:
 - a. Pipe manufacturer.
 - b. Fittings fabricator.
 - c. Contractor's Shop Inspector.
 - d. Contractor's Field Inspector.
 - e. NDT Quality Control Personnel.
 4. Procedures:
 - a. Shop and field welding information; at a minimum include complete welding code paper trail with linkage to Shop Drawings.
 - b. Welder Qualifications and Welding Procedure Specifications in accordance with Welding, and as specified below:
 - 1) Provide complete joint dimensions and details showing bevels, groove angles, root face, and root openings for all welds.
 - 2) Notch-tough welding procedures required. For shop welding, address supplementary essential variables in addition to essential variables as indicated in ASME Section IX, QW-251.2. For field welding, heat-input, control PQR essential variables as indicated in AWS D1.1/D1.1M, Table 4.6 shall be included. For shop and field welding, provide heat-input table on WPSs for welder guidance.
 - 3) PQRs for notch-tough welding shall document heat-input control by monitoring volts, amps, and travel speed or time-rate of change of weld metal volume as calculated by measuring change in electrode length over a period of time. Charpy V-notch tests shall be conducted on weld metal and heat affected zone. Test coupons shall be oriented transverse to final direction of rolling. Full size Charpy specimen test acceptance shall be same as base metal specified herein.
 - 4) Written NDT procedures.

- 5) Written description of proposed sequencing of events or special techniques such as:
 - a) Controlling pipe wall temperature stress during installation.
 - b) Minimizing distortion of steel.
 - c) Shop-Applied Cement-Mortar Lining and Coating: Include description of machine to be used and list of similar projects where machine was used. Identify pipe size and total footage.
 - d) Monitoring pipeline temperatures during installation.
- c. Written weld repair procedures for the Work.
- d. Field coating application and repair.
- e. Field lining application and repair.
5. Reports:
 - a. Source Quality Control Test Reports:
 - 1) Nondestructive weld testing.
 - 2) Steel impact testing using Charpy V-notch method.
 - b. Field Quality Control Test Reports:
 - 1) Weld tests, including re-examination of repaired welds, on each weld joint for the following tests, as applicable:
 - a) RT
 - b) UT
 - c. Cement-mortar lining compressive strength tests in accordance with AWWA C205.
 - d. Cement-mortar coating absorption tests in accordance with AWWA C205.
6. Field Testing Plan: Submit at least 15 days prior to testing and include following information at a minimum:
 - a. Testing dates.
 - b. Piping system and sections to be tested.
 - c. Method of isolation.
 - d. Method of conveying water from source to system being tested.
 - e. Calculation of maximum allowable leakage for piping sections to be tested.
7. Design calculations prepared by a licensed professional engineer in the State of California for fittings, including opening reinforcement details of collars, wrappers, crotch plates; and harnessed joint assemblies.

8. Temperature Stress Control Plan: Submit at least 45 days prior to installing pipe and include at least the following information:
 - a. Step by step installation procedures and sequencing to demonstrate compliance with temperature control requirements, including:
 - 1) Pipe installation.
 - 2) Joint welding of standard joints and temperature control joints.
 - 3) Pipe bedding and backfill.
 - b. Methods to ensure compliance with procedures by installation personnel.
 - c. Equipment to be used to monitor pipe wall temperature.
 - d. Time of day, climatic, or seasonal installation limits to be used to achieve compliance with temperature control requirements.
9. Pipe manufacturer's design engineer's certification of training of Contractor's pipe installation crews.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Pipe Manufacturer:
 - a. Experienced in fabricating pipe of similar diameters, lengths, and wall thickness required for the Work.
 - b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9001:2000 Certification.
 - c. Demonstrate current production capability for volume of work required for Project.
 - d. Experience shall include successful fabrication to AWWA C200 standards of at least 10000 linear feet of 36-inch diameter or larger pipe, with wall thickness of 3/8 inches or greater.
 - e. Experience shall be applicable to fabrication plant facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
2. Fittings Fabricator:
 - a. Experienced in fabricating fittings of similar diameters and wall thickness required for the Work.

- b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9001:2000 Certification.
 - c. Demonstrate current production capability for volume of work required for this Project.
 - d. Experience shall include successful fabrication to AWWA C200 and AWWA C208 standards of at least 25 fittings of 36-inch or larger pipe, with wall thickness 1/2 inch or greater.
 - e. Experience shall include successful fabrication of crotch plate fittings requiring post weld heat treatment.
 - f. Experience shall be applicable to fabrication shop facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
3. Welders and Welding Operators:
 - a. Shop Welders: In accordance with ASME BPVC SEC IX.
 - b. Field Welders: In accordance with AWS D1.1/D1.1M.
 4. Contractor's Inspector for Shop and Field Welding:
 - a. In accordance with AWS QC 1, with knowledge of welding code for the Work.
 - b. After receiving CWI qualification, at least one Shop CWI and one Field CWI shall have professional experience related to welding inspection similar to the Work.
 5. NDT Quality Control Personnel:
 - a. In accordance with requirements of ASNT SNT-TC-1A, NDT Level II.
 - b. After receiving NDT qualification, at least one NDT person shall have professional experience related to NDT inspection similar to the Work.

B. Contractor's Shop Inspector:

1. In accordance with AWWA C200.
2. Responsibilities:
 - a. Verify conformance to use of specified materials and their proper storage.
 - b. Monitor conformance to approved WPS.
 - c. Monitor conformance to approved NDT procedure specifications.
 - d. Monitor conformance of WPQ.

- e. Provide 100 percent visual inspection before, during, and after shop welding.
 - f. Coordinate NDT work and review test results.
 - g. Maintain records and prepare report confirming results of inspection and testing.
- C. Contractor's Field Inspector:
- 1. In accordance with AWWA C206 and AWS D1.1/D1.1M.
 - 2. Responsibilities:
 - a. Verify conformance to use of specified materials and their proper storage.
 - b. Monitor conformance to approved WPS.
 - c. Monitor conformance to approved NDT procedure specifications.
 - d. Monitor conformance of WPQ.
 - e. Provide 100 percent VT before, during, and after field welding.
 - f. Coordinate NDT work and review test results.
 - g. Maintain records and prepare report confirming results of inspection and testing.
- D. Prefabrication Meeting: Hold prior to fabrication of pipe and fittings between representatives of Owner, Contractor, Engineer, and pipe fabricator to review following:
- 1. Project scope.
 - 2. Submittal requirements.
 - 3. Testing.
 - 4. Inspection responsibilities.
 - 5. Shop welding requirements.
 - 6. Field welding requirements.
 - 7. Shop and field coating and lining requirements.
 - 8. Production and delivery schedule.
 - 9. Other issues pertinent to the Work.
- E. Inspection of Coating and Lining Application: Qualified manufacturer's technical representative shall visit pipe coating and lining shop and Site at beginning of application process to verify proper workmanship associated with coating and lining application and as may be required

to resolve shop or field problems. Submit written report of visit to Engineer.

1.06 DELIVERY, HANDLING, AND STORAGE

A. Pipe Marking:

1. Legibly mark installation sequence number on pipe and fittings in accordance with piping layout. Standard pipe sections do not need sequence number labeled provided wall thickness is clearly marked.
2. Fittings shall be marked at each end with notation "TOP FIELD CENTERLINE".
3. The word "TOP" shall be painted or marked on outside top spigot of each fitting.
4. Mark "TOP MATCH POINT" for compound bends per AWWA C208 so end rotations can be easily oriented in field.

B. Delivery:

1. Securely bulkhead or otherwise seal ends of pipe and fittings prior to loading at manufacturing site.
2. Pipe ends shall remain sealed until installation.
3. Damage to pipe and fittings, including linings and coatings, found upon delivery to Site shall be repaired to Engineer's satisfaction or removed from Site and replaced.

C. Storage:

1. Support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials.
2. Support on sand or earth berms free of rock exceeding 3 inches in diameter.

D. Acceptance at Site:

1. Pipe delivered to the site that does not conform to the requirements of this specification shall be rejected for use at the discretion of the Owner Representative and Engineer.

1.07 SEQUENCING AND SCHEDULING

- A. Notify Engineer in writing of the following:
 - 1. Pipe Manufacturing: Not less than 14 days prior to starting.
 - 2. Not less than 5 days prior to start of each of the following:
 - a. Welding.
 - b. Coating application.
 - c. Lining application.
 - d. Shop hydrostatic testing.

PART 2 PRODUCTS

2.01 GENERAL

- A. Pipe Manufacturer:
 - 1. Manufacturing of steel pipe and fittings shall be under direction of one pipe Supplier.
 - 2. Responsibility shall include, at minimum, coordinating work of other suppliers for fittings.

- B. Pipe Type:
 - 1. Flanged and lap welded, rated for maximum working pressure of 150 psi with AWWA C207 Class D flat-faced ring flanges.

- C. Lining and Coating Summary:
 - 1. Buried carbon steel pipe shall have cement mortar lining with thickness meeting requirements of AWWA C205 and the cathodic protection specifications for this project. Buried carbon steel pipe shall be coated with a tapecoat rockshield system.
 - 2. Exposed carbon steel pipe shall have cement mortar lining with thickness meeting requirements of AWWA C205 and the cathodic protection specifications for this product. Exposed carbon steel pipe shall be coated with an epoxy system meeting the requirements of AWWA C213.
 - 3. Steel pipe must have an external tape coating under the cement mortar per AWWA C209 and C214 as called out on the plans.

- D. Steel pipe and fittings shall be manufactured, tested, inspected, and marked to comply with AWWA C200 and additional requirements of these Contract Documents.
- E. In lieu of collar reinforcement, pipe or fittings with outlets may be fabricated in their entirety of steel plate having thickness equal to sum of pipe wall plus required reinforcement.
- F. PIPE BARREL
 - 1. Steel: Provide steel coils for spiral welded steel pipe or steel plate for straight seam welded steel pipe per AWWA C200 and as follows:
 - a. Steel Grade: ASTM A36, Grade 40.
 - b. Minimum Elongation in 2-inch Gauge Length: 21 percent.
 - c. Steel Quality as follows:
 - 1) Coils:
 - a) Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018/A1018M, SS Grade 40, Type 1.
 - b) Continuous cast process, fully-killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A1018/A1018M, HSLAS Grade 50, Class 2 (modified). Measured yield strength shall not exceed 85 percent of measured tensile strength.
 - 2) Plate:
 - a) Fully-killed, conforming to ASTM A20/A20M, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A36, Grade 40.
 - b) Steel Chemistry: Conform to ASTM A36, Grade 40. Steel plates that are 3/4-inch thick or greater shall be normalized.
 - 3) Toughness:
 - a) Charpy V-notch Acceptance Criteria: Transverse specimen orientation, full size specimens, 25 foot-pounds energy at test temperature of 30 degrees F.

- b) Frequency: See Paragraph Steel Toughness Testing for Thickness Equal to or Greater than 7/16 Inches.
2. Minimum nominal wall thickness as shown on Drawings. Maximum allowable thickness variation for plate, sheet, or coil shall be 0.010 inch less than ordered thickness.

2.02 FITTINGS

- A. Conform to the requirements of ASTM A36.
- B. Fabrication:
 1. Shop fabricate. No field fabrication will be allowed, unless approved by Engineer.
 2. Fabricate from materials or straight pipe in conformance with specified requirements and dimensions of AWWA C208, unless otherwise indicated.
- C. Crotch Plate: Fabricate from fully-killed, fine grain, pressure vessel steel conforming to ASTM A36 Grade 36 modified to have minimum yield strength of 40,000 psi, or equivalent, and as follows:
 1. Plates shall be normalized.
 2. Perform through-thickness tension testing of plates in accordance with ASTM A770/A770M.
 3. Charpy V-notch tests in direction transverse to final rolling shall be performed per ASTM A370 on full size specimens of coupons taken from each plate. Acceptance shall be 25 foot-pounds at 30 degrees.
- D. Wall Thickness:
 1. General:
 - a. Refer to ASME B36.10M for definitions of wall thickness for standard weight pipe and nominal pipe size (NPS).
 - b. Reinforce to withstand either internal pressures, both circumferential and longitudinal, or external loading conditions, whichever is greater.
 - c. Minimum Plate Thickness: The greater of adjacent mainline pipe, thickness shown or thickness calculated as hereinafter specified.

E. Bends, Unless Otherwise Indicated:

1. Minimum Radius: 1.0 times pipe diameter or as indicated on Drawings.
2. Minimum Bend Wall Thickness: Greater of Table 1 above or as calculated for straight pipe under internal pressure multiplied by following bend stress intensities (tabulated below or calculated with the following bend stress intensity formula where “n” is the bend radius multiplier and SI=bend stress intensity). For “n” greater than, or equal to, 2.5 the stress intensity factor may be ignored as indicated in AWWA M11.

$$SI = \frac{2 \cdot n - \frac{1}{3}}{2 \cdot n - 1}$$

Bend Radius Multiplier “n”	AWWA M11 Bend Stress Intensity “SI”
1.0	1.67
1.5	1.33
2.0	1.22

3. Maximum Miter Angle: 11-1/4 degrees on each section resulting in a maximum deflection angle of 22.5 degrees per miter weld as recommended in AWWA C208.
4. Bevels: Vary bevels on miters to provide a constant weld groove angle. For 11-1/4-degree miter, (22.5-degree miter weld) bevels must vary from 18.75 degrees on OD of bend to 41.25 degrees on ID of bend to provide a constant 60-degree groove angle for CJP welding.
5. Complete joint penetration (CJP) welds on miter welds.

F. Outlets:

1. 24 Inches and Smaller: Fabricate from ASTM A53/A53M, Type E or S, Grade B, standard weight steel pipe.
2. Larger than 24 Inches: Fabricate from ASTM A106/A106M, Grade B, standard weight pipe.
3. Fabricate collar or wrapper reinforcement using same steel as specified for main pipe barrel.

G. Steel Butt-Weld Fittings:

1. 24 Inches and Smaller: In accordance with ASME B16.9 conforming to ASTM A234/A234M.
2. Standard weight.
3. Taper pipe wall at welds at 4:1 for connection to pipe of different wall thickness.
4. Coordinate difference in diameter convention between fittings and AWWA C200 and AWWA C208 pipe and fittings to provide complete piping system as shown.

2.03 JOINTS

A. Shop Welded:

1. Fabricate in accordance with AWWA C200 as modified herein.
2. Complete joint penetration (CJP) butt joints shall be used for longitudinal, girth, and spiral welds, unless otherwise indicated.
3. Lengths of pipe shall not be shop-joined using lap joints.

B. Preparation of Joints for Field Welding:

1. Butt Joint Welded:
 - a. Plain ends beveled as required by AWWA C200 and Contractor's field WPS.
 - b. Provide protection for factory beveled pipe ends so ends are not damaged during transport.
2. Lap Joint Welded:
 - a. Double fillet lap joints in preparation for field welding shall be in accordance with AWWA C200.
 - b. For pipe 30 inches in diameter and larger, provide one of the following:
 - 1) Tack weld four metal tabs at equal intervals around inside circumference of bell ends to indicate location at which spigot end has reached maximum penetration into bell. Remove stops after welding of joint.
 - 2) Paint a 3/4-inch wide white stripe on outside circumference of spigot end of pipe. Side of stripe furthest from pipe end shall indicate location at which spigot end has reached maximum penetration into bell.

Side of stripe closest to end of pipe will indicate limit of maximum joint pull.

- c. Double welded lap joints and butt-strap joints shall be tapped and drilled for testing in accordance with AWWA C206.

C. Miter-End Cuts:

1. Welded Lap Joints:

- a. As shown on Drawings.
- b. Moderate deflections and long radius curves may be made using miter-end cuts.
- c. Use only lap welded joints, unless specifically approved in writing by Engineer.
- d. Maximum Total Allowable Angle: 3 degrees per pipe joint.
- e. Provide miter-cut that is cold expanded square with face of miter-cut on bell ends only.
- f. Mitering of spigot ends will not be permitted.

2. Welded Butt Joints:

- a. Maximum Total Allowable Angle: 2.5 degrees per pipe joint.
- b. Minimum Pipe Wall Thickness: 1/2 inch.
- c. Welded Butt joints shall be CJP.

D. Special Temperature Control Joint:

1. Provide a special longer bell end (Special Temperature Control Joint) at a maximum spacing as indicated herein to account for movement on installed pipe as a result of temperature changes.
2. Pipe manufacturer shall determine length required for the longer bell.

2.04 FLANGES

A. In accordance with AWWA C207.

- B. Flanges designated to receive insulating flange kits shall have bolt holes overdrilled by an additional 1/8 inch (1/4 inch greater than nominal bolt diameter) as allowed in AWWA C207 Section 4.2.3.

2.05 STULLING (STRUTTING)

A. Materials:

1. Shop-Lined Pipe: Wood stulls and wedges.
2. Unlined Pipe: Steel or wood.

B. Install stulling for pipe and fittings in accordance with approved submittal and as soon as practical after pipe is fabricated or, for shop-lined pipe, after lining has been applied.

C. Install stulling in manner that will not harm lining.

2.06 TAPECOAT ROCKSHEILD SYSTEM

A. General:

1. Provide 25 mil. polyethylene backing and 375 mil. foam
2. Provide perforations 1 ¼" on center
3. Manufacturer: Chase Tapecoat or equal

2.07 CEMENT-MORTAR COATING

A. General:

1. Notify Engineer at least **10** days prior to application of coating products.
2. Holdback of and coating from field-welded joints shall be as follows:
 - a. For lap welded joints and flex couplings, 8 inches.
 - b. For butt weld and butt strap joints, 6 inches.
3. Unless otherwise indicated, coat exterior surfaces of pipe and fittings passing through structure walls from center of wall or from wall flange to end of underground portion.

B. Shop-Applied:

1. Cement-mortar coating shall conform to AWWA C205. Thickness shall conform to AWWA C205 and shall be ¾ inch, minimum.
2. Steel wire or ribbon mesh reinforcement shall be in accordance with AWWA C205.

3. For cement-mortar coatings applied over dielectric coated pipe, ensure reinforcing metals in coating do not electrically contact pipe.
4. Coating system for field joints shall be cement mortar in accordance with AWWA C205. Mortar shall be retained with suitable water-impermeable bands or heavy-duty diapers of sufficient strength to hold fresh mortar and resist rodding.

2.08 CEMENT-MORTAR LINING

A. General:

1. Notify Engineer at least **10** days prior to application of lining products.
2. Holdback of lining from field-welded joints shall be as follows:
 - a. For lap-welded joints and flex couplings, 8 inches
 - b. For butt-weld and butt-strap joints, 6 inches.

B. Shop-Applied:

1. Applied centrifugally in conformance with AWWA C205. Thickness shall be in accordance with AWWA C205.
2. Lining machine type that has been used successfully for similar work and approved by Engineer.
3. Maintain pipe in round condition during lining operation and thereafter by suitable bracing or strutting.
4. Provide polyethylene or other suitable bulkhead on ends of pipe and on special openings to prevent drying out of lining. Bulkheads shall be substantial enough to remain intact during shipping and storage until pipe is installed.
5. Pipe shall be left bare where field joints occur.
6. Ends of lining shall be left square and uniform. Feathered or uneven edges will not be permitted.

C. Field-Applied:

1. Materials conforming to AWWA C602.
2. Do not use pozzolanic material in mortar mix.
3. Admixtures shall contain no calcium chloride.
4. Wire mesh conforming to AWWA C205.

2.09 CATHODIC PROTECTION

- A. Provide as shown on the Drawings.

2.10 SOURCE QUALITY CONTROL

- A. Steel Toughness Testing for Thickness Equal to or Greater than 7/16 Inches:
 - 1. Include three impact specimens; conduct test in direction transverse to final direction of the coil rolling.
 - 2. Coils:
 - a. Conduct Charpy Testing per ASTM A370 on an initial coil of each heat to establish uniformity of steel.
 - b. Take test coupons from an initial coil of each heat at locations of outer and inner wrap of coil.
 - c. For each coil that fails to meet acceptance criteria, conduct Charpy Testing on next two coils in that heat.
 - d. Do not use coils that do not qualify in production of pipe.
 - 3. Plate:
 - a. Conduct Charpy Tests on each plate in accordance with ASTM A20/A20M.
 - b. Conduct on full-size (10 mm by 10 mm) specimens from each plate in accordance with ASTM A20/A20M.
 - c. Do not use plates that do not qualify in production of pipe.
- B. Crotch Plate:
 - 1. Perform through-thickness tension testing with acceptance criteria per Article 5 of ASTM A770/A770M on each plate.
 - 2. Conduct straight-beam ultrasonic examination with acceptance criteria per Article 6 of ASTM A435/A435M on each plate.
 - 3. Plates that do not qualify shall not be used.
- C. Shop Hydrostatic Pressure Test: In accordance with AWWA C200 Section 5.2, except as follows:
 - 1. General: Unless specified otherwise, testing of pipe and fittings shall be performed before lining and coating is applied.
 - 2. Pipe: Maintain test pressure for minimum of 2 minutes.

3. Fittings:
 - a. Except as otherwise specified herein, no additional shop hydrostatic test will be required on fittings fabricated from successfully tested straight pipe.
 - b. Test with crotch plates, regardless of whether or not straight pipe sections used were previously tested.
 - c. Test Pressure: Field test pressure 120 percent of maximum rated working pressure.
 - d. Maintain test pressure for a length of time as required to perform a visual inspection of welds.
 - e. No leakage is allowed.

D. Joints, Lap-Welded:

1. Fit test minimum of 5 joints, selected by Engineer, of each pipe size used:
 - a. Join pipe ends with proposed adjacent pipe end.
 - b. Match-mark pipe ends.
 - c. Record Actual Annular Space:
 - 1) Maximum space at a point.
 - 2) Minimum space at a point.
 - 3) Space at 90-degree intervals; top, bottom, and spring line on both sides.

E. Shop Nondestructive Testing:

1. Welds: 100 percent visually examined by Contractor's Shop Inspector to criteria in ASME BPVC SEC VIII, Division 1.
2. CJP Welds: Spot radiographically or radioscopically examine pipe in accordance with ASME BPVC SEC VIII, Div. 1, Paragraph UW-52.] [B: A minimum of 10 percent radioscopy examine in accordance with ASTM E1255. Acceptance criteria per ASME BPV Code, Section VIII, Division 1, Paragraph UW-51. Welds that, in opinion of Engineer, cannot readily be radiographed, shall be ultrasonically examined in accordance with paragraph UW-53.
3. Fillet Welds: 100 percent examine using magnetic particle inspection method in accordance with ASME BPVC SEC VIII, Division 1, Appendix 6.
4. Air test collars and wrappers in accordance with AWWA C206.

- F. Inspection of Pipe Fabrication Procedure: Select and provide independent testing agency to observe pipe fabrication. Agency staff shall have experience in observation of steel pipe fabrication in accordance with ASTM E329. Representative of agency shall be present while pipe is being fabricated and while protective coating and lining is applied. Provide a letter to Engineer certifying that pipe furnished meets requirements of this section.

PART 3 EXECUTION

3.01 INSTALLATION

A. General:

1. Joints and related work for field assembly of fittings shall conform to requirements for straight pipe, unless otherwise shown.
2. Inspect pipe and fittings before installation. Clean ends thoroughly, remove foreign matter and dirt from inside.
3. Make minor field adjustments by pulling standard joints.
 - a. Maximum Allowable Angle: 75 percent of manufacturer's recommended or angle which results from 3/4-inch pull out from normal joint closure, whichever is less.
 - b. Maximum Allowable Gap: 1/8 inch between bell and spigot at weld location.
4. Horizontal deflections or fabricated angles shall fall on alignment, as shown within tolerances below.
5. Vertical deflections shall fall on alignment, and pipe angle point locations shall match those indicated on Drawings within tolerances below.
6. For field-welded joints, pipe 30 Inches in Diameter and Larger:
 - a. Ensure maximum penetration of spigot end into bell end is achieved through use of shop-welded tabs on inside circumference of bell end or by use of a paint stripe.
 - b. If welded metal tabs are used, remove tabs prior to welding inside of joint.
7. Stulling:
 - a. Maintain stulling in place until pipe is completely backfilled and compacted.
 - b. Reinstall stulls that were temporarily removed to facilitate interior welding prior to backfilling.
8. Pipeline Alignment Tolerances:

- a. Plan: 3 inches.
- b. Elevation: 3 inches.

B. Control of Temperature Stresses:

1. In accordance with AWWA C206, approved Temperature Stress Control Plan submittal, and this Specification.
2. To control temperature stresses, shade unbackfilled special temperature control joint area of pipe from direct rays of sun by use of properly supported awnings, umbrellas, tarpaulins or other suitable materials until pipe is backfilled at least 1 foot over top of pipe. The special temperature control joint area is defined as the entire length of pipe left exposed. Shading materials shall not rest directly on pipe, but shall be supported to allow air circulation around pipe. Shading of special temperature control joints is not required when ambient air temperature is below 50 degrees F.
3. Locate special temperature control joints at 300 foot intervals.
4. Install special temperature control joints as indicated on Drawings.
5. Design, furnish and install a pipeline temperature monitoring system consisting of thermocouple temperature gauges to monitor temperature of steel pipe wall in trench. Gauges shall be located at top inside surface of pipe at intervals not exceeding 50 feet. Hand held portable temperature sensor devices may be used, provided temperature readings are taken at top of pipe at a frequency and spacing that demonstrates compliance with temperature control requirements.
6. Temperature Control Requirements:
 - a. Prior to and during placement of pipe backfill, pipeline steel temperature shall be at or below 90 degrees F. Monitor specified temperature and control for at least 3 hours after placement of pipe backfill. Provide supplemental cooling as required.
 - b. Place pipe backfill from a single heading starting at one special temperature control joint and proceed toward next special temperature control joint.
 - c. During period of pipe backfill placement, pipeline section that is partially backfilled shall be shaded as indicated in above. Temperature of partially backfilled pipe shall not be allowed to exceed 110 degrees F. Provide supplemental cooling as required.

- d. Prior to welding special temperature control joints, pipeline extending 300 feet each direction from joint shall be maintained at or below 85 degrees F. Additionally, pipeline extending 300 feet each direction from joint shall be backfilled to at least 1 foot over top of pipe. Weld special temperature control joint at specified temperature of 90 degrees or below. Begin and complete weld during coolest time interval of the 24-hour day. Use pipeline temperature monitoring system data to demonstrate to Engineer coolest interval of the day.
- e. After field welding of special temperature control joint, pipe temperature for 150 feet in each direction shall be maintained below 110 degrees F for a minimum of 24 hours after special temperature control joint area has been backfilled to at least 1 foot over top of pipe.

3.02 WELDING

- A. Perform welding only in presence of Contractor's Field Inspector.
- B. Conform to AWS D1.1/D1.1M, AWWA C206, approved welding procedures, and referenced welding codes. In case of conflict AWS D1.1/D1.1M shall govern.
- C. Preheat and Interpass temperature requirements for unlisted base metals shall be determined according to AWS D1.1/D1.1M, Annex XI Guideline on Alternative Methods for Determining Preheat.
- D. Rejectable weld defects shall be repaired or redone, and retested until sound weld metal has been deposited in accordance with appropriate welding codes.

3.03 REPAIR OF SHOP-APPLIED CEMENT-MORTAR COATINGS

- A. Exterior surfaces of steel pipe and fittings shall be inspected upon delivery to Site and just prior to backfilling trench.
- B. Repair of Cement Mortar Coating: Field repairs shall be made in accordance with AWWA C205.

3.04 REPAIR OF TAPE COATING

- A. For field repair of tape coating, power tool clean the bare pipe surface to be coated to a bright, shiny metal surface (to remove rust, mill scale, weld splatter or sharp edges). Cut and apply a patch with at least 2 inches of overlap over all adjacent unaffected tape coating. Cut a second piece of tape to cover the patch completely and wrap around the pipe at least 1.25 times the pipe circumference.

3.05 COATING OF FIELD-WELDED JOINTS

- A. Using Cement Mortar: Applied to joints in accordance with AWWA C205.
- B. For Field-Applied Tape Coating: Prior to applying tape coating to field welded joints, power tool clean the bare surface pipe to remove rust, mill scale, weld splatter, and sharp edges. The wrapping process shall start at a minimum of 4 inches beyond the cutback edge of the existing coating and start on the downside of the pipe. A minimum of two (2) layers of joint wrap tape coating shall be applied over the field joint. The joint coating system shall be applied under taught hand or machine tension that will result in a smooth, wrinkle free coating. Apply joint coating system in a spiral configuration. Perform holiday testing of all field joints.

3.06 CEMENT-MORTAR LINING APPLICATION AT JOINTS

- A. Cement-Mortar Lining: For pipe with shop-applied cement-mortar lining, place lining at joints in accordance with AWWA C205.

3.07 CATHODIC PROTECTION

- A. Apply to pipe as shown on the Drawings.

3.08 FIELD QUALITY CONTROL

- A. Field Welding:
 - 1. All welds, 100 percent inspection, shall be VT inspected by Contractor's Field Inspector and marked to indicate acceptance or rejection.

2. Test butt-strap or double-welded lap joint welds by pressurizing connection between the two fillet welds in accordance with AWWA C206.
 - a. Apply air or other Engineer-approved gas into connection between the two fillet welds.
 - b. Paint welds with soap solution.
 - c. Mark leaks indicated by escaping gas bubbles.
 - d. Close threaded openings with flush pipe plugs or by welding them.
3. CJP Welds:
 - a. Inspect 10percent of butt joint welds with full circumference RT.
 - b. Inspect 10 percent of other groove welds with UT.
4. Inspect 10 percent of lap joint welds with PT or MT
5. Weld Acceptance:
 - a. If, in the opinion of Engineer, inspections indicate inadequate quality of welds, percentage of welds inspected shall be increased.
 - b. Welds to be inspected, if less than 100 percent rate, shall be selected at random by Engineer.
 - c. VT: Perform VT per AWS D1.1/D1.1M Paragraph 6.9, Visual Inspection, Statically Loaded Nontubular Connections.
 - d. UT: Perform UT of CJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.13.1.
 - e. RT: Perform RT of CJP butt joint welds in accordance with AWS D1.1/D1.1M, Paragraph 6.12.1.
 - f. PT or MT:
 - 1) Perform on fillet and PJP groove welds in accordance with AWS D1.1/D1.1M, Paragraph 6.10.
 - 2) Acceptance shall be in accordance with VT standards specified above.
 - g. Remove in manner that permits proper and complete repair by welding.
 - h. Caulking or peening of defective welds is not permitted.
 - i. Retest unsatisfactory welds.
6. Verification Acceptance: Owner may conduct random nondestructive inspections of field-welded joints. Inspections will be of an appropriate type for weld being evaluated. Possible types of inspection include, but are not limited to, RT, UT, PT, and VT.

Testing will be performed and evaluated per AWS D1.1/D1.1M.
Provide Owner's Verification Inspector access to the Work.

3.09 MANUFACTURER'S SERVICES

- A. Manufacturer's representative available at Site for installation assistance and training of pipe installation crews.
 - 1. Coordinate pipe manufacturer's representative services.
 - 2. Pipe manufacturer's representative shall visit Site and instruct, guide, and provide procedures for pipe handling, laying, and jointing at start of pipe installation by each crew.

END OF SECTION

CONTRACTOR'S RESPONSIBILITIES

- PURSUANT TO SECTION 4216 OF THE GOVERNMENT CODE, AT LEAST 2 WORKING DAYS PRIOR TO EXCAVATION, YOU MUST CONTACT THE REGIONAL NOTIFICATION CENTER (E.G. UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA) AND OBTAIN AN INQUIRY IDENTIFICATION NUMBER.
- NOTIFY SDG&E AT LEAST 10 WORKING DAYS PRIOR TO EXCAVATING WITHIN 10' OF SDG&E UNDERGROUND HIGH VOLTAGE TRANSMISSION POWER LINES (I.E., 69 KV & HIGHER)
- LOCATE AND RECONNECT ALL SEWER LATERALS. LOCATIONS AS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. LATERAL RECORDS ARE AVAILABLE TO THE CONTRACTOR AT THE WATER DEPARTMENT, 2797 CAMINITO CHOLLAS. LOCATE THE IMPROVEMENTS THAT WILL BE AFFECTED BY LATERAL REPLACEMENTS.
- EXCAVATE AROUND WATER METER BOX (CITY PROPERTY SIDE) TO DETERMINE IN ADVANCE, THE SIZE OF EACH SERVICE BEFORE TAPPING MAIN.
- CITY FORCES, WHEN SPECIFIED OR SHOWN ON THE PLANS, WILL MAKE PERMANENT CUTS & PLUGS AND CONNECTIONS.
- KEEP EXISTING MAINS IN SERVICE IN LIEU OF HIGH-LINING, UNLESS OTHERWISE SPECIFIED SHOWN ON PLANS.
- THE LOCATIONS OF EXISTING BUILDINGS AS SHOWN ON THE PLAN ARE APPROXIMATE.
- STORM DRAIN INLETS SHALL REMAIN FUNCTIONAL AT ALL TIMES DURING CONSTRUCTION.
- UNLESS OTHERWISE NOTED AS PREVIOUSLY POTHOLED (PH), ELEVATIONS SHOWN ON THE PROFILE FOR EXISTING UTILITIES ARE BASED ON A SEARCH OF THE AVAILABLE RECORD INFORMATION ONLY AND ARE SOLELY FOR THE CONTRACTOR'S CONVENIENCE. THE CITY DOES NOT GUARANTEE THAT IT HAS REVIEWED ALL AVAILABLE DATA. THE CONTRACTOR SHALL POTHOLE ALL EXISTING UTILITIES EITHER SHOWN ON THE PLANS OR MARKED IN THE FIELD IN ACCORDANCE WITH THE SPECIFICATIONS SECTION 5-UTILITIES.
- EXISTING UTILITY CROSSING AS SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT REPRESENTATIVE OF ACTUAL LENGTH AND LOCATION OF CONFLICT AREAS. SEE PLAN VIEW.
- ALL ADVANCE METERING INFRASTRUCTURE (AM) DEVICES ATTACHED TO THE WATER METER OR LOCATED IN OR NEAR WATER METER BOXES, COFFINS, OR VAULTS SHALL BE PROTECTED AT ALL TIMES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

MONUMENTATION / SURVEY NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION. A LICENSED LAND SURVEYOR OR LICENSED CIVIL ENGINEER AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA SHALL FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR ANY EARTHWORK, DEMOLITION OR SURFACE IMPROVEMENTS. IF DESTROYED, A LICENSED LAND SURVEYOR SHALL REPLACE SUCH MONUMENT(S) WITH APPROPRIATE MONUMENTS. WHEN SETTING SURVEY MONUMENTS USED FOR RE-ESTABLISHMENT OF THE DISTURBED CONTROLLING SURVEY MONUMENTS AS REQUIRED BY SECTIONS 6730.2 AND 8771 OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA, A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILLED WITH THE COUNTY SURVEYOR, IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION SHALL BE NOTIFIED IN WRITING AT LEAST 7 DAYS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPLACING AND VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

ABBREVIATIONS

ABAND	ABANDON	ELEC	ELECTRIC	PROP	PROPOSED
AC	ASBESTOS CEMENT (PIPE)	ELL	ELBOW	PRS	PRESSURE REDUCING STATION
AHD	AHEAD	EX, EXIST	EXISTING	RCPC	REINFORCED CONCRETE PIPE
ASSY	ASSEMBLY	E/O	EAST OF	RCCP	REINFORCED CONCRETE
A.V.	AIR & VACUUM VALVE	F	FLANGE	RED	REDUCER
BC	BEGINNING OF CURVATURE	FH	FIRE HYDRANT	RT	RIGHT
BFV	BUTTERFLY VALVE	FL	FLOWLINE	R/W	RIGHT-OF-WAY
BK	BACK	FS	FIRE SERVICE	SB	SOUTH BOUND
B.O.	BLOW-OFF ASSEMBLY	GE	GROOVED END	SCCL	STEEL CYLINDER CONCRETE LINED
BTWN	BETWEEN	GJ	GROUP JOB	SCRW	STEEL CYLINDER ROD WRAPPED
CATV	CABLE TV	GV	GATE VALVE	SD	STORM DRAIN
CI	CAST IRON PIPE	HDPE	HIGH-DENSITY POLYETHYLENE	SD&AE	SAN DIEGO & ARIZONA EASTERN
CL	CENTER LINE	HGL	HYDRAULIC GRADE LINE	SDR	STANDARD DIMENSION RATIO
CLSM	CONTROLLED LOW STRENGTH MATERIAL	HORIZ	HORIZONTAL	SDG&E	SAN DIEGO GAS & ELECTRIC
CMP	CORRUGATED METAL PIPE	HP	HIGH PRESSURE	SDRSD	SAN DIEGO REGIONAL STANDARD DRAWING
C.O.	CLEANOUT	HPI	HORIZONTAL POINT OF INTERSECTION	SDSD	SAN DIEGO STANDARD DRAWING
COND	CONDUIT	IE	INVERT ELEVATION	SDW	SAN DIEGO WATER (STANDARD)
CONT	CONTINUED	INT	INTERSECTION	S/O	SOUTH OF
CONTR	CONTRACTOR	ISO	ISOLATION	STA	STATION
COSDSD	CITY OF SAN DIEGO STANDARD DRAWING	KV	KILOVOLT	STL	STEEL
CI	CAST IRON (PIPE)	LF	LINEAL FEET	SWR	SEWER
CIPP	CURED IN PLACE PIPE	LT	LEFT	TELE	TELEPHONE
CML&C	CEMENT MORTAR LINED AND COATED	MH	MANHOLE	UNK	UNKNOWN
CML&TC	CEMENT MORTAR LINED AND TAPE COATED	MIN	MINIMUM	VB	VERTICAL BEND
CPLG	COUPLING	MJ	MECHANICAL JOINT	VC	VITRIFIED CLAY (PIPE)
DB	DIRECT BURIED	MTD	MULTIPLE TELEPHONE DUCT	VCS	VITRIFIED CLAY ENCASED SEWER
DCE	DEPUTY CITY ENGINEER	MTS	METROPOLITAN TRANSIT SYSTEM (SAN DIEGO)	VERT	VERTICAL POINT OF INTERSECTION
DIP	DUCTILE IRON PIPE	N/O	NORTH OF	VPI	VERTICAL POINT
DR	DIMENSION RATIO	OHE	OVERHEAD ELECTRICAL	WBS	WORK BREAKDOWN STRUCTURE
DWGS	DRAWINGS	PCC	PORTLAND CEMENT CONCRETE	WM	WATER METER
DWT	DETECTABLE WARNING TILES	PE	PLAIN END	WTR	WATER
EB	ENCASED BURIED OR EAST BOUND	PIV	POST INDICATOR VALVE	W/O	WEST OF
EC	END OF CURVATURE	POC	POINT ON CURVATURE	WSP	WELDED STEEL PIPE
EL, ELEV	ELEVATION	PP	POWER POLE		
		PT	POINT		
		PVC	POLYVINYL CHLORIDE		

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS. I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

JOSEPH LONG  02/08/19 DATE

CHANGE	DATE	AFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.
	04/05/19	ADDED NEW SHEET 48 (G-06) DISCHARGE PIPING CONNECTION	
	06/07/19	C-15 (40351-19-D) CP-02 (40351-33-D)	

WARNING



IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

OTAY 2nd PIPELINE - PHASE 1

SHEET NO.	DISCIPLINE CODE	TITLE	LIMITS	PIPE		LENGTH (FT)
				SIZE (IN)	MATERIAL	
GENERAL						
1	G-01	COVER SHEET				
2	G-02	KEY MAP				
3	G-03	MTS NOTES				
DEMOLITION						
4	D-01	DEMOLITION PLAN	EXISTING PRS PLAN & NOTES			
WATER						
5	C-01	IMPERIAL AVE	65TH & HERRICK PUMP STATION TO IMPERIAL AVE	48	CML&TC WSP	729.65
6	C-02	IMPERIAL AVE & WOODMAN ST	IMPERIAL AVE E/O 66TH TO WOODMAN ST N/O RITCHEY	48	CML&TC WSP	500.00
7	C-03	WOODMAN ST	WOODMAN ST S/O IMPERIAL TO S/O MADRONE AVE	48	CML&TC WSP	800.00
8	C-04	WOODMAN ST	WOODMAN ST S/O MADRONE AVE TO N/O BENSON AVE	48	CML&TC WSP	800.00
9	C-05	WOODMAN ST	WOODMAN ST N/O BENSON AVE TO N/O CIELO DR	48	CML&TC WSP	800.00
10	C-06	WOODMAN ST	WOODMAN ST N/O CIELO DR TO S/O MARGARITA RD	48/16	CML&TC WSP	800.00/20
11	C-07	WOODMAN ST	WOODMAN ST S/O MARGARITA RD TO SKYLINE DR	48	CML&TC WSP	207.85
12	C-08	PIPELINES TO PRS	IMPERIAL AVE TO PIPELINE EASEMENT	36	CML&TC WSP	79.84
12	C-08	PIPELINES TO PRS	IMPERIAL AVE TO PIPELINE EASEMENT	36	CML&TC WSP	92.01
13	C-09	PRESSURE REDUCING STATION	SITE & GRADING PLAN			
14	C-10	TRENCHLESS CROSSING	65TH & HERRICK PUMP STATION TO IMPERIAL AVE	20	CML&TC WSP	114.41
15	C-11	CIVIL DETAILS - 1	WATER CONSTRUCTION DETAILS			
16	C-12	CIVIL DETAILS - 2	WATER CONNECTION DETAILS			
17	C-13	CIVIL DETAILS - 3	WATER CONSTRUCTION DETAILS			
18	C-14	CIVIL DETAILS - 4	WATER CONSTRUCTION DETAILS			
19	C-15	TUNNELING SECTIONS	TUNNELING SHAFT SECTIONS & DETAILS			
20	C-16	TUNNELING DETAILS	TUNNELING SHAFT DETAILS			
21	C-17	WATER ABANDONMENT	WATER ABANDONMENT PLAN			
22	C-18	CURB RAMP IMPROVEMENTS	CURB RAMP IMPROVEMENTS PLAN			
23	C-19	STREET RESURFACING	STREET RESURFACING PLAN			
MECHANICAL						
24	M-01	PRS MECHANICAL PLAN	PRS VAULT PLAN & SECTION			
25	M-02	VAULT MECHANICAL PLAN	B.O. & A.V. VAULT & ROOF PLAN			
26	M-03	MECHANICAL DETAILS	PRS & VAULT DETAILS			
STRUCTURAL						
27	S-01	GENERAL STRUCTURAL	NOTES & TYPICAL DETAILS			
28	S-02	STRUCTURAL DETAILS	PRS & VAULT DETAILS			
29	S-03	ACCESS MANHOLE VAULT	PLAN & SECTION			
30	S-04	PRS VAULT	PLAN & SECTION			
31	S-05	B.O. & A.V. VAULT	PLAN & SECTION			
CATHODIC PROTECTION						
32	CP-01	CP SITE PLAN	CATHODIC PROTECTION SITE PLAN			
33	CP-02	PRS, CP SITE PLAN	PRS, CATHODIC PROTECTION SITE PLAN			
34	CP-03	CP DETAILS	CATHODIC PROTECTION DETAILS			
35	CP-04	CP DETAILS	CATHODIC PROTECTION DETAILS			
36	CP-05	CP DETAILS	CATHODIC PROTECTION DETAILS			
37	CP-06	CP DETAILS	CATHODIC PROTECTION DETAILS			
ELECTRICAL						
38	E-01	LEGEND & ABBREVIATIONS	PRESSURE REDUCING STATION			
39	E-02	ELECTRICAL SITE PLAN	PRESSURE REDUCING STATION			
40	E-03	ELECTRICAL PLAN	PRESSURE REDUCING STATION			
41	E-04	SINGLE LINE DIAGRAM & DETAILS	PRESSURE REDUCING STATION			
INSTRUMENTATION AND CONTROLS						
42	I-01	LEGEND & SYMBOLS	PRESSURE REDUCING STATION			
43	I-02	SYMBOLS & ABBREVIATIONS	PRESSURE REDUCING STATION			
44	I-03	PRS P&ID	PRESSURE REDUCING STATION			
45	I-04	INSTRUMENT DETAILS	PRESSURE REDUCING STATION			
46	G-04	SURVEY MONUMENT PLAN				
47	G-05	BATCH DISCHARGE PLAN				
48	G-06	DISCHARGE PIPELINE	WOODMAN ST AT CIELO-WOODMAN PUMP STATION	PVC		50
TRAFFIC CONTROL						
I-34	TC-1/TC-34	TRAFFIC CONTROL	IMPERIAL AVE / WOODMAN ST / SKYLINE DR			

CONSTRUCTION STORM WATER PROTECTION NOTES

- TOTAL SITE DISTURBANCE AREA (ACRES) 0.96
HYDROLOGIC UNIT / WATERSHED PUEBLO SAN DIEGO / CHOLLAS CREEK
HYDROLOGIC SUBAREA NAME & NO. SAN DIEGO MESA HA (908.20), CHOLLAS HAS (908.22)
- THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE
 WPCP
 THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100
 SWPPP
 THE PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT NO. R9-2013-0001 AS AMENDED BY R9-2015-0001 AND R9-2015-0100 AND CONSTRUCTION GENERAL PERMIT ORDER 2009-0009-DWO AS AMENDED BY ORDER 2010-0014-DWO AND 2012-0006-DWO
 TRADITIONAL RISK LEVEL 1 2 3
 LUP: RISK TYPE 1 2 3
- CONSTRUCTION SITE PRIORITY
 ASBS HIGH MEDIUM LOW

TOTAL 48" WATER	4637.50
TOTAL 36" WATER	171.85
TOTAL 30" WATER	20.00
TOTAL 20" WATER	114.41
TOTAL 16" WATER	70.00

FIELD DATA

BASIS OF BEARINGS & COORDINATES
 THE BASIS OF BEARINGS FOR THIS PROJECT WAS DERIVED FROM A PREVIOUS STATIC GPS SURVEY USING R.O.F. S.14492 NAD 83 FEET, ZONE 6 (EPOCH 1991.35), UTILIZING RTK/GPS FIELD PROCEDURES WITH A CALVRS BASE STATION BROADCAST OF 2014 AND CONSTRAINING TO GPS I7 (PT. 20017) AND CHECKING GPS I257 (PT. I257), IE N33° 20'19"E.

BENCHMARK
 *SWBP BULLOCK DR AND JANSEN CT
 ELEV. 353.070 MSL, BASED ON NGVD 29 FEET AS SHOWN IN THE CITY OF SAN DIEGO BENCH BOOK

STREET REQUIRING I2" TRENCH CAP:
 IMPERIAL AVE
 WOODMAN ST

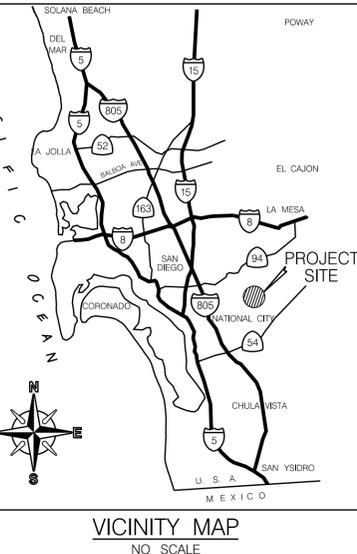
AS-BUILT INFORMATION

MATERIALS	MANUFACTURER
PIPE CL 235 (WATER)	-
PIPE SDR 35 (SEWER)	-
GATE VALVES	-
FIRE HYDRANTS	-
SEWER MANHOLES	-
REHABILITATE SEWER MANHOLES	-
REHABILITATE SEWER MAIN	-

CONTRACTOR INSPECTOR

DATE STARTED

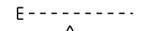
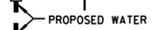
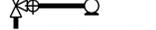
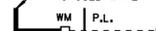
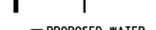
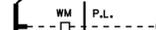
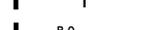
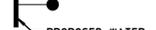
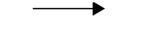
DATE COMPLETED



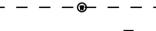
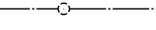
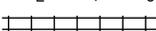
VICINITY MAP
NO SCALE

WORK TO BE DONE

THE PROJECT WILL REPLACE APPROXIMATELY 4,600 LF OF EXISTING 36-INCH CAST IRON TRANSMISSION PIPELINE WITH NEW 48-INCH STEEL CML&TC WATER TRANSMISSION PIPELINE ALONG WITH THE RELOCATION OF THE EXISTING PRS LOCATION WITH THE IMPERIAL AVE TO THE EXISTING EASEMENT SOUTH OF THE MEDIAN LOCATION, WHICH INCLUDES A 36-INCH CML&TC CONNECTION TO THE NEW PRS LOCATION. THE PROJECT WILL INCLUDE THE ABANDONMENT OF APPROXIMATELY 2,800 LF OF THE EXISTING 36-INCH PIPELINE IN PLACE. THE PROJECT INCLUDES APPROXIMATELY 200 LF OF TRENCHLESS CONSTRUCTION TO INSTALL THE PIPELINE BELOW THE SD&E TRACKS. THE NORTHERLY TERMINUS WILL CONNECT TO THE EXISTING 65TH AND HERRICK PUMP STATION VALVE VAULT, AND THE SOUTHERLY TERMINUS WILL CONNECT TO THE EXISTING OTAY 2ND PIPELINE AT THE INTERSECTION OF WOODMAN ST AND SKYLINE DR. THE PIPELINE IN WOODMAN AVE WILL FEED THE CIELO AND WOODMAN PUMP STATION WITH A 16-INCH STEEL CML&TC SUCTION STUB OUT CONNECTION TO THE FUTURE PUMP STATION IMPROVEMENTS.

IMPROVEMENTS	REFERENCE	SYMBOL
CUTTING AND PLUGGING ABANDONED WATER MAIN	WP-03	
SURVEY MONUMENT	M-10, M-10A, M-10B	
WATER MAIN & APPURTENANCES	SDM-105, SDW-110, SDW-151, SDW-161	
VALVES WITH CAPS AND WELLS	SDW-109, SDW-152, SDW-153, WV-05	
FIRE SERVICE CONNECTION & ASSEMBLY	SDM-105, SDW-109, SDW-118, SDW-152, SDW-153	
6" FIRE HYDRANT ASSEMBLY & MARKER 2-PORT UNLESS SPECIFIED AS 3-PORT	SDM-105, SDW-104, SDW-109, SDW-152, SDW-153	
1" WATER SERVICE UNLESS OTHERWISE SPECIFIED	SDM-105, SDW-107, SDW-134, SDW-135, SDW-136, SDW-137, SDW-138, SDW-149, SDW-150, WS-03	
WATER SERVICE TRANSFER	SDW-149, SDW-150	
BLOW-OFF ASSEMBLY	SDM-105, SDW-106, SDW-143, SDW-144, SDW-145, SDW-146, WB-05,	
AIR & VACUUM VALVE	SDM-105, SDW-117, SDW-158, SDW-159, SDW-160	
ACCESS MANHOLE	SDW-103	
CATHODIC PROTECTION TEST STATION	SEE CP SHEETS	
PIPE BEDDING & TRENCH BACKFILL FOR POTABLE WATER MAINS	SDW-110	
PIPE SUPPORT FOR UNDERCUT SEWER MAINS OR SEWER LATERALS	SDW-161	
TRENCH RESURFACING FOR ASPHALT CONCRETE SURFACED STREETS	SDG-107	
TRENCH RESURFACING FOR PCC SURFACED STREETS	SDG-108	
HIGHLINING BY CONTRACTOR	SDW-170, SDW-171, SDW-172, SDW-173	
FOR ADDITIONAL SYMBOLS SEE RESURFACING, CURB RAMP AND TRAFFIC CONTROL SHEETS.		

EXISTING STRUCTURES

EX WATER MAIN & VALVES		EX GROUND LINE (PROFILE)	
EX WATER METER		EX STREET SIGNAL	
EX FIRE HYDRANT		EX STREET LIGHT	
EX SEWER MAIN & MANHOLES		GAS MAIN	
EX DRAINS		ELEC. COND., TEL. COND., CATV	
EX PAVEMENT (PROFILE)		RAILROAD, TROLLEY TRACKS	

REFERENCE:

CITY DWGS: 8333-B, 11995-B, 14957-B, 15047-B, 13280-B, 16102-B, 1141-D, 14825-L

STANDARD DRAWINGS & SPECIFICATIONS:

CITY OF SAN DIEGO STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION (2018 EDITION)

THE 'WHITEBOOK' STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (2018 EDITION) AND AMENDMENTS THERETO.

THE 'GREENBOOK' STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (2018 EDITION) AND AMENDMENTS THERETO.

AECOM

1 Columbia Place - 401 W. A Street, Suite 1200
 San Diego, CA 92101
 T 619.610.7600 F 619.610.7601
 www.aecom.com

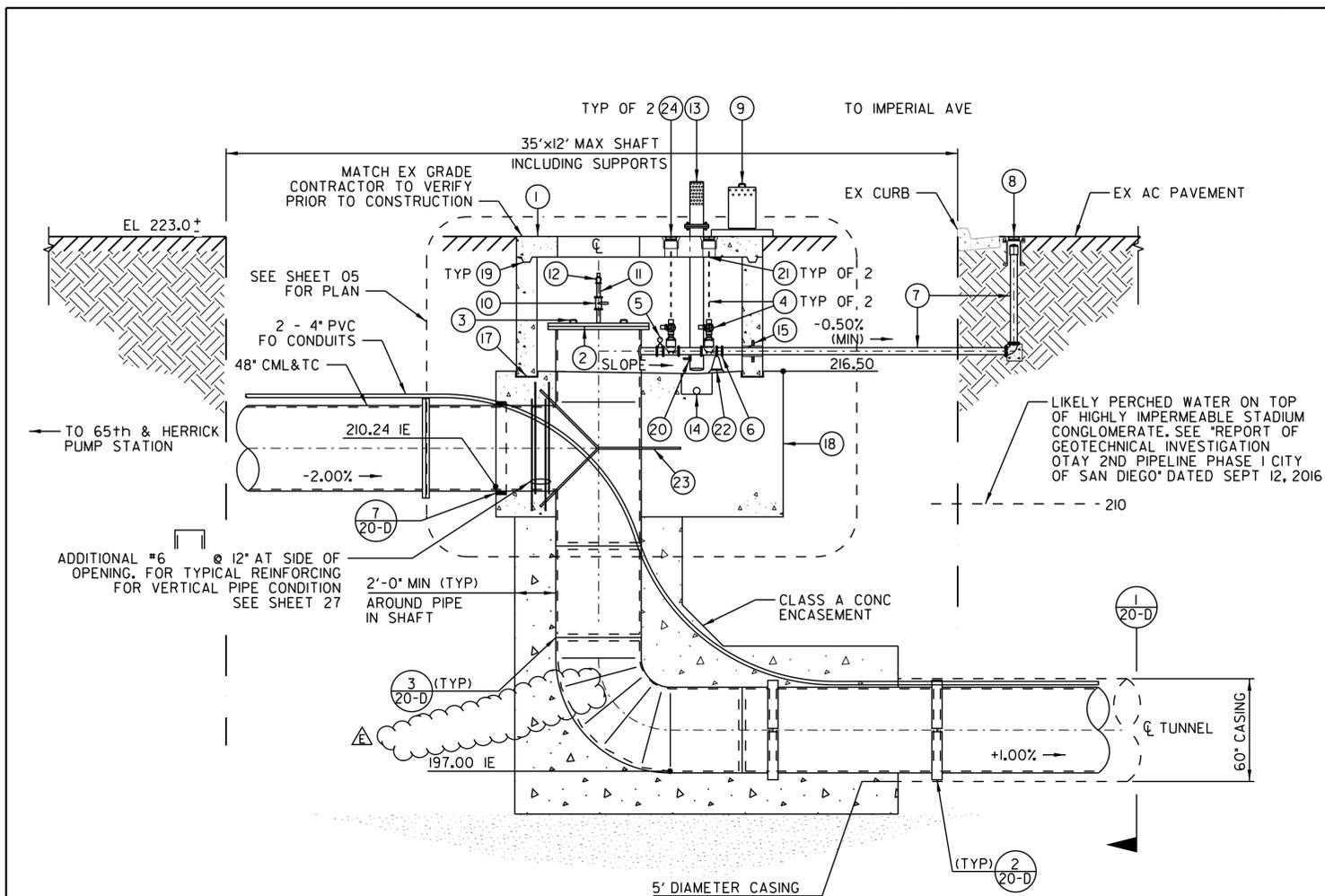
PLANS FOR CONSTRUCTION OF
 OTAY 2nd PIPELINE - PHASE 1

COVER SHEET

CITY OF SAN DIEGO, CALIFORNIA
 PUBLIC WORKS DEPARTMENT
 SHEET 01 OF 48 SHEETS

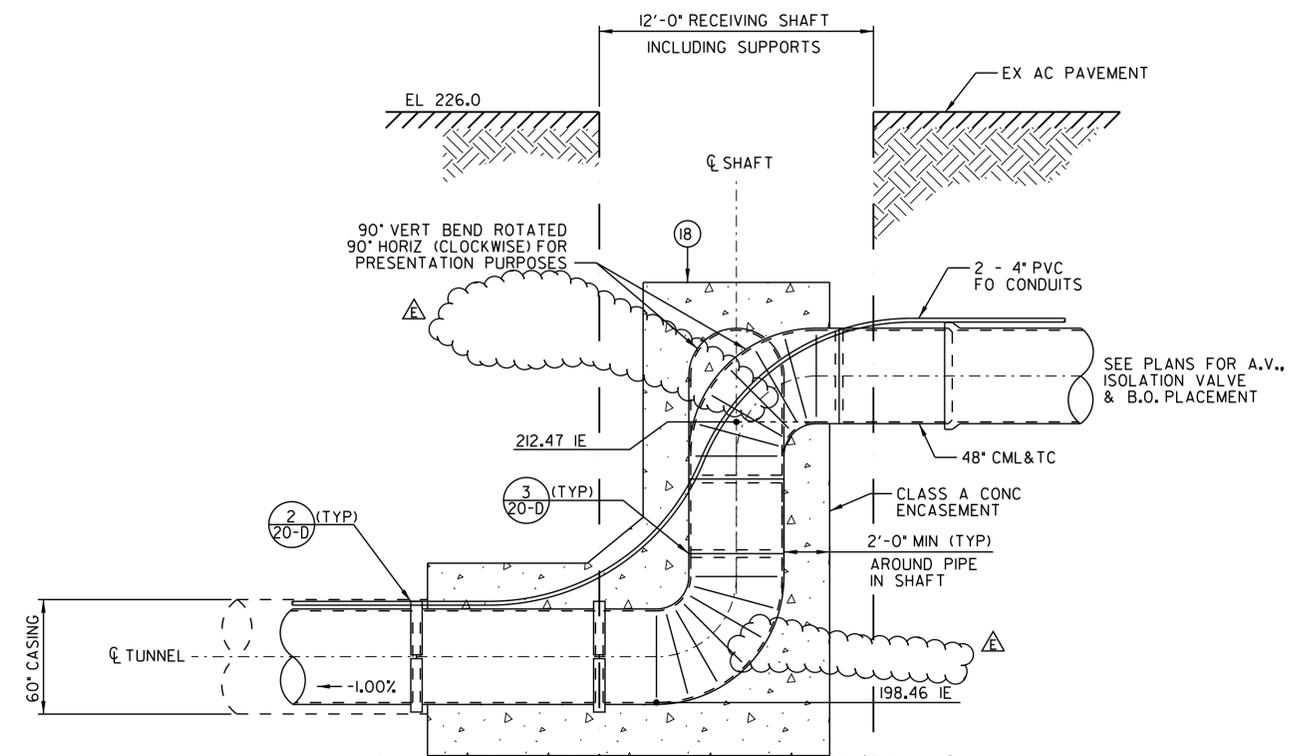
DATE: 3/13/2019
 PROJECT MANAGER: MIKE BAJOUA
 PROJECT ENGINEER: FRANCISCO BORDON

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL	AECOM-RR</			



NOTE: FINAL SHAFT SHORING DESIGN SHALL BE DESIGNED BY CONTRACTOR TO MEET DESIGN PIPELINE DEPTHS WITHIN SITE CONSTRAINTS.

65th & HERRICK PUMP STATION TO IMPERIAL AVE
CROSSING - LAUNCHING SHAFT SECTION
1/4" = 1'-0"

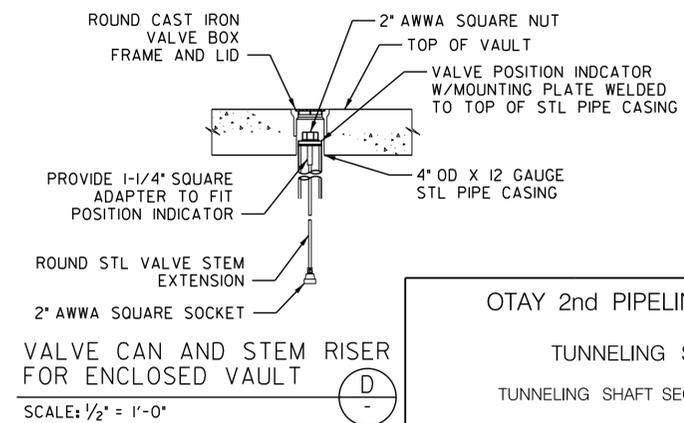
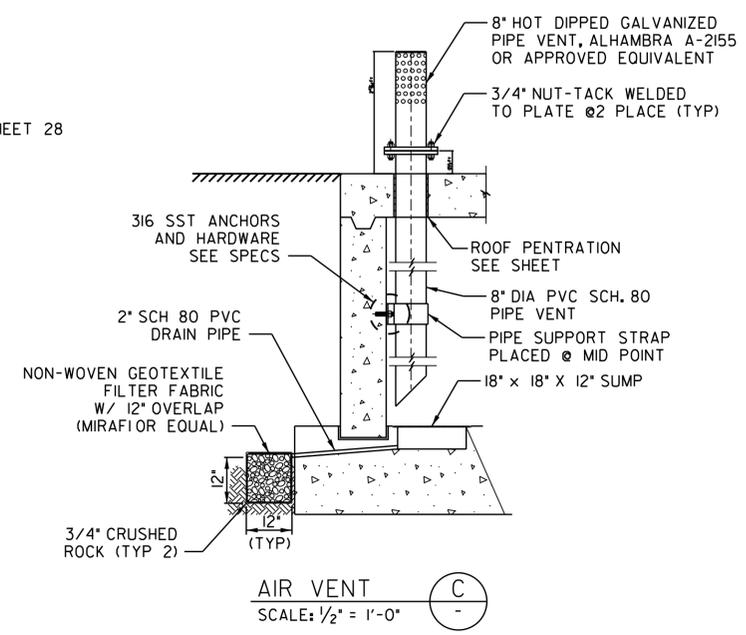


NOTE: FINAL SHAFT SHORING DESIGN SHALL BE DESIGNED BY CONTRACTOR TO MEET DESIGN PIPELINE DEPTHS WITHIN SITE CONSTRAINTS.

65th & HERRICK PUMP STATION TO IMPERIAL AVE
CROSSING - RECEIVING SHAFT SECTION
1/4" = 1'-0"

KEYED NOTES

- ① 8' x 10' INSIDE DIMENSION PRECAST VAULT PER SPECS
- ② 48" MANWAY W/ BLIND FLANGE ACCESS COVER
- ③ MANWAY LIFTING LUGS SEE DETAIL 3 SHEET 26
- ④ 4" RESILIENT WEDGE GATE VALVE W/ STEM EXTENSION PER SDSA SDW-109
- ⑤ PRESSURE GAUGE PER DETAIL 2 SHEET 26
- ⑥ 4" FLEXIBLE COUPLING ROMAC 501 OR EQUAL
- ⑦ 4" DIP CL 350
- ⑧ 4" TYPE B BLOW-OFF ASSEMBLY PER SDSA SDW-145
- ⑨ 2" AUTOMATIC COMBINATION AIR RELEASE & AIR/VACUUM VALVE ENCLOSURE PER SDSA SDW-117. LOCATION PER PLAN
- ⑩ 2" COMP BALL VALVE
- ⑪ 2" SCH 80 STEEL PIPE
- ⑫ 2" SCH 80 90° STEEL BEND
- ⑬ 8" VENT PER DETAIL C THIS SHEET
- ⑭ 18" X 18" X 12" D SUMP W/ CAST IRON GRATE & 4" PVC TO DRYWELL. MEASURE OPENING FOR GRATE 2" FROM THE EDGE OF THE RECESSED KEY FOR THE PRECAST WALL PER DETAIL THIS SHEET
- ⑮ WALL PENETRATION PER DETAIL I ON SHEET 26
- ⑯ DEMOUNTABLE POST PER SDRSD M-16
- ⑰ PRECAST VAULT JOINT TO ENCASEMENT PER DETAIL 4 SHEET 28
- ⑱ CAST IN PLACE CONCRETE PIPE ENCASEMENT
- ⑲ PRECAST TO PRECAST JOINT PER DETAIL 5 SHEET 28
- ⑳ DRAIN CONNECTION PER DETAIL 7 SHEET 26
- ㉑ VALVE STEM EXTENSION CEILING SUPPORT BRACKET. PROVIDE ADJUSTABLE STEM GUIDE, STAINLESS STEEL BY TRUMBULL OR EQUAL. BRACE WALL MID-RISE & MOUNT PER MANUFACTURER'S RECOMMENDATIONS. SEE DETAIL 4 SHEET 26
- ㉒ TYPE B FLANGE SUPPORT PER DETAIL 5 SHEET 26
- ㉓ CROTCH PLATE PER DETAIL 9 SHEET 15
- ㉔ GATE WELL CAP AND CAN PER DETAIL THIS SHEET

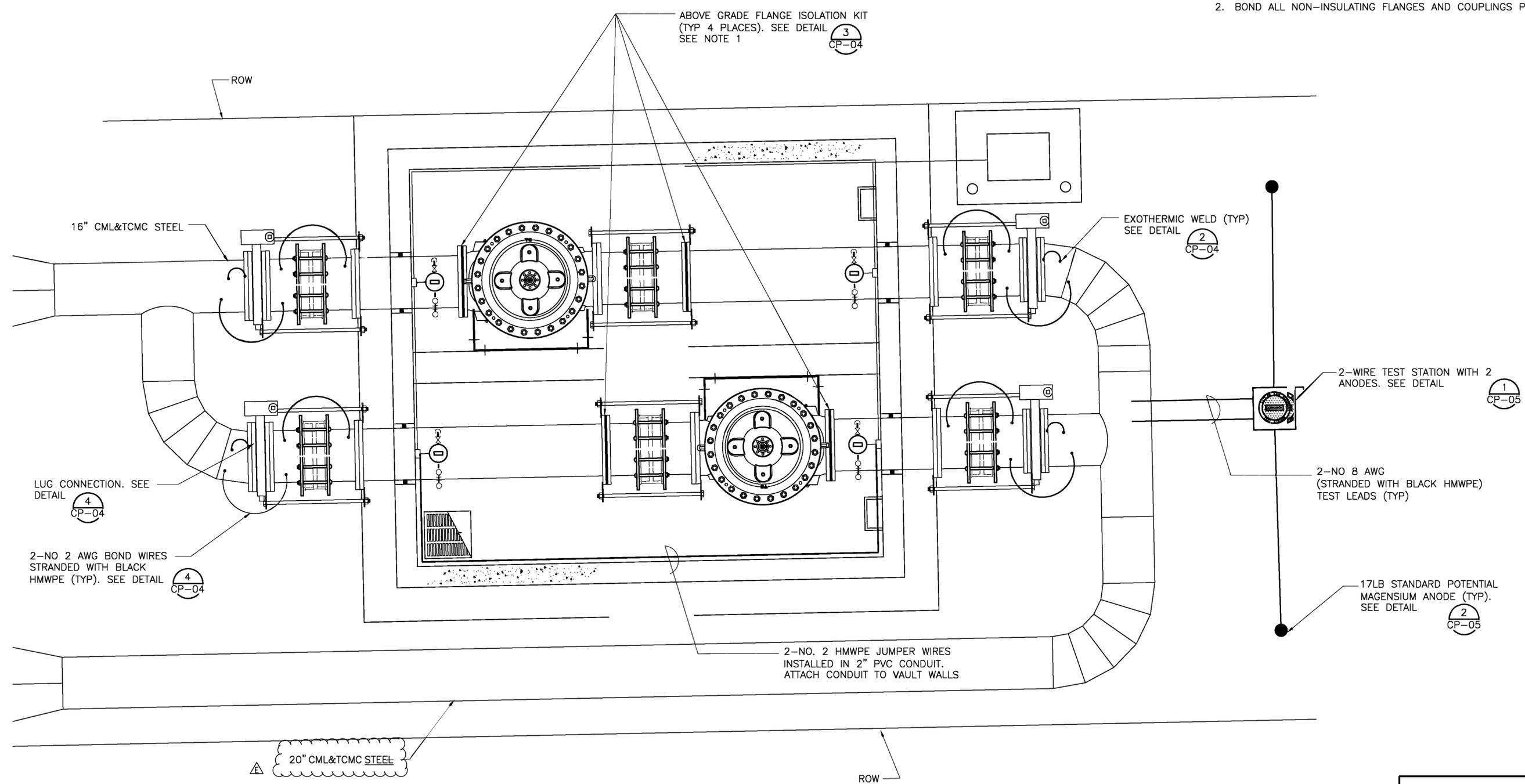


C-15

OTAY 2nd PIPELINE - PHASE 1
TUNNELING SECTIONS
TUNNELING SHAFT SECTIONS & DETAILS

CITY OF SAN DIEGO, CALIFORNIA PUBLIC WORKS DEPARTMENT SHEET 19 OF 47 SHEETS		WATER WBS B-14092
APPROVED: <i>Brian Velle</i> FOR CITY ENGINEER DATE: 03/13/2019	DATE: 03/13/2019	SUBMITTED BY: MIKE BAJOUA PROJECT MANAGER
FOR CITY ENGINEER BRIAN VELLE PRINT DCE NAME	DATE: 03/13/2019	DESIGNED BY: FRANCISCO BORDON PROJECT ENGINEER
DESCRIPTION	BY	APPROVED
ORIGINAL	AECOM-RR	
ADDENDUM E	AECOM-RR	<i>Brian Velle</i>
		DATE
		6/7/19
		FILMED
		SEE SHEETS
		CCS27 COORDINATE
		SEE SHEETS
		CCS83 COORDINATE
CONTRACTOR	DATE STARTED	40351-19-D
INSPECTOR	DATE COMPLETED	

- NOTES:
- FOR FLANGE ISOLATION KITS INSTALLED ON RESTRAINED COUPLINGS, INSULATING WASHERS AND SLEEVES SHALL BE USED FOR THRUST BOLTS SUCH THAT THE THRUST BOLTS DO NOT SHORT THE INSULATING COUPLING.
 - BOND ALL NON-INSULATING FLANGES AND COUPLINGS PER DETAIL 4, SHEET CP-04.



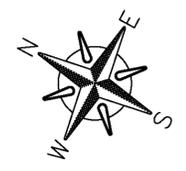
CP-02

OTAY 2nd PIPELINE - PHASE 1
PRS CATHODIC PROTECTION
SITE PLAN

CITY OF SAN DIEGO, CALIFORNIA
PUBLIC WORKS DEPARTMENT
SHEET 33 OF 47 SHEETS

APPROVED: <i>R. Vitell</i> FOR CITY ENGINEER BRIAN VITELLE PRINT NAME	DATE 03/13/2019 DATE C73039 RCE #	WATER WBS: B-14092 SEWER WBS: 0-00000 SUBMITTED BY: MIKE BAJOUA PROJECT MANAGER			
DESCRIPTION	BY	APPROVED	DATE	FILMED	FRANCISCO BORDON PROJECT ENGINEER
ORIGINAL	RFYE				SEE SHEETS
ADDENDUM E	RFYE	<i>R. Vitell</i>	6/7/19		CCS27 COG RD 1 NA .TE
CONTRACTOR					DATE STARTED
INSPECTOR					DATE COMPLETED
					40351-33-D

R. F. Yeager
ENGINEERING
9562 Winter Gardens, Suite D-151
Lakeside, Ca 92040
Ph: 619.647.6265
Fax: 619.561.0031



CATHODIC PROTECTION DETAILS

City of San Diego

CITY CONTACT: Ronald McMinn Jr., Contract Specialist, Email: RMcminn@sandiego.gov
Phone No. (619) 533-4618

ADDENDUM F



FOR

OTAY 2ND PIPELINE PHASE I

BID NO.:	<u>K-19-1832-DBB-3</u>
SAP NO. (WBS/IO/CC):	<u>B-14092</u>
CLIENT DEPARTMENT:	<u>2000</u>
COUNCIL DISTRICT:	<u>4</u>
PROJECT TYPE:	<u>KA</u>

BID DUE DATE:

2:00 PM

JUNE 21, 2019

CITY OF SAN DIEGO'S ELECTRONIC BIDDING SITE, PLANETBIDS

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

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. ADDITIONAL CHANGES

1. The following are additional changes to the Line Items in the PlanetBids Tab:

For clarity where applicable, **ADDITIONS**, if any, have been **Underlined** and **DELETIONS**, if any, have been **~~Stricken out.~~**

2. PLANETBIDS UPDATE:

To Line Items Tab: Unit Prices have been included for line items 2, 37, and 49.

Section	Item Code	Description	UoM	Quantity	Payment Reference	Extension
Main Bid	237110	Dewatering Permit and Discharge Fees (EOC Type I)	AL	1	3-12.8.8	<u>40000</u>
Main Bid	237110	MTS Right of Entry Permit (EOC Type I)	AL	1	600-5	<u>30000</u>
Main Bid		Field Orders (EOC Type II)	AL	1	7-3.9	<u>850000</u>

James Nagelvoort, Director
Public Works Department

Dated: *June 20, 2019*
San Diego, California

JN/MJN/BR/egz

Bid Results**Bidder Details**

Vendor Name Cass Construction, Inc.
Address P. O. Box 309
 El Cajon, CA 92022
 United States

Respondee Buzz Birney
Respondee Title Estimator
Phone 619-334-5012 Ext.
Email bbirney@cassarrieta.com

Vendor Type PQUAL,CADIR,Local
License # 298336
CADIR 1000010675

Bid Detail

Bid Format Electronic
Submitted June 21, 2019 1:59:41 PM (Pacific)
Delivery Method
Bid Responsive
Bid Status Submitted
Confirmation # 182733
Ranking 0

Respondee Comment**Buyer Comment****Attachments**

File Title	File Name	File Type
CONTRACTORS CERTIFICATION OF PENDING ACTIONS	CONTRACTORS CERTIFICATION OF PENDING ACTIONS.pdf	Contractors Certification of Pending Actions
MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM	MANDATORY DISCLOSURE OF BUSINESS INTERESTS FORM.pdf	Mandatory Disclosure of Business Interests
SUBCONTRACTOR LISTING OTHER THAN 1ST TIER	SUBCONTRACTOR LISTING OTHER THAN 1ST TIER.pdf	Subcontractor Listing (Other Than 1st Tier)
BID BOND	BID BOND.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	\$72,000.00	\$72,000.00	
2	Dewatering Permit and Discharge Fees (EOC Type I)					
	237110	AL	1	\$40,000.00	\$40,000.00	
3	Dewatering Non-Hazardous Contaminated Water					
	237110	LS	1	\$5,000.00	\$5,000.00	
4	Mobilization					
	237110	LS	1	\$340,000.00	\$340,000.00	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
5	Conduit, Appurtenances, Innerduct & Fiber Pull Boxes					
	238210	LS	1	\$15,000.00	\$15,000.00	
6	Cathodic Protection					
	238210	LS	1	\$85,000.00	\$85,000.00	
7	Instrumentation and Controls for the Pressure Reducing Station , Complete in place					
	238210	LS	1	\$160,000.00	\$160,000.00	
8	Asphalt Concrete Overlay, 3-Inch Thk per plan for Imperial Ave					
	237310	TON	727	\$152.00	\$110,504.00	
9	Pressure Reducing Station per contract document					
	237310	LS	1	\$755,000.00	\$755,000.00	
10	Remove and Replace Existing Sidewalk					
	237310	SF	1373	\$14.00	\$19,222.00	
11	Curb and Gutter (6-Inch Curb, Type G), Remove and Replace					
	237310	LF	305	\$53.00	\$16,165.00	
12	Curb (4-Inch Curb, Type B1), Remove and Replace					
	237310	LF	55	\$50.00	\$2,750.00	
13	Curb Ramp (Type C-1 & C-2), with Stainless Steel Detectable Warning Tiles					
	237310	EA	8	\$4,225.00	\$33,800.00	
14	Stamped Colored Concrete Pavement					
	237310	SF	700	\$20.00	\$14,000.00	
15	Residential Concrete Driveway					
	237310	SF	163	\$20.00	\$3,260.00	
16	Commercial Concrete Driveway					
	237310	SF	292	\$24.00	\$7,008.00	
17	Removal of Existing 536/390 Pressure Regulating Station					
	237110	LS	1	\$12,000.00	\$12,000.00	
18	Abandon and Fill Existing Water Main Outside of the Trench Limit					
	237110	LF	2205	\$32.00	\$70,560.00	
19	Water Main (36 Inch) pipe, fittings					
	237110	LF	186	\$2,720.00	\$505,920.00	
20	Water Main (CMLC, 48 Inch), pipe, fittings, testing, disinfection					
	237110	LF	4592	\$1,025.00	\$4,706,800.00	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
21	Water Main (CMLC, 16 Inch), pipe, fittings, testing, disinfection					
	237110	LF	25	\$1,537.00	\$38,425.00	
22	Water Main (16 Inch PVC, Class)					
	237110	LF	48	\$630.00	\$30,240.00	
23	Engineered Trench Shoring					
	237110	LS	1	\$290,000.00	\$290,000.00	
24	Butterfly Valve (48 Inch, Class 150B)					
	237110	EA	4	\$42,300.00	\$169,200.00	
25	Butterfly Valve (36 Inch, Class 150B)					
	237110	EA	1	\$22,500.00	\$22,500.00	
26	Butterfly Valve (16 Inch, Class 150B)					
	237110	EA	6	\$6,050.00	\$36,300.00	
27	Water Valve Bypass for T-Mainline 16 Inch and Larger					
	237110	EA	1	\$13,850.00	\$13,850.00	
28	Water Valve Bypass for Straight Mainline 16 Inch and Larger					
	237110	EA	3	\$5,400.00	\$16,200.00	
29	Blow-Off Valve Assembly					
	237110	EA	4	\$24,000.00	\$96,000.00	
30	Air and Vacuum (Air Release) Valve Assembly					
	237110	EA	6	\$9,300.00	\$55,800.00	
31	Temporary Resurfacing					
	237310	TON	1000	\$112.00	\$112,000.00	
32	Imported Trench Backfill					
	237110	TON	1500	\$52.00	\$78,000.00	
33	Manhole Access Vault with Manway Opening (36" and 48")					
	237110	EA	3	\$56,500.00	\$169,500.00	
34	Water Main by Jacking Operation with Steel Casing (48 Inch, 60 Inch casing)					
	237110	LF	135	\$6,350.00	\$857,250.00	
35	Cold Mill AC Pavement (> 3 Inch)					
	237310	SF	40100	\$1.00	\$40,100.00	
36	Exclusive Community Liaison Services					
	541820	LS	1	\$43,000.00	\$43,000.00	

Bid Results

Type	Item Code	UOM	Qty	Unit Price	Line Total	Comment
37	MTS Right of Entry Permit (EOC Type I)					
	237110	AL	1	\$30,000.00	\$30,000.00	
38	Traffic Control					
	541330	LS	1	\$325,000.00	\$325,000.00	
39	Electrical Conduit, 3-Inch DIA. For Fiber Optic					
	238210	LF	10000	\$10.00	\$100,000.00	
40	Pull Box					
	238210	EA	10	\$4,700.00	\$47,000.00	
41	Connections to The Existing System by Contractor (2 X 36)					
	237110	EA	2	\$47,000.00	\$94,000.00	
42	Connections to The Existing System by Contractor (1 x 48" Inch)					
	237110	EA	1	\$51,000.00	\$51,000.00	
43	Cut and plug by contractor (3 x 36" Inch welded steel pipe)					
	237110	EA	3	\$40,000.00	\$120,000.00	
44	Cut-in Tee by Contractor (16"x 16" Inch)					
	237110	EA	1	\$11,000.00	\$11,000.00	
45	WPCP Development					
	541330	LS	1	\$5,000.00	\$5,000.00	
46	WPCP Implementation					
	237990	LS	1	\$75,000.00	\$75,000.00	
47	Removal and Replacement of Existing paint striping					
	237310	LS	1	\$4,900.00	\$4,900.00	
48	Removal and Replacement of Existing Thermoplastic striping and Markings					
	237310	LS	1	\$14,800.00	\$14,800.00	
49	Field Orders (EOC Type II)					
		AL	1	\$850,000.00	\$850,000.00	
				Subtotal	\$10,770,054.00	
				Total	\$10,770,054.00	

Subcontractors

Name & Address	Description	License Num	CADIR	Amount	Type
YBS CONCRETE INC. PO BOX 1197 CHULA VISTA, CA 91911 United States	Concrete Flatwork	885270	1000005182	\$109,560.88	LAT,MALE,SLBE,CA DIR
Payco Specialties, Inc. 120 North Second Ave Chula Vista, CA 91910-1127 United States	Striping	298637	1000003515	\$17,748.40	DBE, WBE
Vic Salazar Communications 5205 Kearny Villa Road Suite 107 San Diego, CA 92123	Community Liaison	N/A	1000364796	\$39,000.00	DBE,ELBE,LAT,MAL E,MBE
		PlanetBids, Inc.			

Bid Results

Name & Address	Description	License Num	CADIR	Amount	Type
Kirk Paving, Inc. 8722 Winter Gardens Blvd. Lakeside, CA 92040 United States	Paving	749206	1000002341	\$734,072.56	CADIR,SDB,SLBE
Cell-Crete Corporation 135 E Railroad ave Monrovia, CA 91016 United States	Grouting	243404	1000000262	\$51,150.00	
McLeod Trucking 1911 Euclid ave. El Cajon, CA 92019 United States	Trucking	N/A	N/A	\$528,624.00	DBE,SDB,SLBE,WBE, WOSB
Golden Triangle Land Surveying, Inc 1298 Navel Place Vista, CA 92081 United States	Survey	PLS 6788	1000015071	\$42,860.00	ELBE
Golden State Boring & Pipe Jacking Inc. 7000 Merrill Ave. Box 40 Chino , CA 91710 United States	Jack & Bore	678500	1000005788	\$197,100.00	
Maxim Construction Co., Inc. 8005 Royal Gardens Place El Cajon, CA 92021 United States	PRS	1000689	1000048900	\$761,220.00	Asian,ELBE,FEM,WO SB
Dean's Certified Welding Inc. 27645 commerce center dr temecula, CA 92590 United States	Welding	618842	1000024764	\$85,000.00	
Robcar Corporation P O BOX 117 El Cajon, CA 92022 United States	Traffic Control	788289	1000004051	\$250,250.00	

Line Totals (Unit Price * Quantity)								
Item Num	Section	Item Code	Description	Reference	Unit of Measure	Quantity	Cass Construction, Inc. Unit Price	Cass Construction, Inc. - Line Total
1	Main Bid	524126	Bonds (Payment and Performance)	1-7.2.1	LS	1	\$72,000.00	\$72,000.00
2	Main Bid	237110	Dewatering Permit and Discharge Fees (EOC Type I)	3-12.8.8	AL	1	\$40,000.00	\$40,000.00
3	Main Bid	237110	Dewatering Non-Hazardous Contaminated Water	3-12.8.8	LS	1	\$5,000.00	\$5,000.00
4	Main Bid	237110	Mobilization	7-3.4.1	LS	1	\$340,000.00	\$340,000.00
5	Main Bid	238210	Conduit, Appurtenances, Innerduct & Fiber Pull Boxes	7-3.1	LS	1	\$15,000.00	\$15,000.00
6	Main Bid	238210	Cathodic Protection	7-3.1	LS	1	\$85,000.00	\$85,000.00
7	Main Bid	238210	Instrumentation and Controls for the Pressure Reducing Station , Complete in place	7-3.1	LS	1	\$160,000.00	\$160,000.00
8	Main Bid	237310	Asphalt Concrete Overlay, 3-Inch Thk per plan for Imperial Ave	302-5.9	TON	727	\$152.00	\$110,504.00
9	Main Bid	237310	Pressure Reducing Station per contract document	7-3.1	LS	1	\$755,000.00	\$755,000.00

10	Main Bid	237310	Remove and Replace Existing Sidewalk	303-5.9	SF	1373	\$14.00	\$19,222.00
11	Main Bid	237310	Curb and Gutter (6-Inch Curb, Type G), Remove and Replace	303-5.9	LF	305	\$53.00	\$16,165.00
12	Main Bid	237310	Curb (4-Inch Curb, Type B1), Remove and Replace	303-5.9	LF	55	\$50.00	\$2,750.00
13	Main Bid	237310	Curb Ramp (Type C-1 & C-2), with Stainless Steel Detectable Warning Tiles	303-5.10.2	EA	8	\$4,225.00	\$33,800.00
14	Main Bid	237310	Stamped Colored Concrete Pavement	303-6.1.2	SF	700	\$20.00	\$14,000.00
15	Main Bid	237310	Residential Concrete Driveway	303-5.9	SF	163	\$20.00	\$3,260.00
16	Main Bid	237310	Commercial Concrete Driveway	303-5.9	SF	292	\$24.00	\$7,008.00
17	Main Bid	237110	Removal of Existing 536/390 Pressure Regulating Station	306-3.3.4	LS	1	\$12,000.00	\$12,000.00
18	Main Bid	237110	Abandon and Fill Existing Water Main Outside of the Trench Limit	306-3.3.4	LF	2205	\$32.00	\$70,560.00
19	Main Bid	237110	Water Main (36 Inch) pipe, fittings	306-15.1	LF	186	\$2,720.00	\$505,920.00

20	Main Bid	237110	Water Main (CMLC, 48 Inch), pipe, fittings, testing, disinfection	306-15.1	LF	4592	\$1,025.00	\$4,706,800.00
21	Main Bid	237110	Water Main (CMLC, 16 Inch), pipe, fittings, testing, disinfection	306-15.1	LF	25	\$1,537.00	\$38,425.00
22	Main Bid	237110	Water Main (16 Inch PVC, Class)	306-15.1	LF	48	\$630.00	\$30,240.00
23	Main Bid	237110	Engineered Trench Shoring	306-15.2	LS	1	\$290,000.00	\$290,000.00
24	Main Bid	237110	Butterfly Valve (48 Inch, Class 150B)	306-15.5	EA	4	\$42,300.00	\$169,200.00
25	Main Bid	237110	Butterfly Valve (36 Inch, Class 150B)	306-15.5	EA	1	\$22,500.00	\$22,500.00
26	Main Bid	237110	Butterfly Valve (16 Inch, Class 150B)	306-15.5	EA	6	\$6,050.00	\$36,300.00
27	Main Bid	237110	Water Valve Bypass for T-Mainline 16 Inch and Larger	306-15.5	EA	1	\$13,850.00	\$13,850.00
28	Main Bid	237110	Water Valve Bypass for Straight Mainline 16 Inch and Larger	306-15.5	EA	3	\$5,400.00	\$16,200.00
29	Main Bid	237110	Blow-Off Valve Assembly	306-15.8	EA	4	\$24,000.00	\$96,000.00

30	Main Bid	237110	Air and Vacuum (Air Release) Valve Assembly	306-15.8	EA	6	\$9,300.00	\$55,800.00
31	Main Bid	237310	Temporary Resurfacing	306-15.9	TON	1000	\$112.00	\$112,000.00
32	Main Bid	237110	Imported Trench Backfill	306-15.11	TON	1500	\$52.00	\$78,000.00
33	Main Bid	237110	Manhole Access Vault with Manway Opening (36" and 48")	306-16.6	EA	3	\$56,500.00	\$169,500.00
34	Main Bid	237110	Water Main by Jacking Operation with Steel Casing (48 Inch, 60 Inch casing)	307-1.7	LF	135	\$6,350.00	\$857,250.00
35	Main Bid	237310	Cold Mill AC Pavement (> 3 Inch)	404-12	SF	40100	\$1.00	\$40,100.00
36	Main Bid	541820	Exclusive Community Liaison Services	5-10.4	LS	1	\$43,000.00	\$43,000.00
37	Main Bid	237110	MTS Right of Entry Permit (EOC Type I)	600-5	AL	1	\$30,000.00	\$30,000.00
38	Main Bid	541330	Traffic Control	601-7	LS	1	\$325,000.00	\$325,000.00
39	Main Bid	238210	Electrical Conduit, 3-Inch DIA. For Fiber Optic	701-2	LF	10000	\$10.00	\$100,000.00
40	Main Bid	238210	Pull Box	701-2	EA	10	\$4,700.00	\$47,000.00
41	Main Bid	237110	Connections to The Existing System by Contractor (2 X 36)	901-2.5	EA	2	\$47,000.00	\$94,000.00

42	Main Bid	237110	Connections to The Existing System by Contractor (1 x 48" Inch)	901-2.5	EA	1	\$51,000.00	\$51,000.00
43	Main Bid	237110	Cut and plug by contractor (3 x 36" Inch welded steel pipe)	901-2.5	EA	3	\$40,000.00	\$120,000.00
44	Main Bid	237110	Cut-in Tee by Contractor (16"x 16" Inch)	901-2.5	EA	1	\$11,000.00	\$11,000.00
45	Main Bid	541330	WPCP Development	1001-4.2	LS	1	\$5,000.00	\$5,000.00
46	Main Bid	237990	WPCP Implementation	1001-4.2	LS	1	\$75,000.00	\$75,000.00
47	Main Bid	237310	Removal and Replacement of Existing paint striping	314-4.3.7	LS	1	\$4,900.00	\$4,900.00
48	Main Bid	237310	Removal and Replacement of Existing Thermoplastic striping and Markings	314-4.4.6	LS	1	\$14,800.00	\$14,800.00
49	Main Bid		Field Orders (EOC Type II)	7-3.9	AL	1	\$850,000.00	\$850,000.00
							Subtotal	\$10,770,054.00
							Total	\$10,770,054.00