Orange County Water District

Groundwater Replenishment System
Plant 2 Secondary Effluent Pipeline Rehabilitation
Contract No. GWRS-2020-01

SPECIFICATIONS

Volume 1

ISSUED FOR BID

April 2020

BLACK & VEATCH

Irvine, California
B&V Project No. 196566
ORANGE COUNTY WATER DISTRICT

CONTRACT DOCUMENTS

FOR

GROUNDWATER REPLENISHMENT SYSTEM
FINAL EXPANSION
PLANT 2 SECONDARY EFFLUENT PIPELINE REHABILITATION PROJECT

CONTRACT NO. GWRS-2020-01

This contract is partially funded by Federal and State of California loans. The Bidder shall carefully review Loan Requirements.

BOARD OF DIRECTORS

Denis R. Bilodeau, P.E.
Jordan Brandman
Cathy Green
Dina Nguyen, Esq.
Kelly Rowe
Vicente F. Sarmiento, Esq.
Stephen R. Sheldon
Tri Ta
Roger Yoh, P.E.
Ahmad Zahra

Date: March 30, 2020

Bids will be received at the office of the Orange County Water District until 2:00 P.M. (PST) on Tuesday, May 26, 2020.

Mailing address: P.O. Box 8300, Fountain Valley, CA 92728-8300

Delivery address (for Federal Express or other courier): 18700 Ward Street, Fountain Valley, CA 92708
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SUPPLEMENTAL INFORMATION
(Supplemental information will be provided in a separate electronic package)


Final Initial Study/Mitigated Negative Declaration & CEQA-Plus Federal Consultation Review (MND)

Limited Environmental Site Assessment Groundwater Replenishment System Final Expansion; prepared by Shannon & Wilson, Inc., April 10, 2019


Report of Foundation Investigation Proposed Interplant Pipeline and Utility Corridor (Job I-9) Adjacent to Santa Ana River Between Plant No. 1 and Plant No. 2 Fountain Valley and Huntington Beach, California for the Orange County Sanitation District. LeRoy Crandall and Associates

Coastal Development Permit Vol 2, Sec 01090 Regulatory Requirements and Permits, Page 2: Coastal Development Permit, Plant No. 2 GWRS Facilities. The contractor shall comply with all requirements and conditions of approval stated in OCWD’s Coastal Development Permit No. 18-023 in the implementation of the Project work on the OCSD Plant 2 site. A copy of the Permit is available for review at the Owner’s office and included in the Supplemental Information
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GROUNDWATER REPLENISHMENT SYSTEM
FINAL EXPANSION
PLANT 2 SECONDARY EFFLUENT PIPELINE REHABILITATION PROJECT

CONTRACT NO. GWRS-2020-01

PLEASE TAKE NOTICE that sealed bids will be received at the office of the Contracts Administrator of the Orange County Water District ("District"), 18700 Ward Street, Fountain Valley, CA 92708 (mailing address: P.O. Box 8300, Fountain Valley, CA 92728-8300), until 2:00 p.m. local time on Tuesday, May 26, 2020, at which time the bids will be publicly opened and read aloud as well as presented online via a link at ocwd.com for performing all work and furnishing all labor, materials and equipment for:

The existing 100 million gallons per day (mgd) Advanced Water Treatment Facility (AWTF) owned and operated by the District is to be expanded by 30 mgd to a total production capacity of 130 mgd. In order to provide enough influent to the AWTF to produce 130 mgd of product water, additional secondary effluent from the Orange County Sanitation District's (OCSD) Plant 2 must be conveyed to the AWTF to supplement secondary effluent received from Plant 1. The Work includes rehabilitation of approximately 15,700 feet of an existing 66-inch reinforced concrete pipe (RCP) pipeline. The existing 66-inch RCP pipeline is located on the west side of the Santa Ana River at/near the outside toe of the levee and extends from just south of Garfield Avenue to OCSD’s Plant 2 in Huntington Beach.

The Work includes cleaning, CCTV, dewatering, and sliplining a portion of the 66-inch RCP pipeline with either high density polyethylene (HDPE) or fiberglass reinforced plastic (FRP) pipe; sliplining a portion of the 66-inch pipeline with steel; installation of insertion pits including shoring and if required dewatering; demolition of existing manways and boxes; installation of manways and vacuum relief valve assemblies; temporary support or relocation of existing utilities; installation of temporary closure pieces; installation of a cathodic protection system; protection of the existing 66, 84, and 120-inch pipelines; traffic control; site security, cathodic protection; and restoration of irrigation, rip rap, and vegetation removed for installation of the Work. The Work includes furnishing all labor, materials, tax, equipment, bonds, insurance, and services in strict compliance with the Contract Documents for a complete and operating pipeline.

DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION AND PARTICIPATION:
As required by the Environmental Protection Agency, the Guidelines for Meeting the Clean Water State Revolving Fund Program Disadvantaged Business Enterprise Requirements are enclosed in Exhibit C. Every bidder is required to submit the Disadvantaged Business Enterprise Contractor Subcontractor Certification form and the
Program Disadvantaged Business Enterprise Selected Prime Contractor and Subcontractor(s) form in its bid proposal prior to or at Bid Opening.

LABOR COMPLIANCE: The selected contractor and its subcontractors shall comply with the Davis-Bacon labor compliance program, a federal requirement of the Environmental Protection Agency Water Infrastructure Finance and Innovation Act loan. Specific requirements of the Davis-Bacon labor compliance program are described in the enclosed Exhibit D. For reference, the most recent Davis-Bacon wage rate determinations for Orange County, California at the time of preparation of this bid document are enclosed in Exhibit E.

The selected contractor and its subcontractors shall also comply with applicable California Labor Code requirements, including, but not limited to, Section 1720 et seq. of the California Labor Code regarding public works, limitations on use of volunteer labor (California Labor Code Section 1720.4), labor compliance programs (California Labor Code Section 1771.5) and payment of prevailing wages for work done and funded pursuant to these guidelines, including any payments to the Department of Industrial Relations under Labor Code Section 1771.3.

AMERICAN IRON AND STEEL COMPLIANCE: The selected contractor and its manufacturers of the listed products permanently incorporated into this project shall comply with the American iron and steel requirements as required by the Environmental Protection Agency.

EQUAL EMPLOYMENT OPPORTUNITY EXECUTIVE ORDER NUMBER 11246: The selected contractor shall comply with the nondiscrimination and affirmative action provisions of Equal Employment Opportunity Executive Order Number 11246. Detailed descriptions of these provisions are summarized in Exhibit H.

NEW RESTRICTIONS ON LOBBYING, SECTION 319 OF PUBLIC LAW 101-121: To comply with these restriction requirements, the District and the selected contractor shall not utilize the Environmental Protection Agency Water Infrastructure Finance and Innovation Act loan proceeds for prohibited payments related to lobbying and to influence legislation or appropriations pending before Congress or any State legislature. Pertinent lobbying resources and the District’s responsibilities are described in Exhibit I.

CIVIL RIGHTS LAWS: The selected contractor shall comply with the following federal non-discrimination requirements:

1. Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency.
2. Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination against persons with disabilities.
3. The Age Discrimination Act of 1975, which prohibits age discrimination.

Civil Rights resources and the District’s responsibilities are described in Exhibit J.
NON-MANDATORY PREBID CONFERENCE: A prebid conference will be held online on Thursday, April 14, 2020 at 8:30 A.M. All potential bidders and other interested parties are encouraged to attend this conference conducted by the District and Engineer. To be added to the invite for the prebid conference, any potential bidder must submit their email address to aperry@ocwd.com prior to Thursday, April 14, 2020. A link for the prebid conference will also be provided at ocwd.com. Site visits will be made on any potential bidder’s own time, as access to the site is available to the public. A map of the site will be provided by OCWD at the time of the prebid conference.

The District Project Manager will also discuss the role and participation of potential bidders in the District’s Contractor Safety Program (Exhibit H) in the prebid conference.

COMPLETION OF WORK AND LIQUIDATED DAMAGES: All Work must be substantially completed within Two Hundred and Sixty (260) consecutive calendar days from the date of the Notice to Proceed issued by the District. The bidder agrees that the Work will reach Final Completion within Two Hundred and Ninety (290) consecutive calendar days from the date of the Notice to Proceed issued by the District. Failure to complete the Work within the time set forth herein will result in the imposition of liquidated damages for each day of delay, in the amount set forth here and in the Information for Bidders.

OBTAINING CONTRACT DOCUMENTS: Plans, specifications and all contract documents will be electronically provided at ocwd.com. Please contact Sandy Scott-Roberts, Project Manager, at sscott@ocwd.com or Audrey Perry, Project Support, at aperry@ocwd.com if there are any issues obtaining the project documents.

BID GUARANTEE: Each Bid shall be accompanied by one of the following: a certified or cashier’s check, or bid bond in an amount not less than ten percent (10%) of the total bid price, payable to the Orange County Water District, as a guarantee that the Bidder, if its Bid is accepted, shall promptly execute the Agreement, furnish a satisfactory Faithful Performance Bond in an amount not less than one hundred percent (100%) of the total bid price, furnish a Labor and Material Bond in an amount not less than one hundred percent (100%) of the total bid price, and furnish certificates evidencing that the required insurance is in effect in the amounts set forth in the Insurance Conditions. The Faithful Performance Bond shall remain in full force and effect through the guarantee period as specified in the General Provisions. All surety companies shall be admitted surety insurers and shall comply with the provisions of Code of Civil Procedure Section 995.630.

WAGE RATE: As required by Section 1773 of the California Labor Code, the Director of the Department of Industrial Relations of the State of California has determined the general prevailing rates of wages in the locality in which the Work is to be performed. The prevailing wage determinations are available at the following web site: http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm The Contractor and any subcontractor under it shall not pay less than the specified prevailing rates of wages to all workers employed in the execution of the Contract.
PROJECT ADMINISTRATION: All questions relative to this project prior to the opening of bids shall be directed, in writing, to the Engineer for the project:

ORANGE COUNTY WATER DISTRICT  
18700 Ward Street  
Fountain Valley, CA 92708

Mailing Address:  
P.O. Box 8300  
Fountain Valley, CA 92728-8300

Attention: Sandy Scott-Roberts  
Email: sscott@ocwd.com  
Telephone: 714/378-3292  
Facsimile: 714/378-3373

Questions, interpretations, or clarifications may be e-mailed to Sandy Scott-Roberts (sscott@ocwd.com) or provided in the form of a letter in PDF format. The potential bidder shall consecutively number each submitted question for reference purposes.

SUBSTITUTION OF SECURITIES: At the request and expense of the successful bidder, the District will pay the amounts retained pursuant to the contract documents as security for the completion of the Work in compliance with the requirements of Public Contract Code Section 22300 and the provisions of the General Provisions pertaining to "Substitution of Securities."

CONTRACTOR'S LICENSE SPECIFICATION: In accordance with the provisions of California Public Contract Code Section 3300, the District requires that the bidder possess the following classification of contractor's license at the time that the bid proposal is submitted: Class A or Class C-34. If the license classification specified hereinabove is that of a "specialty contractor" as defined in Section 7058 of the California Business and Professions Code, the specialty contractor awarded the Contract for this Work shall itself construct a majority of the Work, in accordance with the provisions of California Business and Professions Code Section 7059. Each bidder shall clearly write or type their contractor's license number on the outside of the bidding envelope.

The installing contractor shall have a minimum of 5 years' experience in pipeline rehabilitation. Experience shall include installation of a minimum of 30,000 linear feet of pipeline rehabilitation and three projects with pipe of 48-inch diameter or larger utilizing the same sliplining trenchless technology sewer rehabilitation as is indicated in the bid. Personal experience of the construction manager with other construction companies may be substituted in lieu of the current company experience as approved by the Engineer and Owner.
DEBARMENT AND SUSPENSION: The prime contractor shall ensure that any subcontractors hired for the project are not suspended or debarred.

CONTRACTOR'S REGISTRATION: In accordance with Labor Code Section 1771.1.a, contractor or subcontractor shall not be qualified to bid on or be listed in a bid proposal or engage in the performance of this Work unless currently registered and qualified to perform the Work pursuant to Labor Code Section 1725.5.

COMPLIANCE MONITORING AND ENFORCEMENT: Contractor's performance of the Work described in this Notice Inviting Bids is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

SHEETING, SHORING AND BRACING: Pursuant to the provisions of California Labor Code Section 6707, each bid submitted in response to this Notice Inviting Bids shall contain, as a bid item, adequate sheeting, shoring, and bracing, or equivalent method, for the protection of life and limb in trenches and open excavation, which shall conform to applicable safety orders.

CONTRACTOR SAFETY PROGRAM: The District has instituted a Contractor Safety Program to comply with Cal/OSHA's Multi-Employer Worksite Standards. A copy of the District's Contractor Health & Safety Handbook is appended as Exhibit H of these contract documents. Potential bidders are strongly encouraged to familiarize themselves with this handbook and complete and submit appropriate forms with their bid proposal as indicated.

DISTRICT'S RIGHTS RESERVED: The Orange County Water District reserves the right to reject any or all bids, and to waive any informality in any bid.

Dated: March 30, 2020

ORANGE COUNTY WATER DISTRICT

By: Michael R. Markus, P.E., D.WRE
General Manager
INFORMATION FOR BIDDERS

GROUNDWATER REPLENISHMENT SYSTEM
FINAL EXPANSION
PLANT 2 SECONDARY EFFLUENT PIPELINE REHABILITATION PROJECT

CONTRACT NO. GWRS-2020-01

OBTAINING CONTRACT DOCUMENTS: Plans and specifications and all contract documents must be electronically requested by the contractor through OCWD.

CONTRACT DOCUMENTS: The Contract Documents consist of Notice Inviting Bids; Information for Bidders; Insurance Conditions; Bid; Examination of Proposed Work; Summary and Bid Schedule; Firm Identification; List of Subcontractors; Equipment/Material Source Information; Noncollusion Declaration to be Executed by Bidder and Submitted with Bid; Bid Bond; Contractor’s License Declaration; Firm’s Experience; Firm’s References; the Electrical Subcontractor’s License Declaration; the Electrical Subcontractor’s Experience; the Selected Disadvantaged Business Enterprise Forms 6100-3 and 6100-4; Contractor Safety Program; Agreement; Faithful Performance Bond; Labor and Materials Bond; Escrow Agreement for Security Deposits in Lieu of Retention; General Provisions; Special Provisions and Technical Specifications; the Guidelines for Meeting the California State Revolving Fund Programs Disadvantaged Business Enterprise (DBE) Requirements; the State Water Resources Control Board – California Clean Water State Revolving Fund and US EPA WIFIA Davis Bacon Requirements; Plans and Specifications; Subsurface or Geotechnical Investigation Report; Environmental Impact Report; Mitigated Negative Declaration; and any Addenda issued prior to the submittal of the Bid. Also included shall be any and all Change Orders or supplemental written agreements approved as required by these Contract Documents amending the scope or cost or extending the time of completion of the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner.

SCOPE OF WORK: The Work involves furnishing all labor, materials and equipment, in strict compliance with the Contract Documents, for a completed work of improvement, as follows:
The existing 100 million gallons per day (mgd) Advanced Water Treatment Facility (AWTF) owned and operated by the District is to be expanded by 30 mgd to a total production capacity of 130 mgd. In order to provide enough influent to the AWTF to produce 130 mgd of product water, additional secondary effluent from the Orange County Sanitation District’s (OCSD) Plant 2 must be conveyed to the AWTF to supplement secondary effluent received from Plant 1. The Work includes rehabilitation of approximately 15,700 feet of an existing 66-inch RCP pipeline. The existing 66-inch pipeline is located on the west side of the Santa Ana River at/near the outside toe of the levee and extends from just south of Garfield Avenue to OCSD’s Plant 2.

The Work includes cleaning, CCTV, dewatering, and slilining a portion of the 66-inch pipeline with either high density polyethylene (HDPE) or fiberglass reinforced plastic (FRP) pipe; slilining a portion of the 66-inch pipeline with steel, installation of insertion pits including shoring and if required dewatering; demolition of existing manways and boxes; installation of manways and vacuum relief valve assemblies; temporary support or relocation of existing utilities; installation of temporary closure pieces; installation of a cathodic protection system; protection of the existing 66, 84, and 120-inch pipelines; traffic control; site security, cathodic protection; and restoration of irrigation, rip rap, and vegetation removed for installation of the Work. The Work includes furnishing all labor, materials, tax, equipment, bonds, insurance, and services in strict compliance with the Contract Documents for a complete and operating pipeline.

SITE OF WORK: The site of the Work is defined in the specifications and on the drawings. The primary site of the Work is along the west levee of the Santa Ana River between Garfield Avenue in Fountain Valley and OCSD Plant 2 located at 22212 Brookhurst Street, Huntington Beach, CA 92646. A portion of the Work is located within the OCSD Plant 2 site.

SITE EXAMINATION: At its own expense and prior to submitting its Proposal, each Bidder shall examine the Contract Documents; attend the Prebid Conference and visit the site and determine the local conditions which may in any way affect the performance of the Work, including the prevailing wages and other relevant cost factors; familiarize itself with all Federal, State and local laws, ordinances, rules, regulations and codes affecting the performance of the Work, including the cost of permits and licenses required for the Work and the review and compliance by Contractor of District’s Contractor Safety Program; make such surveys and investigations as it may deem necessary for performance of the Work at its Bid price within the terms of the Contract Documents; determine the character, quality, and quantities of the Work to be
performed and the materials and equipment to be provided; and correlate its observations, investigations, and determinations with the requirements of the Contract Documents. The Contract Documents show and describe the existing conditions, as they are believed to exist, and the surveys, investigations, and other data, which have been used in the design of the Work.

**PREPARATION OF BIDS:** Bids shall be submitted on the prescribed Bid forms, completed in full. All bid items and statements shall be properly filled out. Numbers shall be stated both in words and in figures where so indicated, and where there is a conflict in the words and the figures, the words shall govern. The signatures of all persons signing the Bid shall be in longhand. Prices, wording and notations must be in ink or typewritten. Erasures or other changes shall be noted over by signature of the Bidder. In the event that the Bidder is a joint venture or partnership, there shall be submitted with the bid certifications signed by authorized officers of each of the parties to the joint venture or partnership, naming the individual who shall be the agent of the joint venture or partnership, who shall sign all necessary documents for the joint venture or partnership and, should the joint venture or partnership be the successful Bidder, who shall act in all matters relative to the Contract resulting therefrom for the joint venture or partnership.

**FORM AND DELIVERY OF BIDS:** The Bid shall be made on the Bidding Schedule provided, and the complete Bid shall be enclosed in a sealed envelope, addressed and delivered or mailed to the District. The address label shall read: Orange County Water District, SEALED BID: ATTENTION CONTRACTS ADMINISTRATOR, 18700 Ward Street, Fountain Valley, CA 92708 (for express mail, courier, or hand delivery) or Post Office Box 8300, Fountain Valley, CA 92728-8300 (for U.S. Postal Service delivery). The bid must be received on or before the time set forth in the Notice Inviting Bids for the opening of bids. The envelope shall be plainly marked in the lower left hand corner with the bidder's name and contractor's license number, the Contract designation and the date and time for the opening of bids. It is the Bidder's sole responsibility to ensure that its Bid is received prior to the scheduled closing time for receipt of Bids. In accordance with Government Code Section 53068, any Bid received after the scheduled closing time for receipt of Bids shall be returned to the Bidder unopened. At the time set forth in the Notice Inviting Bids for the opening of bids the sealed Bids will be opened and read aloud at the District office.

**BIDDER REGISTRATION REQUIREMENT:** In accordance with Labor Code Section 1771.1., a Bid shall not be accepted and a contract for this Work shall not be entered into without proof of the Bidder's and all proposed subcontractors' current registration to perform public work pursuant to Labor Code Section 1725.5.

**WITHDRAWAL OF BIDS:** The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative, and received at the District office prior to the scheduled closing time for receipt of Bids. Any request to withdraw a Bid shall be so worded as not to reveal the amount of the original bid. Withdrawn Bids may be resubmitted until the scheduled time for receipt of Bids, so long as the resubmitted Bids are in full conformance with the Contract Documents.
Pursuant to Section 5100, et seq., of the California Public Contract Code, the Bidder shall notify the District within five (5) calendar days after the opening of bids of the mistake, specifying in the notice how the mistake occurred, in case of a mistake in the bid submitted by the Bidder.

**MODIFICATIONS AND ALTERNATIVE PROPOSALS:** Unauthorized conditions, limitations or provisos attached to a Bid will render it informal and may cause its rejection. Bids may be rejected if they show any alteration in form, are incomplete, otherwise contain irregularities of any kind, or fail to conform in all respects to the requirements for bidding. Alternative Proposals will not be considered unless called for in the Contract Documents. Oral, telephonic or telegraphic Bids or modifications will not be considered. The District reserves the right to reject any or all Bids.

**DISCREPANCIES IN BIDS:** In the event there is more than one bid item in a bidding schedule, the Bidder shall furnish a price for all bid items in the schedule, and failure to do so will render the Bid informal and may cause its rejection. In the event there are unit price bid items in a bidding schedule and the "amount" indicated for a unit price bid item does not equal the product of the unit price and quantity, the unit price shall govern and the amount will be corrected accordingly. In the event there is more than one bid item in a bidding schedule and the total indicated for the schedule does not agree with the sum of the prices bid on the individual items, the prices bid on the individual items shall govern and the total for the schedule will be corrected accordingly.

**INTERPRETATIONS AND ADDENDA:** Each bidder shall promptly and in writing, notify the District of any conflicts, errors, omissions, ambiguities or discrepancies found in the bidding documents. Addenda may be issued to modify the Contract Documents as deemed advisable by the District. Addenda will be posted or delivered to all parties recorded by the District as having received the Contract Documents. No Addenda will be issued later than seven (7) calendar days prior to the date for receipt of bids, except an Addendum, if necessary, postponing the date and time for receipt of bids or withdrawing the request for bids. Full consideration shall be given to all Addenda in the preparation of Proposals, as Addenda form a part of the Contract Documents. Bidders shall verify the number of Addenda issued, if any, and acknowledge the receipt of all Addenda in the Bid. Failure to so acknowledge may cause the Bid to be rejected.

Clarifications, interpretations, and questions must be received by the Project Manager no later than fourteen calendar days (14) prior to bid opening.

**DISQUALIFICATION OF BIDDERS:** Any individual, firm, partnership, corporation, or association under the same or different name that submits more than one bid without adhering to the legal requirements under applicable law for withdrawing and resubmitting bids will not be considered for the Project. Reasonable grounds for believing that any Bidder is interested in more than one Bid for the Work contemplated will cause the rejection of all Bids in which such Bidder is interested. If there is reason to believe that collusion exists among the Bidders, all bids will be rejected and none of the participants in such collusion will be considered in future Proposals.
**BID GUARANTEE:** Each Bid shall be accompanied by a certified or cashier’s check or bid bond in the amount of not less than ten percent (10%) of the total bid amount stated in the Bid. Said check or bond shall be made payable to the Orange County Water District and shall be given as a guarantee that the Bidder, if awarded the Work, will enter into an Agreement within fourteen (14) calendar days after award of the contract, and will furnish, on the prescribed forms, the necessary insurance forms, faithful performance bond, and labor and materials bond in accordance with the Contract Documents. In case of refusal or failure to enter into the Agreement, the check or bid bond, as the case may be, shall be forfeited to the District. If the Bidder elects to furnish a bid bond as its Bid guarantee, the Bidder shall use the bid bond form bound herein.

**RETURN OF BID GUARANTEE:** The District will return the Bid Guarantees accompanying all Bids within ten (10) calendar days after the execution of the Agreement by the successful Bidder.

**PRE-AWARD CONTRACT AUDIT:** As a condition precedent to award of the Contract and issuance of Notice to Proceed, the District reserves the right to audit the Contractor’s accounting system and chart of accounts. This audit will be used to establish a written agreement concerning how the Contractor collects and accounts for both direct and indirect costs in their accounting system and the methodology used by the Contractor in allocating costs to project. The audit will also review the Contractor’s internal controls concerning their cost collection and billing system.

**AWARD OF CONTRACT:** The District will award the contract to the lowest responsible bidder. Evaluation of the Bidder’s experience and additional information requested on the form "FIRM’S REFERENCES," bound herein, will be used to determine whether a bidder is responsible. Any such award, if it be awarded, will be made within sixty (60) calendar days after opening of the Bids. Unless otherwise indicated, a single award will not be made for less than all the bid items in an individual bidding schedule. In the event there is more than one bidding schedule, the District may award schedules individually or in combination. The District reserves the right to reject any or all bids, and to waive any informality in any bid.

**COMPETENCY OF BIDDERS:** In selecting the lowest responsible Bidder, consideration will be given not only to the financial standing but also to the general competency of the Bidder for the performance of the Work covered by the Bid. By submitting a Bid, each Bidder agrees that the District, in determining the successful Bidder and its eligibility for the award, may consider the Bidder's experience and facilities, conduct and performance under other contracts, financial condition, reputation in the industry, and other factors which could affect the Bidder's performance of the Work. To this end, each Proposal shall be supported by a statement of the Bidder's experience as of recent date on the form entitled "FIRM’S EXPERIENCE," bound herein.

The District may also consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work. Operating costs,
maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the District. In this regard, the District may conduct such investigations as the District deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidder, proposed subcontractors, and other persons and organizations to do the Work in accordance with the Contract Documents to the District's satisfaction within the prescribed time; and the District reserves the right to reject the bid of any Bidder who does not pass any such evaluation to the satisfaction of the District. No Proposal for the Work will be accepted from a contractor who is not licensed in accordance with applicable State law at the time the bid is submitted to the District.

EXECUTION OF AGREEMENT: The Bidder to whom award is made shall execute a written Agreement with the District on the form of Agreement provided, shall secure all insurance and shall furnish all certificates and bonds in the form prescribed in or required by the Contract Documents within fourteen (14) calendar days of the award of the Contract from the District. Failure or refusal to enter into the Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and the forfeiture of the Bid Guarantee. If the successful Bidder refuses or fails to execute the Agreement, the District may award the contract to the second lowest responsible Bidder. If the second lowest responsible Bidder refuses or fails to execute the Agreement, the District may award the Contract to the third lowest responsible Bidder. On the failure or refusal of such second or third lowest Bidder to execute the Agreement, such Bidders' Proposal Guarantees shall be likewise forfeited to the District.

CONTRACTOR'S INSURANCE: The Contractor shall not commence Work under this contract until it has obtained all insurance required hereunder by the Contract Documents; and such insurance shall have been approved by the District as to form, amount and carrier. Such insurance coverage shall be evidenced by submittal of an insurance certificate at the time the contract is executed and returned to the District. The Contractor shall not allow any subcontractor to commence Work on its subcontract until any such subcontractor has obtained the same insurance required of the Contractor under the Contract Documents.

If necessary, the General Contractor may insure their respective subcontractors for the full required coverage.

FAITHFUL PERFORMANCE BOND: The Bidder to whom award is made shall be required at the time of the execution of the Agreement to furnish a Faithful Performance Bond in an amount not less than one hundred percent (100%) of the total bid price. This bond shall be secured from an admitted surety company, shall be submitted on the prescribed bond form, and the premiums thereon shall be paid by the successful Bidder. The Faithful Performance Bond shall remain in full force and effect through the guarantee period as specified in the General Provisions.

LABOR AND MATERIALS BOND: The Bidder to whom award is made shall be required at the time of execution of the Agreement to furnish a Labor and Materials
Bond, in an amount not less than one hundred percent (100%) of the total bid price. This bond shall be secured from an admitted surety company, shall be submitted on the prescribed bond form, and the premiums thereon shall be paid by the successful Bidder.

CONTRACTOR SAFETY PROGRAM: The District has instituted a Contractor Safety Program to comply with Cal/OSHA’s Multi-Employer Worksite Standards. Bidders shall familiarize themselves with the District’s Contractor Health and Safety Handbook included with the contract documents and submit the appropriate form with their bid proposal as indicated. The Bidder to whom award is made shall be required to submit a “Post Award EHA Review Packet” and discuss its contents with the District at the Preconstruction Meeting.

EQUAL EMPLOYMENT OPPORTUNITY EXECUTIVE ORDER NO. 11246:


During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

2. The contractor will, in all solicitations or advancements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

3. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation
information of other employees or applicants as a part of such employee’s essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor’s legal duty to furnish information.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers’ representative of the contractor’s commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

6. The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

7. In the event of the contractor’s noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States. [Sec. 202 amended by EO
Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246) located at 41 CFR 60-4.3:

1. As used in these specifications:
   a. “Covered area” means the geographical area described in the solicitation from which this contract resulted;
   b. “Director” means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   d. “Minority” includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by
other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the
Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor’s EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and
timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, sexual orientation, gender identity, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be
maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Segregated Facilities located at 41 CFR 60-1.8:

1. The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; Provided, That separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246) located at 41 CFR § 60-4.2:

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

<p>| Time- | Goals for minority participation | Goals for female participation |</p>
<table>
<thead>
<tr>
<th>tables</th>
<th>for each trade</th>
<th>in each trade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Insert goals for each year¹</td>
<td>6.9%²</td>
</tr>
</tbody>
</table>

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of

---

¹ Goals can be found at: [https://www.dol.gov/ofccp/TAguides/TAC_FedContractors_JRF_QA_508c.pdf](https://www.dol.gov/ofccp/TAguides/TAC_FedContractors_JRF_QA_508c.pdf)

² Nationwide goal for all covered areas
the covered area, it shall apply the goals established for such geographical area
where the work is actually performed. With regard to this second area, the
contractor also is subject to the goals for both its federally involved and non-
federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41
CFR part 60-4 shall be based on its implementation of the Equal Opportunity
Clause, specific affirmative action obligations required by the specifications set
forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority
and female employment and training must be substantially uniform throughout
the length of the contract, and in each trade, and the contractor shall make a
good faith effort to employ minorities and women evenly on each of its projects.
The transfer of minority or female employees or trainees from Contractor to
Contractor or from project to project for the sole purpose of meeting the
Contractor's goals shall be a violation of the contract, the Executive Order and
the regulations in 41 CFR part 60-4. Compliance with the goals will be measured
against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of
Federal Contract Compliance Programs within 10 working days of award of any
construction subcontract in excess of $10,000 at any tier for construction work
under the contract resulting from this solicitation. The notification shall list the
name, address and telephone number of the subcontractor; employer
identification number of the subcontractor; estimated dollar amount of the
subcontract; estimated starting and completion dates of the subcontract; and the
geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the
“covered area” is (insert description of the geographical areas where the contract
is to be performed giving the state, county and city, if any).

NEW RESTRICTIONS ON LOBBYING, SECTION 319 OF PUB. L. 101-121:
Recipients of federal grants, cooperative agreements, contracts, and loans are
(limitation on use of appropriated funds to influence certain federal contracting and
financial transactions) from using federal (appropriated) funds to pay any person for
influencing or attempting to influence any officer or employee of an agency, a member
of Congress, an officer or employee of Congress, or an employee of a member of
Congress with respect to the award, continuation, renewal, amendment, or modification
of any of these instruments.

CIVIL RIGHTS LAWS: Contractor shall comply with the following federal non-
discrimination requirements:
4. Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on
race, color, and national origin, including limited English proficiency (LEP).
5. Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination
against persons with disabilities.

QUALIFICATIONS OF SURETY: All surety companies shall be admitted surety insurers and shall comply with the provisions of Code of Civil Procedure Section 995.630.

CONTRACT DURATION AND LIQUIDATED DAMAGES: Time is of the essence in completing the Work of this contract. Work must be substantially completed within the time limits set forth in the Notice Inviting Bids. It is agreed that damages for the failure of the Contractor to complete the total Work described herein within the time limits required are difficult to ascertain with certainty but that the sum of Nine Thousand Three Hundred and Fifty Dollars ($9,350) per day is a reasonable estimate. Should the Work not be substantially completed within the specified time for completion or such other time as may be established by Change Order, the Contractor shall be liable for liquidated damages, payable to the Orange County Water District, in an amount of One Thousand Five Hundred Dollars ($1,500) for each calendar day of delay in substantial completion.

PROGRESS PAYMENTS: The Contract Documents call for monthly progress payments based upon the percentage of the Work completed. The District will retain five percent (5%) of each progress payment as security for completion of the Work. At the request and expense of the successful Bidder, the District will pay the amount so retained in compliance with the requirements of Public Contract Code Section 22300 and the provisions of the Contract Documents pertaining to "Substitution of Securities."
INSURANCE CONDITIONS

Minimum Scope and Limits of Insurance: Contractor shall procure and maintain for the duration of the contract, and for five (5) years thereafter, insurance against claims for injuries or death to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors. This requirement is not applicable to the builders’ risk policy.

Minimum Scope and Limits of Insurance” on page IC-1, the following, “The Contractor shall not commence work under this Contract until it has obtained the insurance required hereunder in a company or companies having an A.M. Best rating of A:VII and mutually acceptable to the OCWD and Contractor nor shall the Contractor allow any subcontractor to commence work on its subcontract until all insurance required herein of the Contractor has been obtained by such subcontractor.

The Contractor shall at the time of the execution of the Agreement present certificate(s) of insurance evidencing the coverage required by this agreement. Such evidence shall include a separate additional insured endorsement and other provisions required herein.

At least thirty (30) calendar days prior to the expiration of any such policy, a signed complete certificate of insurance, with all endorsements required herein, showing that such insurance coverage has been renewed or extended will be filed with the OCWD. At the time of contract document preparation, efforts were made to include all known insurance requirements which would take place during the contract. It is possible additional insurance requirements may be made by another agency or government entity to provide additional insurance not included here. At the direction of the agency/entity, the Contractor shall comply and satisfy the additional insurance requirements.

Coverage shall be at least as broad as the following:

1. General Liability – Commercial General Liability (CGL) – Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 00 01) including products and completed operations, property damage, bodily injury, personal and advertising injury with limit of at least ten million dollars ($10,000,000) per occurrence or the full per occurrence limits of the policies available, whichever is greater. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (coverage as broad as the ISO CG 25 03, or ISO CG 25 04 endorsement provided to the OCWD or the general aggregate limit shall be twice the required occurrence limit.

2. Automobile Liability – Insurance Services Office (ISO) Business Auto Coverage (Form CA 00 01) covering Symbol 1 (Any Auto) with limit of one million dollars ($1,000,000) for bodily injury and property damage each accident.
3. **Workers' Compensation Insurance** – The Contractor shall provide Workers’ Compensation coverage as required by the State of California, with Statutory Limits, and Employer’s Liability Insurance with limit of no less than $1,000,000 per accident for bodily injury or disease.

   **Waiver of Subrogation** (also known as Transfer of Rights of Recovery Against Others to Us) – The Contractor hereby agrees to waive rights of subrogation to obtain endorsement necessary to affect this Waiver of Subrogation in favor of the OCWD, its directors, officers, employees, and authorized volunteers, for losses paid under the terms of this coverage which arise from work performed by the Named Insured for the OCWD; this provision applies regardless of whether or not the OCWD has received a Waiver of Subrogation from the insurer.

4. **Builder's Risk** – (Course of Construction) – Where required by the District Contractor will obtain insurance utilizing an “All Risk” (Special Perils) coverage form with limits equal to the completed value of the project and no coinsurance penalty provision.

   **Responsibility for Work** – Until the completion and final acceptance by the OCWD of all the work under and implied by this agreement, the work shall be under the Contractor's responsible care and charge. The Contractor shall rebuild, repair, restore and make good all injuries, damages, re-erections, and repairs occasioned or rendered necessary by causes of any nature whatsoever. The Contractor shall provide and maintain Builder's Risk (course of construction) or an installation floater (for materials and equipment) covering all risks of direct physical loss, damage or destruction to the work to insure against such losses until final acceptance of the work by the OCWD. Such insurance shall insure at least against the perils of fire and extended coverage, theft, vandalism and malicious mischief, and collapse. The Policy shall be endorsed with the OCWD, its directors, officers, employees, and authorized volunteers named as loss payee, as their interest may appear.

5. **Contractor’s Pollution Liability** – (optional: if project involves environmental hazards) with limits of no less than $5,000,000 per occurrence or claim, and $10,000,000 policy aggregate.

   If the Contractor maintains broader coverage and/or higher limits than the minimums shown above, the OCWD requires and shall be entitled to the broader coverage and/or higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum of insurance and coverage shall be available to the OCWD.

   **Other Required Provisions** – The Commercial General Liability policy and Contractor’s Pollution (if necessary) are to contain, or be endorsed to contain, the following provisions:

   1. **Additional Insured Status** – The Orange County Water District, its directors, officers, employees, and authorized volunteers are to be given insured status (at
least as broad as ISO Form CG 20 10 11 85 or if not available, through the addition of both CG 20 10 10 01 and CG 20 37 10 01) with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations. General Liability coverage can be provided in the form of an endorsement to the Contractor’s insurance. CG 20 10 04 13 and CG 20 37 04 13 may be used in lieu of CG 20 10 10 01 and CG 20 37 10 01.

2. **Primary Coverage** – For any claims related to this project, the Contractor’s insurance coverage shall be primary at least as broad as ISO CG 20 01 04 13 as respects to the Orange County Water District, its directors, officers, employees, and authorized volunteers. Any insurance or self-insurance maintained by the Orange County Water District, its directors, officers, employees, and authorized volunteers shall be excess of the Contractor’s insurance and shall not contribute with it.

**Notice of Cancellation** – Each insurance policy required above shall provide that coverage shall not be canceled, except with notice to the OCWD.

**Acceptability of Insurers** - The Contractor agrees that it will comply with such provisions before commencing work. Acceptability of Insurers” on page IC-3, the following, “All of the insurance shall be provided on policy forms and through companies rated A:VII or greater by A.M. Best satisfactory to OCWD. The OCWD reserves the right to obtain complete, certified copies of all required insurance policies, including the policy declarations page with endorsement number. Failure to continually satisfy the insurance requirements is a material breach of contract.

**Deductibles and Self-Insured Retentions** – At the election of the OCWD, the Contractor shall either cause the insurer to reduce or eliminate such self-insured retentions as respects the Orange County Water District, its directors, officers, employees, and authorized volunteers or the Contractor shall provide a financial guarantee satisfactory to the OCWD guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the OCWD.

**Verification of Coverage – Evidence of Insurance** – The Contractor shall furnish the OCWD with copies of certificates and amendatory endorsements effecting coverage required by this Contract. All certificates and endorsements are to be received and approved by the OCWD before work commences. However, failure to obtain the required documents prior to the working beginning shall not waive the Contractor’s obligation to provide them. The OCWD reserves the right to require complete, certified copies of all required insurance policies, including policy Declaration pages and Endorsement pages, required by these specifications, at any time. Failure to continually satisfy the insurance requirements is a material breach of contract.
Continuation of Coverage – The Contractor shall, upon demand of the OCWD deliver evidence of coverage showing continuation of coverage for at least five years after completion of the project, except builders’ risk insurance. Contractor further waives all rights of subrogation under this agreement. When any of the required coverages expire during the term of this agreement, the Contractor shall deliver the renewal certificate(s) including the General Liability Additional Insured endorsement and evidence of Waiver of Rights of Subrogation against the OCWD (if Builder’s Risk Insurance is applicable) to the District at least ten days prior to the expiration date.

Subcontractors – In the event that the Contractor employs other contractors (subcontractors) as part of the work covered by this agreement, it shall be the Contractor’s responsibility to require and confirm that each subcontractor meets the minimum insurance requirements specified above (via as broad as ISO CG 20 38 04 13). The Contractor shall, upon demand of the District, deliver to the OCWD copies of such policy or policies of insurance and the receipts for payment of premiums thereon. If necessary, the General Contractor may insure their respective subcontractors for the full required coverage.

**Note 1:** Any combination of a minimum $1,000,000 per occurrence General Liability and Excess Liability to meet the $10,000,000 total may be accepted.

**Note 2:** The General Liability and/or Automobile Liability coverage shall include mobile equipment.

**Note 3:** All insurance terms provided by the Contractor for this contract are subject to approval and acceptance by the Orange County Water District.

**Note 4:** The Orange County Water District, its directors, officers, employees, authorized volunteers, Orange County Sanitation District, Orange County Flood Control District, US EPA Water Infrastructure Finance and Innovation Act (WIFIA) shall be named, by separate endorsement, as additional insured on the policy.

**Note 5:** Contract Name and/or Contract Number shall be indicated on insurance certificate.

**Note 6:** If an insurance policy does not meet these minimum requirements, it shall be the sole responsibility of the Contractor to amend said policy with appropriate ISO endorsements for the duration of this contract, plus 30 calendar days.

**Note 7:** Contract Name and/or Contract Number shall be indicated on insurance certificate.

**Note 8:** Evidence of insurance should be on Acord Form 25S or equivalent.

**Note 9:** Evidence of insurance – Prior to execution of the Agreement for this Public Works Contract, the Contractor shall file with the Orange County Water District a certificate of insurance (Acord Form 25S or equivalent) signed by the insurer’s
representative evidencing the coverage required by this Agreement. Such evidence shall include an additional insured endorsement signed by the insurer’s representative and evidence of waiver of rights of subrogation against the Orange County Water District (if Builder’s Risk insurance is applicable).
BID

BY

_______________________________________________________

(firm)

FOR

GROUNDWATER REPLENISHMENT SYSTEM
FINAL EXPANSION
PLANT 2 SECONDARY EFFLUENT PIPELINE REHABILITATION PROJECT

CONTRACT NO. GWRS-2020-01

EXAMINATION OF PROPOSED WORK

The undersigned declares that he has carefully examined the location(s) of the proposed Work and that he has examined the Contract Documents and hereby proposes and agrees to furnish all labor, materials, equipment, tools, transportation and services necessary to do all work required to construct:

Groundwater Replenishment System Final Expansion
Plant 2 Secondary Effluent Pipeline Rehabilitation Project

The existing 100 million gallons per day (mgd) Advanced Water Treatment Facility (AWTF) owned and operated by the District is to be expanded by 30 mgd to a total production capacity of 130 mgd. In order to provide enough influent to the AWTF to produce 130 mgd of product water, additional secondary effluent from the Orange County Sanitation District’s (OCSD) Plant 2 must be conveyed to the AWTF to supplement secondary effluent received from Plant 1. The Work includes rehabilitation of approximately 15,700 feet of an existing 66-inch RCP pipeline. The existing 66-inch pipeline is located on the west side of the Santa Ana River at/near the outside toe of the levee and extends from just south of Garfield Avenue to OCSD’s Plant 2.

The Work includes cleaning, CCTV, dewatering, and slilining a portion of the 66-inch pipeline with either high density polyethylene (HDPE) or fiberglass reinforced plastic (FRP) pipe; slilining a portion of the 66-inch pipeline with steel, installation of insertion pits including shoring and if required dewatering; demolition of existing manways and boxes; installation of manways and vacuum relief valve assemblies; temporary support or relocation of existing utilities; installation of temporary closure pieces; installation of a cathodic protection system; protection of the existing 66, 84, and 120-inch pipelines; traffic control; site security, cathodic protection; and restoration of irrigation, rip rap, and vegetation removed for installation of the Work. The Work includes furnishing all labor, materials, tax,
equipment, bonds, insurance, and services in strict compliance with the Contract Documents for a complete and operating pipeline.

and all appurtenances therefor, in strict conformance with the Contract Documents prepared by the Engineer, for the price(s) shown on the following pages. The total price for each Bid Schedule stated in this Proposal for all Bid Items is based on the estimated quantities indicated in the Plans and Specifications, and shall include all items necessary to complete the Work.

Person(s) who examined the proposed work for your firm:

Firm: ______________________________________________
Examiner’s Name: _________________________________________
Official Title: ___________________________________________
# BASE BID SCHEDULE FOR CONTRACT NO. GWRS-2020-01 (FRP)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of the Bid Item</th>
<th>Unit</th>
<th>Quantity (Est.)</th>
<th>Unit Price</th>
<th>Bid Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization and demobilization, including but not limited to providing a field office and cleanup</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>2</td>
<td>Worker protection and safety/sheeting, shoring and bracing</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>3</td>
<td>Builders All Risk Insurance (per Public Contract Code Section 7105)</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>4</td>
<td>Furnish all equipment, labor, and materials to clean, remove and dispose of all debris in and CCTV of the 66-inch pipeline.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>5</td>
<td>Furnish all equipment, labor, and materials to construct the steel lining portion of the Project from approximately STA 70+25 to approximately STA 81+05, complete and in place.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>6</td>
<td>Furnish all equipment, labor, and materials to construct the FRP lining portion of the Project from approximately STA 25+40 to approximately STA 70+25, and from approximately STA 81+05 to STA 181+60, complete and in place.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
<tr>
<td>7</td>
<td>Furnish all equipment, labor, and materials for installation of the cathodic protection system.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>$</td>
</tr>
</tbody>
</table>

Total Base Bid, Numbers: $

Base Bid for Contract GWRS-2020-01 (FRP)

Total Base Bid Price, Written in Words:

The undersigned Bidder understands and agrees that the Total Base Bid is the sum of Base Bid items 1 through 7 in the Bid Schedule. Each Bid item shall include the work as defined in the Measurement and Payment section.
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description of the Bid Item</th>
<th>Unit</th>
<th>Quantity (Est.)</th>
<th>Unit Price</th>
<th>Bid Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization and demobilization, including but not limited to providing a field office and cleanup</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>2</td>
<td>Worker protection and safety/sheeting, shoring and bracing</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>3</td>
<td>Builders All Risk Insurance (per Public Contract Code Section 7105)</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>4</td>
<td>Furnish all equipment, labor, and materials to clean and, remove and dispose of all debris in and CCTV of the 66-inch pipeline.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>5</td>
<td>Furnish all equipment, labor, and materials to construct the steel lining portion of the Project from approximately STA 70+25 to approximately STA 81+05, complete and in place.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>6</td>
<td>Furnish all equipment, labor, and materials to construct the HDPE lining portion of the Project from approximately STA 25+40 to approximately STA 70+25, and from approximately STA 81+05 to STA 181+60, complete and in place.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
<tr>
<td>7</td>
<td>Furnish all equipment, labor, and materials for installation of the cathodic protection system.</td>
<td>LS</td>
<td>1</td>
<td>N/A</td>
<td>Same as Base Bid</td>
</tr>
</tbody>
</table>

Alternative Total Bid, Numbers: $

Alternative Bid for Contract GWRS-2020-01 (HDPE)

Alternative Total Bid Price, Written in Words:

Pursuant to the Public Contract Code Section 20103.8, the District has elected to establish a Base Bid, which includes the scope of work detailed herein, and a separate Alternative Bid. A responsible bidder who submitted the lowest bid on the Base Bid
shall be awarded the contract. The District reserves the right to move forward with the Alternative Bid at its own discretion. The District will adjust the contract price accordingly, if necessary.

Each individual bid item shall be determined from visiting the work site, reviewing the Plans and Specifications, and all other portions of the Contract Documents, and shall include all items necessary to complete the Work, including the assumption of all obligations, duties, and responsibilities necessary to the successful completion of the Contract, and the furnishing of all materials and equipment required to be incorporated in and form a permanent part of the Work: tools, equipment, supplies, transportation, facilities, labor, superintendence, and services required to perform and complete the Work; site and home office overhead and bonds, insurance and submittals; all as per the requirements of the Contract Documents, whether or not expressly listed or designated.

Payment for the bid items designated as an allowance will be computed based upon the actual quantities of the completed work.
It is understood and agreed that:

1. The Bidder has carefully examined all the Contract Documents which will form a part of the contract; namely, documents consist of Notice Inviting Bids; Information for Bidders; Insurance Conditions; Bid; Examination of Proposed Work; Summary and Bid Schedule; Firm Identification; List of Subcontractors; Equipment/Material Source Information; Noncollusion Declaration to be Executed by Bidder and Submitted with Bid; Bid Bond; Contractor’s License Declaration; Firm’s Experience; Firm’s References; the Electrical Subcontractor’s License Declaration; the Electrical Subcontractor’s Experience; the Selected Disadvantaged Business Enterprise Forms 6100-3 and 6100-4; Contractor Safety Program; Agreement; Faithful Performance Bond; Labor and Materials Bond; Escrow Agreement for Security Deposits in Lieu of Retention; General Provisions; Special Provisions and Technical Specifications; the Guidelines for Meeting the California State Revolving Fund Programs Disadvantaged Business Enterprise (DBE) Requirements; the State Water Resources Control Board – California Clean Water State Revolving Fund and US EPA WIFIA Davis Bacon Requirements; Plans (if they are provided) and Specifications; Subsurface or Geotechnical Investigation Report; Environmental Impact Report; Mitigated Negative Declaration; and any Addenda issued prior to the submittal of the Bid. Also included shall be any and all Change Orders or supplemental written agreements approved as required by these Contract Documents amending the scope or cost or extending the time of completion of the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner.

2. The Bidder has satisfied itself as to the nature and location of the Work and fully informed itself as to all conditions and matters which can in any way affect the Work or the cost thereof.

3. The Bidder fully understands the scope of Work and has checked carefully all words and figures inserted in this Proposal and further understands that the Orange County Water District will in no way be responsible for any errors or omissions in the preparation of this Proposal.

4. The Bidder has given the Engineer written notice of all omissions, conflicts, errors or discrepancies that the Bidder has discovered in the Contract Documents, and the written resolution thereof is acceptable to the Bidder.

5. The Bidder agrees and acknowledges that it is aware of the provisions of Section 3700 of the Labor Code which require 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 that the Bidder will comply with such provisions of that Code before commencing the performance of this contract if it is awarded to the Bidder.
6. The Bidder hereby certifies that it is, and at all times during the performance of work hereunder shall be, in full compliance with the provisions of the Immigration Reform and Control Act of 1986 ("IRCA") in the hiring of its employees, and the Bidder shall indemnify, hold harmless and defend the District against any and all actions, proceedings, penalties or claims arising out of the Bidder's failure to comply strictly with the IRCA.

7. The Bidder will execute the Agreement and furnish the required bonds, together with the certification of insurance required, within fourteen (14) calendar days after the award of the Contract.

8. The Bidder will not begin work unless and until all requirements in regard to bonds and insurance have been satisfied, and the Bidder will complete said Work within the period of time specified in the Notice Inviting Bids.

9. If requested by the District, the Bidder shall furnish a notarized financial statement, references, and other information sufficiently comprehensive to permit an appraisal of its current financial condition.

10. Prior to and as a condition of entering into an Agreement for the Work scheduled herein on which it submits a bid, the Bidder shall provide the District with proof of the Bidder's and all subcontractors' current registration to perform public work pursuant to Labor Code Section 1725.5 effective March 1, 2015.

11. The Bidder will accept an award and enter into an Agreement for all Work scheduled herein on which it submits a bid. The awards for such Work are to be entirely at the discretion of the Orange County Water District after evaluation of the submitted bids. Attached hereto is a (certified check)* (cashier's check)* (bid bond)* in the amount of _____________________________ Dollars ($______), said amount being not less than ten percent (10%) of the total bid price payable to or in favor of Orange County Water District, which it is agreed shall be retained as liquidated damages by the District if the Bidder fails or refuses to execute the Agreement and furnish the required bonds and certificate of insurance within the time provided.

Receipt is hereby acknowledged of the following Supplemental Information.

Supplemental Information Checklist


☐ Final Initial Study/Mitigated Negative Declaration & CEQA-Plus Federal Consultation Review (MND)
12. Receipt is hereby acknowledged of Addenda number(s) ____ through _____. All Addenda have been considered in the preparation of this Proposal.

13. The Bidder is familiar with and is satisfied as to all Federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

14. The Bidder shall note that per State Water Resources Control Board – California Clean Water State Revolving Fund and US EPA WIFIA Davis Bacon Requirements document, every prime contractor and all sub-contractors must spell out details of their wage determinations.

NOW, THEREFORE, in compliance with the Contract Documents and all the provisions hereinbefore stipulated, the undersigned, with full cognizance thereof, proposes to perform the entire Work for the prices set forth in the hereinbefore set forth Schedule(s) upon which award of Contract is made.
All Bids shall remain subject to acceptance by the District for a minimum of 60 days after the opening of the Bids.

(SIGN AND COMPLETE APPLICABLE SECTION)

*Strike out items not applicable
FIRM IDENTIFICATION

Check one of the following as it applies to your firm:

____ Individual     _____ Partnership     _____ Corporation      _____ Joint Venture

AND,

Complete the applicable section in its entirety:

Individual Contractor

Firm Name: ___________________________________________________________

Federal Identification Number: _____________________________________________

Signed by: ___________________________ Date: ____________________________

Officer Title: _________________________________________________________

Names and Titles of All Officers of the Firm:

___________________________________ ________________________________

___________________________________ ________________________________

___________________________________ ________________________________

___________________________________ ________________________________

Business Address: ______________________________________________________

_____________________________________________________________________

Telephone No.: ______________________ Facsimile No.: ______________________

Partnership

Name: _______________________________________________________________

Federal Identification Number: _____________________________________________

Signed by: ___________________________, Partner

Date: ________________________________

Other Partners: _______________________________________________________

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_____________________________
Partnership (Continued)

Names and Titles of All Officers of the Firm:
___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________

Business Address: ______________________________________________________
_____________________________________________________________________

Telephone No.: ______________________     Facsimile No.:  ____________________

Corporation

Name: _______________________________________________________________
   (a ________________________ Corporation*)

Federal Identification Number: _____________________________________________

Names and Titles of All Officers of the Firm:
___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________

Business Address: ______________________________________________________
_____________________________________________________________________

Telephone No.: ______________________     Facsimile No.:  ____________________

Signed By: _________________________, President    Dated: ___________________
Signed By: _________________________, Secretary    Dated: ___________________

[ Seal and Attest ]

Business Address: ______________________________________________________
_____________________________________________________________________

* A corporation receiving the award shall furnish evidence of its corporate existence
and evidence that the officer signing the Agreement and Bonds is duly authorized to
do so.
Joint Venture

Name: _______________________________________________________________

Federal Identification Number: _____________________________________________

Signed by: __________________________, Joint Venture

Date: ______________________________

Names and Titles of All Officers of the Firm:

___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________
___________________________________ ________________________________

Business Address: ______________________________________________________
_____________________________________________________________________

Telephone No.: ______________________ Facsimile No.: ____________________

Other Parties to Joint Venture:

If an Individual: _________________________________________________________
(signed)

Doing Business as: ______________________________________________________

If a Partnership: ________________________________________________________

Signed By: ___________________________ Partner

If a Corporation: ________________________________________________________
(a _______________________________________ Corporation)

By: ________________________ Date: ___________________

Title: ___________________________ (Seal and Attest)
LIST OF SUBCONTRACTORS

The Bidder is required to furnish the following information (in accordance with the provisions of Section 4100 et seq., of the Public Contract Code of the State of California and any amendments thereto) for each Subcontractor performing more than 0.5% of the Total Base Bid. Do not list alternative subcontractors for the same work. **The Bidder shall provide proof of each listed Subcontractor's current registration to perform public work pursuant to Section 1725.5 of the Labor Code of the State of California.**

<table>
<thead>
<tr>
<th>Division of Work Or Trade</th>
<th>Name of Subcontractor</th>
<th>CA License &amp; Registration Nos.</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CA License No.:</td>
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<td>CA Registration No.:</td>
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EQUIPMENT/MATERIAL SOURCE INFORMATION

The name of the manufacturer of each piece of equipment listed below that will be installed in this project shall be set forth below. Only one manufacturer of each item shall be listed and all blanks shall be completed. Bidder agrees that in the event any so listed manufacturer is not specifically named in the Contract Documents, it will, prior to award, submit complete information satisfactory to the Engineer that such manufacturer's equipment complies with all requirements of the Contract Documents. If, in the opinion of the Engineer, the so listed manufacturer's equipment does not comply with the Contract Documents, the bid may be rejected unless, prior to award, the Bidder, agrees in writing to supply approved equipment without a change in the bid price.

Equipment where the name of the manufacturer or supplier is stated in the table below shall be furnished without exception. Alternative manufacturers or suppliers will not be accepted.

<table>
<thead>
<tr>
<th>Section</th>
<th>Equipment</th>
<th>Manufacturer or Supplier</th>
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<tbody>
<tr>
<td>02636</td>
<td>Fiberglass Reinforced Polymer Mortar Pipe</td>
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<tr>
<td>02637</td>
<td>High Density Polyethylene Pipe</td>
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<tr>
<td>15062</td>
<td>Steel Pipe</td>
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<tr>
<td>15102</td>
<td>Eccentric Plug Valves</td>
<td></td>
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<tr>
<td>15108</td>
<td>Vacuum Valves</td>
<td></td>
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</tbody>
</table>
NONCOLLUSION DECLARATION TO BE EXECUTED BY BIDDER
AND
SUBMITTED WITH BID

The undersigned declares:

I am the ________________________ of _________________________ _____,
the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person,
partnership, company, association, organization, or corporation. The bid is genuine and
not collusive or sham. The bidder has not directly or indirectly induced or solicited any
other bidder to put in a false or sham bid. The bidder has not directly or indirectly
colluded, conspired, connived, or agreed with any bidder or anyone else to put in a
sham bid, or to refrain from bidding. 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. All statements contained in the bid are
ture. 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, to any corporation, partnership, company, association, organization, bid
depository, or to any member or agent thereof, to effectuate a collusive or sham bid,
and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation,
partnership, joint venture, limited liability company, limited liability partnership, or any
other entity, hereby represents that he or she has full power to execute, and does
execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that
the foregoing is true and correct and that this declaration is executed on
______________ (date, at _______________________________(city), ______ (state).

Signature

Print Name

Title
BID BOND

KNOW ALL PERSONS BY THESE PRESENTS,

That ________________________________________________, as Principal, and _______________________________________________, as Surety, are held and firmly bound unto the ORANGE COUNTY WATER DISTRICT, hereinafter called "District," in the sum of ___________________________________________________________ Dollars ($__________________), (not less than ten percent [10%] of the total amount of the bid) for 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 District to perform all work required under the bidding schedule of the District's Contract Documents, entitled: Groundwater Replenishment System Final Expansion Plant 2 Secondary Effluent Pipeline Rehabilitation Project, Contract No. GWRS-2020-01;

NOW THEREFORE, if said Principal is awarded a contract by said District and within the time and in the manner required under the heading "Information for Bidders," bound with said Contract Documents, enters into a written contract on the form of "Agreement," bound with said Contract Documents, and furnishes the required bonds, to guarantee faithful performance and payment of labor and material, and furnishes certificates as evidence of required insurance coverage, 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 District and judgment is recovered, said Surety shall pay all costs incurred by said District in such suit, including reasonable attorney fees to be fixed by the Court.

SIGNED AND SEALED, this _______ day of _______________________, 20 _______

Surety                                             (Seal) Principal                                      (Seal)
By: ______________________________ By ____________________________
(Name and Title)                  (Name and Title)

(Mailing Address of Surety) (Mailing Address of Principal)

(NOTARIAL ACKNOWLEDGMENT OF SURETY)  
(NOTARIAL ACKNOWLEDGMENT OF PRINCIPAL)

ORANGE COUNTY WATER DISTRICT  
APPROVED AS TO FORM: GENERAL COUNSEL

By: ______________________________
Dated: ___________________________
CONTRACTOR'S LICENSE DECLARATION

(Business and Professions Code Section 7028.15)

The undersigned declares that he or she is ________________________________ of _____________________________, the party making the foregoing Bid (hereinafter, the "Bidder").

1. Bidder's Contractors License Number is as follows: ________________________.

2. The expiration date of Bidder's Contractor's License is _________________, 20__.

3. Bidder acknowledges that Section 7028.15(e) of the Business and Professions Code provides as follows:

"Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a contractor who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the contractor was properly licensed when the contractor submitted the bid."

The undersigned declares under penalty of perjury that the foregoing is true and correct.

Executed on ____________________, 20______, at ____________________________________________________________________

(Insert city and state where declaration signed).

________________________________________________________________________

Signature

________________________________________________________________________

Typed Name

________________________________________________________________________

Title

________________________________________________________________________

Name of Bidder
FIRM’S EXPERIENCE

Furnish the following information:

Number of years as a Contractor in construction work of this type: ________

The following should contain information relative to the Work as described for this contract:

1. Work Performed for: ________________________________  (Name of Company/Agency)
   Address: ________________________________
   Telephone No.: _______________ Contact: ________________________________
   Type of Project: ________________________________
   Date Work Performed: _______________ Contract Amount: _______________

2. Work Performed for: ________________________________  (Name of Company/Agency)
   Address: ________________________________
   Telephone No.: _______________ Contact: ________________________________
   Type of Project: ________________________________
   Date Work Performed: _______________ Contract Amount: _______________

3. Work Performed for: ________________________________  (Name of Company/Agency)
   Address: ________________________________
   Telephone No.: _______________ Contact: ________________________________
   Type of Project: ________________________________
   Date Work Performed: _______________ Contract Amount: _______________
FIRM’S REFERENCES

The following should contain persons or entities familiar with the Bidder’s Work:

1. Work Performed for: _______________________________________________(Name of Company/Agency)
   Address: _____________________________________________________________
   Telephone No.: _______________ Contact: _______________________________
   Type of Project: _______________________________________________________
   Date Work Performed: _______________ Contract Amount: _______________

2. Work Performed for: _______________________________________________(Name of Company/Agency)
   Address: _____________________________________________________________
   Telephone No.: _______________ Contact: _______________________________
   Type of Project: _______________________________________________________
   Date Work Performed: _______________ Contract Amount: _______________

3. Work Performed for: _______________________________________________(Name of Company/Agency)
   Address: _____________________________________________________________
   Telephone No.: _______________ Contact: _______________________________
   Type of Project: _______________________________________________________
   Date Work Performed: _______________ Contract Amount: _______________
CONTRACTOR SAFETY PROGRAM

The following form must be fully completed by the Contractor and included with this Bid Proposal. Failure to complete any of the items of the form may render the bid as being nonresponsive and it will not be considered for award.

Exhibit H – Contractor Required Information Forms (Parts 1 & 2 to be included in Bid Proposal package and completed in its entirety and submitted by proposing Contractor in Bid Proposal package. Note: Part 3 will be completed by OCWD).
AGREEMENT

This Agreement, made and entered into as of _________________________, 2020, by and between Orange County Water District, a political subdivision, organized and existing in the County of Orange under and by virtue of the laws of the State of California (hereinafter designated as the "District"); and ____________________________________________________________ (hereinafter designated as the "Contractor"), to enter into the contract for Groundwater Replenishment System Final Expansion Plant 2 Secondary Effluent Pipeline Rehabilitation Project, Contract No. GWRS-2020-01;

WITNESSETH: That the parties hereto have mutually covenanted and agreed and by these presents do covenant and agree with each other as follows:

ARTICLE I

The Contract Documents consist of the Notice Inviting Bids; the Information for Bidders; the Insurance Conditions; the accepted Bid; the Examination of Proposed Work; the Summary and Bid Schedule; the Firm Identification; the List of Subcontractors; the Equipment/Material Source Information; the Noncollusion Declaration to be Executed by Bidder and Submitted with Bid; the Bid Bond; the Contractor’s License Declaration; the Firm’s Experience; the Firm’s References; the Electrical Subcontractor’s License Declaration; the Electrical Subcontractor Experience; the Selected Disadvantaged Business Enterprise Forms 6100-3 and 6100-4; the Contractor Safety Program; this Agreement; the Faithful Performance Bond; the Labor and Materials Bond; the Escrow Agreement for Security Deposits in Lieu of Retention; the General Provisions; the Special Provisions; the Technical Specifications; the Compliance Guidelines For Clean Water State Revolving Fund (CWSRF) Program Disadvantaged Business Enterprise (DBE) and Approval of Award (AOA); the California State Water Resources Control Board – Clean Water State Revolving Fund Davis Bacon Requirements; the Plans and Specifications; Subsurface Geotechnical Investigation Report; Environmental Impact Report; Mitigated Negative Declaration; and any Addenda issued prior to the submittal of the Bid. Also included shall be any and all Change Orders or supplemental written agreements approved as required by these Contract Documents amending the scope or cost or extending the time of completion of the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner.

ARTICLE II

For and in consideration of the payments and agreements to be made and performed by the District as set forth in the Contract Documents, the Contractor agrees to construct the public work herein described, for which award of contract was made, to furnish at its own cost and expense all tools, equipment, services, labor and materials necessary therefore, and to do everything required by said Contract Documents.

ARTICLE III
For furnishing all said services and materials, furnishing and removing all plant, temporary work or structures, tools and equipment, and doing all the work contemplated and embraced in this Agreement, and for well and faithfully completing the work and the whole thereof within the stipulated time and in the manner shown and described in said documents and in accordance with the requirements of the Engineer under them, the District will pay and the Contractor will receive in full compensation thereof, the prices set forth by the Contractor in the accepted Bid.

ARTICLE IV

The District hereby promises and agrees with the Contractor to employ, and does hereby employ, the Contractor to provide the material and to do the work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby contracts to pay the same at the time and in the manner and upon the conditions set forth in the Contract Documents. The parties hereto for themselves, their heirs, executors, administrators, successors and assigns do hereby agree to the full performance of the covenants herein contained.

ARTICLE V

No work, services, material or equipment shall be performed or furnished under this Agreement unless and until a Notice to Proceed has been given to the Contractor by the District, and all bonds and certificates of insurance have been furnished to, and approved by, the District.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed the day and year first above written.

ORANGE COUNTY WATER DISTRICT

By: ____________________________
Vicente Sarmiento, Esq., President

By: ____________________________
Michael R. Markus, P.E., D.WRE
General Manager

CONTRACTOR

_______________________________
(Name of Firm)

By: ____________________________
Signature, Corporate Officer

By: ____________________________
Printed Name, Title

By: ____________________________
Signature, Corporate Officer

By: ____________________________
Printed Name, Title

APPROVED AS TO FORM
GENERAL COUNSEL

By: ____________________________

Dated: __________________________
FAITHFUL PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: That

WHEREAS, the Orange County Water District, by Resolution No.__________, passed _________________, 2 ______ , has awarded to ______________ ________________ (hereinafter designated as the "Principal"), a contract for:

Groundwater Replenishment System Final Expansion
Plant 2 Secondary Effluent Pipeline Rehabilitation Project
Contract No. GWRS-2020-01; and

WHEREAS, said Principal is required under the terms of said contract to furnish a bond for the faithful performance of said contract.

NOW, THEREFORE, we _________________________________________, as Principal, and ____ ______________________________________________, as Surety, are held and firmly bound unto the Orange County Water District (hereinafter called the "District"), in the sum of ________________________________ Dollars ($_________________) (this amount being not less than one hundred percent (100%) of the total bid price of the contract awarded by the District to the Principal), lawful money of the United States of America, for payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if the hereby bonded Principal, its heirs, executors, administrators, successors, or assigns, shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions, and agreements in the said contract and any alteration thereof, made as therein provided, including, but not limited to, the provisions regarding contract duration and liquidated damages, all within the time and in the manner therein designated in all respects according to their true intent and meaning, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a condition precedent to the satisfactory completion of the Contract, the above obligation shall hold good for a period of one (1) year after the acceptance of the Work by District, during which time if Principal shall fail to make full, complete, and satisfactory repair and replacements and totally protect the District from loss or damage made evident during the period of one (1) year from the date of acceptance of the Work, and resulting from or caused by defective materials or faulty workmanship, the above obligation in penal sum thereof shall remain in full force and effect. However, nothing in this paragraph to the contrary notwithstanding, the obligation of Surety hereunder shall continue so long as any obligation of principal remains.
Whenever Principal shall be, and is declared by the District to be, in default under the Contract, the District having performed the District's obligations thereunder, the Surety shall promptly either remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions; or

2. Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible Bidder, arrange for a contract between such Bidder and the District, and make available as Work progresses (even though there should be a default or succession of defaults under the Contract or Contracts of completion arranged under this Paragraph) sufficient funds to pay the cost of completion less the balance of the contract price, but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in the first executory Paragraph hereof. The term "balance of the contract price" as used in this Paragraph shall mean the total amount payable to Principal by the District under the Contract and any modifications thereto, less the amount properly paid by the District to the Principal.

Surety expressly agrees that the District may reject any contractor or subcontractor (in accordance with the Contract Documents for this Contract) that may be proposed by Surety in fulfillment of its obligations in the event of default by the Principal.

Surety shall not utilize Principal in completing the Contract nor shall Surety accept a Bid from Principal for completion of the Work if the District, when declaring the Principal in default, notifies Surety of the District's objection to Principal's further participation in the completion of the Work.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the District named herein or the successors or assigns of the District.

Surety and Contractor shall provide District notice thirty (30) calendar days prior to any modification, renewal, or termination of this bond.

FURTHER, the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or modification of the contract documents, or of the work to be performed thereunder, shall in any way affect its obligations on this bond; and it does hereby waive notice of any change, extension of time, alteration or modification of the contract documents or of work to be performed thereunder.
IN WITNESS WHEREOF, two (2) identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety named therein, on the _____ day of ______________, 20____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

Surety (Seal)  Principal (Seal)

By: ___________________________ By: _____________________________
(Name and Title)            (Name and Title)

(Mailing Address of Surety) (Mailing Address of Principal)

(ATTACH NOTARIAL ACKNOWLEDGMENT OF SURETY) (ATTACH NOTARIAL ACKNOWLEDGMENT OF PRINCIPAL)

APPROVED AS TO FORM:

GENERAL COUNSEL ORANGE COUNTY WATER DISTRICT

By: ___________________________

Dated: __________________________
LABOR AND MATERIALS BOND

KNOW ALL PERSONS BY THESE PRESENTS: That

WHEREAS, the Orange County Water District, by Resolution No._______, passed ________________, 20 ____, has awarded to ________________________________ (hereinafter designated as the "Principal"), a contract for:

Groundwater Replenishment System Final Expansion
Plant 2 Secondary Effluent Pipeline Rehabilitation Project
Contract No. GWRS-2020-01;

WHEREAS, said Principal is required under the terms of said contract to furnish a bond as security for the payment of labor and materials, equipment or other supplies in connection with the performance of said contract.

NOW, THEREFORE, WE, ________________________________________________, as Principal, and _____________________________________________________, as surety, are held and firmly bound unto the Orange County Water District (hereinafter called the "District"), in the sum of ______________________________________________________________________ Dollars ($_______ ____ ) (this amount being not less than one hundred percent (100%) of the total bid price of the contract awarded by the District to the Principal), lawful money of the United States of America, for payment of such sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and assigns, jointly and severally by these presents.

If said Principal, or any subcontractor of said Principal, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, or for amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the State of California Employment Development Department, said surety will pay the same in the amount not exceeding the sum specified above, and, in the event suit is brought upon this bond, reasonable attorney fees to be fixed by the court. This bond shall inure to the benefit of the District and of any persons, companies, or corporations, or their respective assigns, entitled to file claims under applicable State law, including, but not limited to, California Civil Code Section 9100.

Surety and Contractor shall provide District notice thirty (30) calendar days prior to any modification, renewal, or termination of this bond.
PROVIDED, that any alterations in the work to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of said contract, shall not in any way release either said Principal or said Surety thereunder, nor shall any extensions of time granted under the provision of said contract release either said Principal or said Surety, and notice of such alterations or extensions of the contract is hereby waived by said Surety.

IN WITNESS WHEREOF, two identical counterparts of this instrument, each of which shall for all purposes be deemed an original thereof, have been duly executed by the Principal and Surety named herein, on the ______ day of ________________, 2_____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

______________________________ ______________________________
Surety                  (Seal) Principal               (Seal)
By: _____________________________ By: ____________________________
    (Name and Title)            (Name and Title)

________________________________ _______________________________
________________________________ _______________________________
________________________________ _______________________________

(Mailing Address of Surety) (Mailing Address of Principal)

(ATTACH NOTARIAL ACKNOWLEDGMENT OF SURETY) (ATTACH NOTARIAL ACKNOWLEDGMENT OF PRINCIPAL)

APPROVED AS TO FORM:
GENERAL COUNSEL
ORANGE COUNTY WATER DISTRICT

By: _____________________________
Dated: __________________________
ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between ______________________________________________________________ whose address is 18700 Ward Street, Fountain Valley, CA 92708, hereinafter called “Owner,” _________________________________________________________ whose address is _____________________________________, hereinafter called “Contractor” and _________________________________________________________ whose address is __________________________________________, hereinafter called “Escrow Agent.”

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to Section 22300 of the California Public Contract Code, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Contract Agreement entered into between the Owner and Contractor for Groundwater Replenishment System Final Expansion Plant 2 Secondary Effluent Pipeline Rehabilitation Project, Contract No. GWR2-2020-01 in the amount of __________________________________, dated __________ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 calendar days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of __________________________________ and shall designate the Contractor as the beneficial owner.

2. The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

3. When the Owner makes payments of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the
Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven calendar days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all monies and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections 5 to 8, inclusive, of this agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner, and on behalf of Contractor, in connection with the foregoing, and exemplars of their respective signatures are as follows:

<table>
<thead>
<tr>
<th>On behalf of Owner:</th>
<th>On behalf of Contractor:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Title</td>
</tr>
<tr>
<td>Name</td>
<td>Name</td>
</tr>
<tr>
<td>Signature</td>
<td>Signature</td>
</tr>
<tr>
<td>18700 Ward Street</td>
<td></td>
</tr>
<tr>
<td>Fountain Valley, CA 92708</td>
<td>Address</td>
</tr>
</tbody>
</table>
On behalf of Escrow Agent:

_____________________________________
Title

_____________________________________
Name

_____________________________________
Signature

_____________________________________
Address


At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

OWNER:  

_____________________________________
Title

_____________________________________
Name

_____________________________________
Signature


CONTRACTOR: 

_____________________________________
Title

_____________________________________
Name

_____________________________________
Signature

APPROVED AS TO FORM:

GENERAL COUNSEL FOR
ORANGE COUNTY WATER DISTRICT

By: ___________________________

ESCROW AGENT:

_____________________________________
Title

_____________________________________
Name

_____________________________________
Signature
GENERAL PROVISIONS
GENERAL PROVISIONS

SECTION 1. INTENT

The Contract Documents are complementary, and what is called for by one part shall be as binding as if called for by all. The intent of the Contract Documents is to include all Work consistent therewith and reasonably inferable therefrom as being necessary for completion of the contract and to provide a functionally complete project. The Contract Documents intend to include all items necessary for the proper execution and completion of the Work. Materials or Work described in words that indicate the proper execution and a well-known technical or trade designation shall be held to refer to such recognized standards.

It is understood and agreed that the written terms and provisions of the Contract Documents represent the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.

SECTION 2. PRECEDENCE OF CONTRACT DOCUMENTS

In resolving inconsistencies or ambiguities among two (2) or more components of the Contract Documents, highest precedence shall be given to the Agreement and decreasing order as follows:

A. Agreement
B. Special Provisions
C. General Provisions
D. Specifications
E. Drawings
F. Standard Plans
G. Standard Specifications
H. Reference Specifications
I. Reference Drawings

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.
In the event of a conflict between an accepted schedule or schedule update and a specific requirement of these Contract Documents, the Contract Documents shall, at all time, have precedence. Acceptance of a schedule or schedule update shall not waive any requirements of the Contract Documents.

SECTION 3. DEFINITIONS OF TERMS

Whenever the following terms, or pronouns used in their stead, occur in these Contract Documents, or in any documents where these Contract Documents govern, the intent and meaning shall be interpreted, unless expressly provided to the contrary, as follows:

A. **Acceptance** - Acceptance means final acceptance of the Work by formal action of the Board of Directors, upon completion of all portions of the Work as evidenced by certification from the Engineer to the Board.

B. **Accepted Bid** - The Bid accepted by the District.

C. **Addenda** - Written or graphic instruments issued prior to the bid opening which modify, clarify or interpret the Contract Documents by additions, deletions, or corrections.

D. **Award** - The formal acceptance of the Bid by the District.

E. **Bid** - The offer or bid of the Bidder for the Work when properly completed, signed, guaranteed and submitted in accordance with the Contract Documents.

F. **Bidder** - Any individual, firm or corporation submitting a Bid for the Work contemplated, acting directly or through a duly authorized representative.

G. **Board of Directors** - Board of Directors of the Orange County Water District.

H. **Change Order** - A written order issued by the Engineer to the Contractor authorizing an addition, deletion or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.

I. **Contract** - The written Agreement executed between the District and the Contractor.

J. **Contract Documents** - The Contract Documents consist of the Notice Inviting Bids, the Information for Bidders, the Insurance Conditions, the Bid, the Examination of Proposed Work, the Summary and Bid Schedule, the Firm Identification, the List of Subcontractors, the Equipment/Material Source Information, the Noncollusion Affidavit to be Executed by Bidder and Submitted With Bid, the Bid Bond, the Contractor's License Declaration, the Firm's Experience, the Firm's References, the Contractor Safety Program; the Agreement, the Faithful Performance Bond, the Labor and Materials Bond, the
Escrow Agreement for Security Deposits in Lieu of Retention, the General Provisions, the Special Provisions, the Technical Specifications, the Plans and Specifications, the subsurface or geotechnical investigations report, and any Addenda issued prior to the submittal of the Bid. Also included shall be any and all Change Orders or supplemental written agreements approved as required by these Contract Documents amending the scope or cost or extending the time of completion of the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner.

K. Contract Time - The number of calendar days for completion of the Work, including time extensions authorized by executed Change Orders. In case a calendar date of completion is specified in the proposal in lieu of the number of calendar days, the Work shall be completed by the specified date.

L. Contractor - The individual, firm or corporation entering into Contract with the District for the performance of Work required by these Contract Documents.

M. Days - When used to designate a period of time, shall mean consecutive calendar days.

N. Defective - An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to the Engineer's recommendation of final payment.

O. District or Owner - Orange County Water District.

P. Drawing Clarification/Plan Clarification: An answer from the District, in response to an inquiry from the Contractor, intended to make the requirement(s) of the drawings or plans clearly understood. Drawing clarifications or plan clarifications may be sketches, drawings or in narrative form and will not change any requirements of the drawings or plans. Responses to Contractor inquiries shall be as outlined in the Section entitled Requests for Information of these General Provisions.

Q. Engineer - District Engineer, District Geologist, or person, consultant or other authorized to act for District Engineer or District Geologist.

R. Inspector - Any person acting on behalf of the Engineer to perform inspection during construction of the Work.

S. Laboratory - The designated laboratory authorized by the Engineer and/or District to test materials and work involved in the Contract.

T. Legal Address of Contractor - The address given on the Contractor's bid is hereby designated as the place to which all notices, letters or other
communications to the Contractor shall be mailed or delivered. The Contractor may change this address by submitting a written notice of change of address to the District. Any such change of address shall not be deemed effective until acknowledged by the District in writing.

U. Non-Conformance Notice - A notice issued by the Engineer documenting that the Work, or some portion thereof, has not been performed in accordance with the requirements of the Contract Documents. Payment shall not be made on any portion of the work for which a Non-Conformance Notice has been issued and the work not corrected to the satisfaction of the owner. Upon receipt of a Non-Conformance Notice the Contractor shall provide a written Response to Non-Conformance Notice within five (5) working days after receipt of the Notice. The Contractor’s response shall detail either (a) why they believe that the Work was performed in accordance with the Contract Documents or (b) what corrective action they intend to take and the timeframe for completing such action, at their sole expense, to correct the non-conforming Work. Such responses shall not be identified as Requests for Information. If the Contractor disputes issuance of the Notice the Engineer has five (5) working days in which to respond by either (a) withdrawing the Notice of Non-Conformance or (b) directing the Contractor to correct the Work. Such determination by the Engineer shall be final and conclusive of the matter. If directed to correct the work, the Contractor shall commence doing so within five (5) working days after receipt of such direction from the Engineer, or such other time as may be agreed to with the Engineer and such corrective Work shall be accomplished in accordance with the requirements of the Section entitled Correction of Defective Work of these General Provisions.

V. Notice of Award - A written communication issued by the District to the apparent successful Bidder, stating that upon compliance by the apparent successful Bidder with the terms and conditions set forth therein and in the Contract Documents, within the time specified, the District will execute and deliver the Agreement.

W. Notice to Proceed - A written communication issued by the District to the Contractor, authorizing the Contractor to proceed with the Work required under the Contract Documents and establishing the date of commencement of the Work.

X. Plans - The official plans, working drawings, detail drawings, profiles, typical cross-sections and supplemental drawings, or exact reproductions thereof, approved by the Engineer, which show the locations, character, dimension, and details of the Work to be done.

Y. Project Communications - Routine written communications between the District and the Contractor shall be in letter, field memo or fax format. Such communications shall not be identified as Requests for Information nor shall they substitute for any other written requirement pursuant to the provisions of these
Z. **Requests for Information** - A written request from the Contractor or one of their subcontractors, to the Engineer, seeking an interpretation or a clarification of some requirement of the Contract Documents. The Contractor shall clearly and concisely set forth the issue for which they seek clarification or interpretation and why a response is needed from the Engineer. The Contractor shall, in the written request, set forth their interpretation or understanding of the contract requirements along with reasons why they have reached such an understanding. Responses from the Engineer will not change any requirements of the Contract Documents unless so noted in the Request for Information Response by the Engineer. Responses to contractor inquiries shall be as outlined in the Section entitled **Requests for Information** of these General Provisions.

AA. **Schedule Submittals** - When required by the Scheduling requirements of the Special Provisions of these Contract Documents, the Contractor shall submit to the District required schedules, schedule updates, schedule revisions, time impact analyses, etc. for review and acceptance. Such submittals shall not be identified as Requests for Information.

BB. **Specifications** - The official specifications, approved by the Engineer, which provide the directions, provisions, and requirements pertaining to the method and manner of performing the Work, and to the qualities and quantities of materials to be furnished under the Contract.

CC. **Subcontractor** - An individual, firm, or corporation supplying labor or labor and materials at the site of the Work as a part of the Contractor's obligation under the Contract.

DD. **Submittals/Shop Drawings** - When required by any technical specification included in these Contract Documents, the Contractor shall transmit to the Engineer technical submittals, shop drawings or samples, including supporting catalogue cuts, manufacturer’s literature, sketches or drawings, calculations, and other pertinent data, in sufficient detail to enable the Engineer to review the information and determine that the Contractor clearly understands the requirements of the Contract Documents. Such submittals shall not be identified as Requests for Information.

EE. **Substitution/Or Equal Submittals** - A written request from the Contractor to substitute a material, article, device, product, fixture, form, and type of construction or process called for in the Contract Documents with another item, which shall be substantially equal in all respects to that so indicated or supplied. Such submittals shall not be identified as Requests for Information.

FF. **Supplier** – An individual, organization or firm who is not required for the purposes of the Work to be licensed as a Contractor, subcontractor, or sub-subcontractor,
who provides equipment and/or materials for the Work, including that fabricated to a special design, but who does not perform labor at the site except for labor or labor supervision required by some manufacturers as part of their equipment installation for warranty or other purposes or for operation of rented equipment. The term “supplier” also includes a fabricator, manufacturer or vendor.

GG. **Surety** - Any person, firm, or corporation that executes as Surety the Contractor's Faithful Performance Bond, the Contractor's Labor and Material Bond or the Contractor's Bid Bond.

HH. **Work** - The entire improvement proposed by the District to be constructed in whole, or in part, pursuant to the Contract.

II. **Definitions** - Whenever in the Contract Documents, the words directed, required, permitted, ordered, designated, prescribed, or words of like import are used, it shall be understood that the directions, requirements, permission, order, designation, or prescription of the Engineer is intended; and similarly the words approved, acceptable, satisfactory or words of like import shall mean approved by, or acceptable to, or satisfactory to the Engineer, unless otherwise expressly stated.

**SECTION 4  SCOPE OF WORK**

A. **Work to be Done** - The Work to be done consists of furnishing all labor, materials, methods or processes, implements, tools, and machinery necessary for and appurtenant to the construction and completion of the Work in accordance with the Contract Documents, and to leave the construction site in a neat, clean and orderly condition.

B. **Progress Schedule** - The Contractor shall submit work schedules as specified, in the Special Provisions. The Contractor shall assume the full responsibility for performing the Work in an orderly procedure under the Contract Documents.

C. **Estimated Quantities** - Quantities of Work to be done and materials to be furnished under this Contract are estimated, as herein stated, approximately only. In the event that any original quantity of Work changes by more than twenty-five percent (25%), either increase or decrease, then either the District or the Contractor may request, in writing, a review of the price of such Work (including both unit price and lump sum price) to determine if a new price shall be mutually determined by negotiation. Any new price shall apply only to the units in excess of one hundred twenty five percent (125%) of the originally estimated quantity shown in the bid documents for overruns, or to the units below seventy five percent (75%) of the original quantity for underruns.

D. **Verification of Work and Site** - Before undertaking the Work, the Contractor shall carefully study and compare the Contract Documents for any discrepancies, inconsistencies, ambiguities, conflicts, or other errors in them or between the
Contract Documents and the site conditions, and check and verify all figures, dimensions, and quantities shown thereon and all field measurements and actual site conditions. The Contractor shall at once report in writing to the District any error, which it may discover and shall not perform or construct any of the Work affected thereby until a written interpretation or clarification has been issued by the District. The Contractor assumes full responsibility for having familiarized itself with the nature and extent of the Contract Documents, the Work, locality, and local conditions that may in any manner affect the Work to be done, and represents that it has visited the site and correlated its observations with the requirements of the Contract Documents.

E. Drawings and Specifications on the Work - The Contractor shall at all times keep one (1) copy of all design and/or record drawings and specifications on the Work. These drawings and specifications shall be updated on a daily basis, maintained in good order, and made available for review by the Engineer or their representatives at all times. Upon completion of the Work, and as a condition precedent to the reduction of retainage or the Contractor's receipt of the final payment for the Work, the completed record drawings and specifications shall be submitted to the District.

F. Removal of Obstructions - The Contractor shall remove and dispose of all structures, debris, or other obstructions to the construction of the Work. Where such obstructions consist of improvements not required by law to be removed by the owner thereof, all such improvements shall be removed, maintained and permanently replaced by the Contractor at its expense.

G. Underground Services Alert - The Contractor shall comply with all of the requirements of Government Code Section 4216, et seq., and from time to time during the course of the Work, including but not limited to the notification of regional notification centers, in connection with any excavations in the course of the construction of the Work.

H. Public Utilities - As used in this Paragraph, the word "utility" shall be understood to include tracks, overhead or underground wires, cables, pipelines, conduits, ducts, sewers or storm drains. As used in this Paragraph, the term "construction interference" shall be understood to include any utility or service connection within the limits of excavation or overexcavation required for the Work under the Contract as shown or as ordered by the District, or any utility or service connection located in the space which will be required by any of the Work under the Contract.

1. In the event a utility or service connection is required to be disturbed or removed to permit construction of a pipeline or other structure under the Contract, such disturbance or removal shall be done only with the written approval of the District, and following notification to the owner of the interfering utility or service connection. Any such utility or service connection removed or otherwise disturbed shall be reconstructed as
promptly as possible in its original or other authorized location in a
c Condition at least as good as prior to such removal or disturbance, subject
to the inspection of the owner of same. The Contractor's responsibility
under this Section to remove or replace shall apply even in the event such
damage or destruction occurs after backfilling or is not discovered until
after completion of backfilling. The owner of the utility or service
connection shall be notified immediately after damage or destruction
occurs or is discovered.

2. During the performance of the work under this Contract, the owner of any
utility affected by the Work shall have the right to enter when necessary
upon any portion of the Work for the purpose of maintaining service and of
making changes in or repairs to said utility.

3. The Plans show the approximate positions of known utilities in the
immediate vicinity of the Work, but the District does not guarantee that all
existing utilities are shown. The Contractor, before commencing any
excavation, shall ascertain, from records or otherwise, the existence,
horizontal and vertical position, and ownership of all existing facilities and
service connections. If the Contractor discovers any utility in the line of
the Work, which is not shown on the Plans, it shall immediately notify, in
writing, the District of the existence of it. The District will not be liable for
any consequences arising as a result of a service connection being
incorrectly located in the field by the agency having jurisdiction over the
service connection.

4. Should the Contractor encounter a third party owned utility not shown or
noted on the drawings, the Contract adjustment allowed the Contractor
shall be limited to the direct costs of removing, altering, or relocating the
utility, as needed, and an excusable non-compensable time extension for
the amount of time that such extra work affects the end date of the work
past the current Contract completion date. All costs involved in removing,
relocating, protecting, supporting, repairing, maintaining or replacing a
main or trunk line utility facility which actually constitutes a construction
interference, when such utility is not shown with reasonable accuracy as
an interference or is omitted from the Plans, will be paid for by the District
as extra work; provided, however, District's obligation to repair damage to
such a facility shall not extend to damage due to the failure of the
Contractor to use reasonable care. The District will also compensate the
Contractor for equipment on the project necessarily idled during and by
reason of such work. The Contractor shall not be entitled to damages or
additional payment for delays attributable to such additional work as is
required for removing, relocating, or altering the utilities not shown or
noted on the drawings. The District will not assess liquidated damages for
this amount of time.
5. The costs involved in removing, relocating, protecting, supporting, repairing, maintaining or replacing any utility or service connection other than those described in paragraph 4 hereof shall be borne by the Contractor.

6. The Contractor shall not be assessed liquidated damages for failure to complete the Work on time to the extent that such delay was caused by failure of the District or of the agency having jurisdiction over the utility to authorize or otherwise provide for the removal, relocation, protection, support, repair, maintenance or replacement of a main or trunk line utility facility described in paragraph 4 hereof, on the condition that Contractor made reasonable efforts to secure such action.

7. The District reserves the right, upon determination of the actual position of existing utilities and service connections, to make changes in alignment or grade of the Work when, by so doing, the necessity for relocation of existing utilities or service connections will be avoided. Such changes will be ordered in writing by the Engineer. Where applicable, adjustment in the Contract price will be on the basis of the unit prices stated in the Bidding Schedule. Where unit prices in the Bidding Schedule are not applicable, adjustment in Contract price will be in accordance with the General Provisions.

8. In all cases, the public utility shall have the sole discretion to perform repairs or relocation work or to permit the Contractor to perform the same at a reasonable price.

I. Differing Site Conditions - Pursuant to Section 7104 of the California Public Contract Code, the provisions of this section shall apply whenever the Work involves digging trenches or other excavations that extend deeper than four (4) feet below the surface.

1. The Contractor shall promptly, on the date of discovery (verbally) and within one (1) day (in writing), and before the following conditions are disturbed, notify the District, in writing, of any:

   a. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law;

   b. Subsurface or latent physical conditions at the site differing from those indicated; or

   c. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally
recognized as inherent in work of the character provided for in the contract.

2. The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work, shall issue a change order under the procedures described in the Contract Documents.

3. In the event that a dispute arises between the District and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for by the Contract Documents, but shall proceed with all work to be performed under the Contract Documents. The Contractor shall retain any and all rights provided either by the Contract Documents or by law, which pertain to the resolution of disputes and protests between the contracting parties.

4. If the Contractor intends to assert a claim for equitable adjustment under this section, it must, within twenty (20) days after receipt of a determination from the Engineer as to whether a differing site condition exists, submit a written statement setting forth the nature and monetary extent of such claim and all factual grounds. Failure to comply with the notice requirement shall be deemed waiver of claim by the Contractor. The Contractor shall, within forty five (45) days after overcoming the differing site condition, file with the Engineer its complete claim, including all costs and all time requested.

5. No claim of the Contractor under this section shall be allowed if asserted after final payment under this contract.

SECTION 5. CHANGES IN WORK

A. Changes Initiated by the District - The District may, at any time, without notice to Sureties, by written order designated or indicated to be a Change Order, make any change in the Work, within the general scope of the contract, including but not limited to, changes in the specifications, including plans and designs; in the time of performance of the Work; in the means, methods or manner of performance of the Work; in District furnished facilities, equipment, materials, services, or site; or directing acceleration in the performance of the Work. Change Orders shall be in writing and in the form bound herein, and state the dollar value of the change or establish method of payment, any adjustments in Contract time, and, when negotiated prices are involved, shall provide for the Contractor's signature indicating its acceptance. Upon receipt of a Change Order, the Contractor shall promptly proceed with the Work covered thereby, which shall
be performed in strict accordance with the provisions of the Contract Documents except as otherwise specifically provided.

A Change Order shall also be any other written order, including direction, instruction, interpretation or determination, from the Engineer, which causes any change, provided the Contractor gives the Engineer written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a Change Order.

Should a change be required and it is not feasible to delay construction of that portion of the Work until such time as a Change Order can be issued or if the Engineer and the Contractor cannot reach agreement on the cost or time to perform such changed Work, written direction to proceed with the change shall be issued by the Engineer to the Contractor who shall then proceed with the changed Work without delay.

Except as provided in this section, no order, statement or conduct of the Engineer shall be treated as a change under these Contract Documents or shall entitle the Contractor to an equitable adjustment.

If any change under this section causes an increase or decrease in the Contractor’s cost or time required to perform any part of the Work under this contract, the Engineer will make an equitable adjustment and modify the contract in writing. Except for claims based on defective specifications, no claim for any change under this section shall be allowed for any cost incurred more than twenty (20) days before the Contractor gave written notice. In the case of defective specifications, the equitable adjustment shall include any increased cost the Contractor reasonably incurred in attempting to comply with the defective specifications.

If the Contractor intends to assert a claim for an equitable adjustment under this section, it must, within twenty (20) days after receipt of a written Change Order or the furnishing of a written notice, submit a written statement to the Engineer setting forth the general nature and monetary extent of such claim and all factual grounds therefor. The Contractor may include the statement of claim in the written notice. Failure to comply with the twenty (20) day notice requirement shall be deemed a waiver of claim by the Contractor. If the changed Work is performed pursuant to a directive to proceed from the Engineer, without issuance of a Change Order, the Contractor shall, within forty five (45) days after completing the changed Work, file with the Engineer its complete claim, including all costs and all time requested.

No adjustment shall be made under this section for any suspension, delay, interruption, change or any other cause, to the extent that an equitable adjustment is provided for or excluded under any other provision of the Contract. No claim by the Contractor shall be allowed if the claim is made after final payment under this contract.
B. **Payment for Changes** - Changes in, additions to, or deductions from the Work, including increases or decreases in the quantity or cost of any item or portion of the Work, or the time to perform such Work, shall be set forth in a written Change Order which shall specify:

1. The changes, additions, and deductions to be made.

2. The increase or decrease in compensation due the Contractor, if any.

3. Adjustment in the time of completion, if any. Extensions to the Contract Time will be made in writing and only if and to the extent that the acceptable causes of delay affect the prosecution of work having a direct effect on the critical sequence of performance (critical path) required to complete the Contract within the Contract Time.

All change orders shall be executed on the Change Order form bound herein. No additions or deletions to this form shall be allowed.
CHANGE ORDER FORM

Pursuant to this section of the General Provisions, the Contractor shall use this Change Order Form for all Change Orders associated with the Work. No additions or deletions to this form shall be allowed.

<table>
<thead>
<tr>
<th>CHANGE ORDER NO.</th>
<th>CONTRACT NO.</th>
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<tbody>
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TO:
You are hereby directed to provide the extra work necessary to comply with this Change Order.

DESCRIPTION OF CHANGE:

PAYMENT:

CONTRACT TIME:

ACCEPTANCE:
Contractor accepts the terms and conditions stated above as full and final settlement of any and all claims arising from this Change Order and acknowledges that the compensation (time and cost) set forth in the Change Order comprises the total compensation due for the work or change defined in the Change Order, including all impact on any unchanged work. By signing the Change Order, the Contractor acknowledges and agrees that the stipulated compensation includes payment for all Work contained in the Change Order, plus all payment for the interruption of schedules, extended overhead costs, delay, and all impact, ripple effect or cumulative impact on all other Work under this Contract. The signing of the Change Order acknowledges full mutual accord and satisfaction for the change, and that the time and/or cost under the Change Order constitute the total equitable adjustment owed the Contractor as a result of the change. The Contractor agrees to waive all rights, without exception or reservation of any kind whatsoever, to file any further claim or request for equitable adjustment of any type, for any reasonably foreseeable cause that shall arise out of or as a result of this Change Order or the impact of this Change Order on the remainder of the Work under this contract.

Contractor agrees to perform the above-described work in accordance with the above terms and in compliance with applicable sections of the Contract Documents.

This Change Order is hereby agreed to, accepted and approved, all in accordance with the General Provisions of the Contract Documents.

<table>
<thead>
<tr>
<th>ORANGE COUNTY WATER DISTRICT</th>
<th>CONTRACTOR</th>
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<td>Project Manager</td>
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<td>By: ________________________</td>
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<td>Director of Engineering</td>
<td>Date</td>
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<td>By: ________________________</td>
<td>By: ________</td>
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<tr>
<td>Executive Director of Engineering and Local Resources</td>
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<td>By: ________________________</td>
<td>By: ________</td>
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<tr>
<td>General Manager</td>
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C. **Method of Adjustments to Compensation Due the Contractor** - Adjustment in the compensation due the Contractor shall be determined by one or more of the following methods in the order of precedence listed below:

1. **Unit prices** contained in the Accepted Bid.

2. **Mutually agreeable lump sum or unit prices.** If requested by the District, the Contractor shall furnish an itemized breakdown of the quantities and prices used in computing proposed lump sum and unit prices in accordance with Subsection 3 below.

3. **Force account** whereby the Contractor is compensated for furnishing labor, materials, tools, and equipment as follows:

   a. **Cost of labor plus 15 percent** for workers directly engaged in the performance of the work. Cost of labor shall include actual wages paid, including employer payments to or on behalf of such workers for health and welfare, pension, vacation, and similar purposes, plus payments imposed on payroll amounts by state and federal laws, plus subsistence and travel allowance payments to such workers.

   b. **Cost of material plus 15 percent.** Cost of material shall include sales tax, freight, and delivery charges. The District reserves the right to furnish such materials as it deems advisable and the Contractor shall not be paid the 15 percent markup on such materials furnished by the District.

   c. **Cost of equipment plus 15 percent.** For any machine power tools and special or heavy equipment used, the Contractor shall be paid in accordance with the latest edition of "Labor Surcharge and Equipment Rental Rates" published by the State of California, Department of Transportation. In the event that any of the equipment to be used is not shown in said schedule, the rental rate for such equipment shall be as agreed upon in writing before the work is started. Fifteen percent (15%) shall be added to such rental rates, but no allowance shall be made for the use of small tools and minor items of equipment which shall be considered as part of the overhead. As used herein, such tools and equipment are defined as individual tools or prices of equipment having a replacement value of One Thousand Dollars ($1,000) each or less.

**Equipment Haulage and Set Up Costs:** Documented and actual equipment haulage and set up costs shall be paid for, provided the Contractor can demonstrate that the equipment was brought to the site solely as a result of changed Work.
d. **Subcontractor Invoices to the Contractor Plus Fifteen Percent (15%).** Subcontractor invoices shall be based on the above-described cost of labor plus 15%, cost of material plus 15%, and tool and equipment rental rates plus 15%. No additional fixed fee shall be allowed on Work performed by sub-subcontractors or lower tiers.

e. The markups stipulated above shall be full payment to the Contractor or subcontractor for all overhead and profit, including field overhead, home office overhead, supervision, insurance and bonds.

f. **Disallowed Costs** - Costs which shall not be allowed or paid in Change Orders or claim settlements under this contract include, but are not limited to, interest cost of any type other than those mandated by statute; claim preparation or filing costs; legal expenses; the costs of preparing or reviewing proposed Change Orders or Change Order proposals concerning Change Orders which are not issued by the District; lost revenues; lost profits; lost income or earnings; rescheduling costs; costs of idled equipment when such equipment is not yet at the site or has not yet been employed on the Work; lost earnings or interest on unpaid retainage; claims consulting costs; the costs of corporate officers or staff visiting the site or participating in meetings with the District; any compensation due to the fluctuation of foreign currency conversion or exchange rates; loss of other business; or any other cost identified as an unallowable cost under the provisions of the Federal Acquisition Regulations.

For force account work, the Contractor shall submit to the Engineer for verification daily work sheets showing an itemized breakdown of labor, materials, tools, and equipment used in performing the changed Work. No payment will be made for work not verified by the Engineer. Verification by the Engineer shall only be for the purposes of determining time, labor, equipment, and materials utilized and shall not determine entitlement to claimed extra Work.

D. **Claims for Extra Work** - If the Contractor claims that any instructions involve extra cost or additional time under this contract, it shall give the District written notice thereof within forty-eight (48) hours after receipt of such instructions, and in any event, before proceeding to execute the Work. No such claims shall be valid unless written notice is delivered to the District within said forty-eight (48) hour period.

If the Contractor claims that the defective Plans and Specifications involve extra cost or additional time under this contract, it shall give the District written notice thereof within forty-eight (48) hours after the occurrence of the cost or time...
associated with such Work. No such claims shall be valid unless written notice is delivered to the District within said forty-eight (48) hour period.

E. **Acceleration** - The District reserves the right to accelerate the Work of the Contract. In the event that the District directs acceleration, such directive will be only in written form. The Contractor shall keep cost and other project records related to the acceleration directive separately from normal project costs and records and shall provide a written record of acceleration cost to the Engineer on a daily basis.

In the event that the Contractor believes that some action or inaction on the part of the District constitutes an acceleration directive, the Contractor shall immediately notify the Engineer in writing that the Contractor considers the actions an acceleration directive. This written notification shall detail the circumstances of the acceleration directive. The Contractor shall not accelerate their work efforts until the Engineer responds in writing to the written notification. If acceleration is then directed or required by the District, all cost records related to such acceleration shall be maintained by the Contractor and provided to the Engineer on a daily basis.

In order to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

SECTION 6. **CONTROL OF THE WORK**

A. **Authority of the Engineer** - The Engineer shall be represented on the Work by a duly authorized resident engineer or assistant engineer and by inspectors. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Contract Documents, including the Plans and Specifications. The Contractor shall promptly comply with instructions from the Engineer or an authorized representative.

On all questions related to the quantities, the acceptability of material, equipment or workmanship, the execution, progress or sequence of Work, the interpretation of specifications or drawings, and the acceptable fulfillment of the Contract on the part of the Contractor, the decision of the Engineer shall govern and shall be precedent to any payment under the Contract unless otherwise ordered by the Board of Directors. The progress and completion of the Work shall not be impaired or delayed by virtue of any question or dispute arising out of or related to the foregoing matters and the instructions of the Engineer relating thereto. Any such question or dispute shall be determined as provided in the Disputes section of the Contract Documents.
B. **Authority of Inspectors** - Inspectors are authorized to enforce strict compliance with the terms and conditions of the Contract Documents and determine the acceptability of materials and workmanship. Inspectors are authorized to reject work or materials if they determine that Work or materials does not conform to the requirements of the Contract Documents. Whenever an inspector determines that some work installed by the Contractor, or any subcontractor, supplier or materialman at any tier, does not conform to the requirements of the Contract Documents, a Notice of Non-Conformance will be issued to record this determination.

Inspectors are not authorized to issue or direct changes to the requirements of the Contract Documents. In the event that the Contractor believes some direction given by an inspector does constitute a change to the requirements of the Contract Documents, the Contractor shall within two (2) days provide written notice to the Engineer detailing the direction given, by whom, when and under what circumstances, and why the Contractor believes that such direction constitutes a change to the requirements of the Contract Documents. Failure to provide such written notice to the Engineer within the specified timeframe shall constitute waiver of claim with respect to the direction received by the Contractor.

Inspection of the Work does not extend to the Contractor's safety measures. The inspector, the Engineer and the District are not liable for the Contractor's jobsite safety requirements.

C. **Authority of the Board** - The Board of Directors has the final authority in all matters affecting the Work covered by the Contract. As specified in Paragraph 6A above, the Engineer has authority to determine all questions concerning the progress and completion of the Work and the Contractor shall promptly comply with the instructions and decisions of the Engineer. In accordance with the Disputes Section of the Contract Documents, the Board of Directors shall determine, after completion of the Work and prior to final payment, all questions and disputes arising out of the instructions of the Engineer. Notwithstanding the existence of any such questions or dispute the Contractor shall diligently pursue the Work to completion.

D. **Plans** - The approved Plans shall be supplemented by such working drawings as are necessary to control the Work adequately. All such drawings shall be consistent with the Contract Documents, true developments thereof, and reasonably inferable therefrom. All drawings signed by the Engineer and delivered to the Contractor shall be deemed written instructions to the Contractor.

E. **Conformity with Plans and Allowable Deviations** - Finished surfaces in all cases shall conform with the lines, elevations, grades, cross-sections and dimensions shown on tolerances, shall in all cases be determined by the Engineer.

F. **Requests for Information** - In the event that the Contractor, subcontractor or supplier, at any tier, determines that some portion of the drawings, specifications,
or other Contract Documents requires clarification or interpretation by the District, the Contractor shall submit a Request for Information in writing to the Engineer. Requests for Information may only be submitted by the Contractor and shall only be submitted on the Request for Information form provided by the Engineer. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Engineer. In the Request for Information the Contractor shall set forth their own interpretation or understanding of the requirement along with reasons why they have reached such an understanding.

The Engineer will review all Requests for Information to determine whether they are Requests for Information within the meaning of this term. If the Engineer determines that the document is not a Request for Information it will be returned to the Contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.

Responses to Requests for Information will be issued within five (5) working days of receipt of the request from the Contractor unless the Engineer determines that a longer period of time is necessary to provide an adequate response. If a longer period of time is determined necessary by the Engineer, the Engineer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. The five (5) working days referred to herein will start on the date stamped received “In From Contractor” by the Engineer and ends on the date stamped “Out to Contractor” by the Engineer. If the Contractor submits a Request for Information on an activity with five (5) working days or less of float on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Engineer to respond to the request provided that the Engineer responds within the five (5) working days set forth above.

Responses from the Engineer will not change any requirement of the Contract Documents unless so noted by the Engineer in the response to the Request for Information. In the event the Contractor believes that a response to a Request for Information will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Engineer stating that the Contractor considers the response to be a Change Order. Failure to give such written notice within forty eight (48) hours shall waive the Contractor’s right to seek additional time or cost under these Contract Documents.

G. Reference Points - The Engineer will establish reference points for vertical and horizontal control, consisting of two temporary bench marks, with elevation and coordinates for each of the two bench marks. The Contractor shall establish all other lines and grades necessary for the execution of the Work. The Contractor shall carefully preserve all reference points, benchmarks, and other survey points, and shall be liable for and charged with the cost of their replacement and of any expense resulting from their loss or disturbance.
H. **Inspection** - The Engineer shall at all times have complete and safe access to the Work during construction and shall be furnished with every reasonable facility for ascertaining full knowledge respecting the progress, workmanship and character of materials used and employed in the Work.

Whenever the Contractor varies the period during which Work is carried on each day (outside routine work hours of 7:00 A.M. to 6:00 P.M., Monday through Friday), it shall give due notice to the Engineer so that proper inspection may be provided. Any Work done in the absence of the Engineer will be subject to rejection.

The inspection of the Work shall not relieve the Contractor of any of its obligations to fulfill the Contract as prescribed. Defective Work shall be made good and unsuitable materials may be rejected, notwithstanding the fact that such defective Work and unsuitable materials have been previously overlooked by the Engineer and accepted.

The Engineer’s inspection of the Work is intended to determine whether the Work is being accomplished in strict conformance with the requirements of the Contract Documents. The District shall be the sole beneficiary of such inspection and the Contractor will receive no protection whatsoever and derive no benefit from inspections performed by the Engineer.

I. **Errors or Discrepancies Noted by Contractor** - If the Contractor, either before commencing Work or in the course of the Work, finds any discrepancy between the Specifications and the Plans, or between either of them and the physical conditions at the site of the Work, or finds any error or omission in any of the drawings or in any survey, it shall immediately notify the Engineer verbally and in writing, within one (1) work day, of such discrepancy, error or omission.

If the Contractor observes that any Plans or Specifications are at variance with any applicable law, ordinance, regulation, order or decree, it shall immediately notify the Engineer verbally and in writing, within one (1) work day, of such conflict.

The Engineer, on receipt of any such notices, shall within one (1) work day investigate the circumstances and give appropriate instructions to the Contractor. Subsequent to providing the Engineer notice, and until such instructions are given by the Engineer, any Work done by the Contractor, either directly or indirectly after its discovery of such error, discrepancy or conflict, will be done at its own risk and the Contractor shall bear all costs arising therefrom.

J. **Contractor Quality Control** - The Contractor shall, at its sole expense, perform all labor and services and furnish all materials, tools and appliances necessary and proper for performing and completing the Work in strict compliance with the terms and conditions of the Contract Documents. The Contractor shall provide
all labor, materials and equipment in strict conformity with the Contract Documents and other directions given by the Engineer.

The Contractor shall, at their sole expense, inspect their own Work to determine strict conformance to the requirements of the Contract Documents. If the Contractor determines that some Work performed does not comply with the requirements of the Contract Documents, the Contractor shall repair or replace such defective Work at their sole expense.

The Contractor shall gain no protection or right of reliance on the District’s inspection of the Work. If it is determined that the Engineer inspected Work and failed to call defects or non-conforming items to the attention of the Contractor, the District shall not be deemed to have waived the requirements of the Contract Documents or accepted the Work.

K. Notices of Non-Conformance - When the Engineer determines that Work installed by the Contractor does not conform to the strict requirements of the Contract Documents, a Non-Conformance Notice shall be issued in writing to the Contractor. Such Notice shall record the fact that, in the opinion of the Engineer, Work has been determined to be defective and not in compliance with the Contract requirements.

Payment shall not be made on any portion of the Work for which a Non-Conformance Notice has been issued and the Work not corrected to the satisfaction of the Engineer.

Upon receipt of a Non-Conformance Notice the Contractor shall provide a written Response to Non-Conformance Notice within five (5) working days after receipt of the Notice. The Contractor’s response shall detail either

1. Why they believe that the Work was performed in accordance with the Contract Documents, or

2. What corrective action they intend to take and the timeframe for completing such action, at their sole expense, to correct the non-conforming Work.

If the Contractor disputes issuance of the Notice the Engineer has five (5) working days in which to respond by either:

1. Withdrawing in writing the Notice of Non-Conformance, or

2. Directing the Contractor in writing to correct the work.

Such determination by the Engineer shall be final and conclusive of the matter. If directed to correct the Work, the Contractor shall begin to do so within five (5) working days after receipt of such direction from the Engineer, or such other time...
as may be agreed to with the Engineer. If the Contractor believes that this
determination is in error, they shall nevertheless, proceed promptly to repair or
replace the work, as directed, keeping separate track of the costs of such repair
or replacement. The Contractor may submit a request for equitable adjustment
for such costs under the provisions of the Disputes Section of these General
Provisions.

L. Correction of Defective Work - All Work, material, or equipment that is
unsatisfactory, faulty, incomplete, or does not conform to the Contract
Documents, or does not meet the requirements of any inspection, test, or
approval, is defective. If the Work or any part thereof is found to be defective,
whether or not manufactured, fabricated, installed, completed, or overlooked and
accepted by the District, the Contractor shall, promptly and in accordance with
the written instructions of the District, either correct such defective Work or, if it
has been rejected by the District, remove it from the site and replace it with
nondefective and conforming Work. The Contractor shall bear all costs for the
correction or removal and replacement of defective Work and all additional direct
and indirect costs the District may incur on account of defective Work, including,
but not limited to, the costs of additional administrative, professional, consultant,
inspection, testing, and other services. If such additional costs are incurred by
the District prior to the making of final payment, a Change Order will be issued to
effect a reduction in the Contract price in the amount of the District's additional
costs; otherwise, the Contractor shall pay the amount to the District. The
Contractor shall also bear all costs of making good all Work and the work and
property of separate contractors, the District, and others that is destroyed or
damaged by the Contractor's correction or removal and replacement of its
defective Work.

M. Reexamination of Work - If the District, at any time prior to the final acceptance of
the Work, orders re-examination of Work completed, including the uncovering,
removing, exposing, dismantling, inspecting, or testing of Work covered by such
order, the Contractor shall promptly comply with the order. If the Work so re-
examined is defective, the Contractor shall correct or remove and replace it with
nondefective and conforming Work in accordance with all the provisions of
Paragraph 5L and also shall bear the cost of the satisfactory reconstruction of the
Work. If the work so re-examined is not defective, the District shall bear the cost.

N. Equipment - The Contractor shall furnish adequate equipment to properly
perform the Work in a workmanlike manner in accordance with the Contract
Documents. Such equipment must be in a good state of repair and maintained in
such state during the progress of the Work. No worn or obsolete equipment shall
be used, and in no case shall the maker's rating of capacity for any equipment be
exceeded.

O. Shop Drawings
1. Wherever shop drawings are called for in the Contract Documents, or where required by the Engineer, the Contractor shall furnish to the Engineer for review six (6) prints of each shop drawing. The term "shop drawing" as used herein shall be understood to include, but not be limited to, detail design calculations, fabrication and installation drawings, lists, graphs and operating instructions.

Unless otherwise required, shop drawings shall be submitted at a time sufficiently early to allow review of it by the Engineer, and to accommodate the rate of construction progress required under the Contract.

2. All shop drawing submittals shall be accompanied by a transmittal form using the format bound herein. Any shop drawing submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for resubmittal. The Contractor may authorize a material or equipment supplier to deal directly with the Engineer with regard to shop drawings, however ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor.

3. A separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of shop drawings on various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates review of the group or package as a whole. At its option, the Contractor or Supplier may obtain from the Engineer quantities of the shop drawing transmittal form at reproduction cost.

4. Unless noted otherwise in these Contract Documents, the Engineer will have thirty (30) days from date of receipt in which to review and respond to each shop drawing or resubmittal of a shop drawing.

It is considered reasonable that the Contractor shall make a complete and acceptable submittal to the Engineer by the second submission of drawings. The District reserves the right to withhold funds due the Contractor to cover additional costs of the Engineer's review beyond the second submission.

5. If two (2) prints of the drawing are returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision of said drawing would not be required.

6. If two (2) prints of the drawing are returned to the Contractor marked "MAKE CORRECTIONS NOTED," formal revision of said drawings will not be required.
7. If two (2) print of the drawing is returned to the Contractor marked "AMEND - RESUBMIT," the Contractor shall revise said drawing and shall resubmit six (6) copies of the revised drawing to the Engineer.

8. If two (2) prints of the drawing is returned to the Contractor marked "REJECTED - RESUBMIT," the Contractor shall resubmit six (6) new copies of the drawing to the Engineer.

9. Fabrication of an item shall not be commenced before the Engineer has reviewed the pertinent shop drawings and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN," or "MAKE CORRECTIONS NOTED." Revisions indicated on shop drawings shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from the Contractor's having to make the required revisions to shop drawings unless review by the Engineer of said drawings is delayed beyond a reasonable period of time and unless the Contractor can establish that the Engineer's delay in review actually resulted in a delay to the critical path of the Contractor's construction schedule. The review of such drawings by the Engineer will be limited to checking for general conformance with the requirements of the Contract Documents, and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein, nor shall such review operate to waive or modify any provision contained in the Contract Documents. Fabricating dimensions, quantities of material, applicable code requirements, and other contract requirements shall be the Contractor's responsibility.

10. Conformance - No Work represented by required shop drawings should be purchased or commenced until the applicable submittal has been returned marked “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED”. The Work shall conform to the approved shop drawings and all other requirements of the Contract Documents. The Contractor shall not proceed with any related Work which may be affected by the Work covered under shop drawings until the applicable shop drawings have been approved, particularly where piping, machinery, and equipment and the required arrangements and clearances are involved.

11. Interrelated Shop Drawings - Except where the preparation of a shop drawing is dependent upon the approval of a prior shop drawing, all shop drawings pertaining to the same class or portion of the Work shall be submitted simultaneously.

SHOP DRAWING TRANSMITTAL FORM

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Pursuant to this Section, the Contractor shall use this transmittal form for submittal of shop drawings to the District. The procedure governing shop drawings submittal is contained in this section of the General Provisions of these Contract Documents.

Failure to comply with all requirements specified therein will constitute grounds for return of the shop drawings for proper resubmittal. The Contractor shall sequentially number each submittal.
<table>
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<tr>
<th>Date:</th>
<th>Submittal No.:</th>
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<tr>
<td>From:</td>
<td>To: Orange County Water District</td>
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<td>Project Name:</td>
<td>Attention:</td>
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<td>Owner:</td>
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<td>Orange County Water District</td>
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<td>Subject of Submittal:</td>
<td>Equipment Specification</td>
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<td>Designation:</td>
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<td>Complete either (a) or (b) following:</td>
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</table>
(a) We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (NO EXCEPTIONS). | 
(b) We have verified that the material or Equipment contained in this submittal Meets all the requirements specified or shown, except for the following deviations (ATTACH LIST OF DEVIATIONS:) | 
| Contractor's or Supplier's Authorized Signature: | |

GP-25
P. **Working Hours** - All Work at the site shall be performed during regular working hours, and the Contractor shall not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without the written consent of the Engineer. Unless otherwise specified, the Contractor shall prosecute the Work only between the hours of 7:00 a.m. and 6:00 p.m. Should the Contractor choose to work outside normal working hours all District inspection required by the Contractor on holidays, weekends and overtime shall be accomplished at the sole expense of the Contractor by issuance of a deductive Change Order.

Q. **Cleaning** - The Contractor shall on daily basis remove dirt, debris, waste and rubbish from the working area and the construction site. At the completion of Work, the Contractor shall thoroughly clean and remove all refuse and debris from the site in the manner approved by the Engineer.

R. **Final Clean-up** - Upon completion and before making application for acceptance of the Work, the Contractor shall clean the construction site and all ground occupied by it in connection with the Work of all rubbish, excess materials, temporary structures and equipment, and all parts of the Work shall be left in a neat and presentable condition. Care should be taken to prevent spillage on streets over which hauling is done, and any such spillage or debris deposited on streets due to the Contractor's operations shall be immediately cleaned up.

S. **Final Inspection** - The Engineer will not make the final inspection until the Work provided for and contemplated by the Contract has been completed and the final cleaning up performed.

SECTION 7. **CONTROLS OF MATERIALS**

A. **Quality of Materials and Source of Supply** - Articles, materials, and equipment to be incorporated into the Work under the Contract shall be new or unused unless otherwise specified and shall conform to the requirements of the Contract Documents and be approved by the Engineer before incorporation into the Work; and, where required to conform to standard specifications or tests of the District or other authorities incorporated by reference, shall conform to the respective editions, including amendments, specified or, where editions are not specified shall conform to the editions including amendments in effect on the date of the Notice Inviting Bids.

At the option of the Engineer, the source of supply of each item of the material shall be approved by the Engineer before delivery is started. All materials proposed for use may be inspected or tested at any time during their preparation and use. If after trial it is found that sources of supply, which have been approved, do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved material from other approved sources. After approval, any material which becomes unfit for use due to improper storage, handling, or any other reason, shall be rejected.
B. **Samples and Tests** - All tests of materials furnished by the Contractor shall be made by the Engineer in accordance with the commonly recognized standards of national organizations, and such special methods and tests as are prescribed in the Contract Documents. In the event there is a conflict between a commonly recognized standard and the requirements of the Contract Documents, the requirements of the Contract Documents will be followed.

Field tests of materials will also be made by the Engineer when deemed necessary and these tests shall be made in accordance with commonly recognized standards of national organizations or the requirements of the Contract Documents. The District will pay all initial testing unless specifically called out elsewhere in the Contract Documents. Re-tests, required by failure of materials or equipment to pass the initial test or due to deficiencies discovered during the initial test, shall be at the sole expense of the Contractor.

The Contractor shall furnish such samples of all materials as are requested by the Engineer without charge. No material shall be used until the Engineer has approved it. Samples will be secured and tested whenever necessary to determine the quality of the material.

Promptly after the approval of the Contract, the Contractor shall notify the Engineer of the proposed sources of supply of all materials to be furnished by it, using a form in which will be supplied by the Engineer upon request.

Whenever reference is made in the Contract Documents to standard tests or requirements of the ASTM, or any other common specifications institute, the reference shall be construed to mean the standards that are in effect at the date of the Notice Inviting Bids with subsequent amendments, changes or additions as thereafter adopted and published by the organization referred to.

C. **Defective Materials** - All materials not conforming to the requirements of the Contract Documents shall be considered as defective and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the Work unless otherwise permitted by the Engineer. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval in writing has been given by the Engineer. Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this section the Engineer shall have the authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due the Contractor.

D. **Storage of Materials and Equipment** - The Contractor shall obtain the written permission of the Engineer prior to stockpiling and/or storing any material and/or equipment to be used in the Work on the job site. All materials and/or equipment approved for storage on the site shall be stored by the Contractor in such a manner as to prevent damage from exposure to the elements, mixture with foreign materials or from any other cause. Such materials and/or equipment
stored or kept on the site shall be the sole responsibility of the Contractor. In the event that materials or equipment stored on the site are lost or damaged, such damage shall be repaired, and such injury shall be remedied, at the sole expense of the Contractor. In connection therewith, Contractor shall fully indemnify the District as to any claims in whatever form.

E. **Brand Name or Equal** - For convenience in designation on the Plans or in the Specifications, certain articles or materials to be incorporated in the Work may be designated under a brand name or the equal thereof or the name of a manufacturer and its catalogue information or the equal thereof. Such designations are intended to be descriptive, but not restrictive, and are to indicate the quality and characteristics of articles and materials that will be satisfactory. The use of alternative articles or materials which are of equal quality and of the required characteristics for the purposes intended will be permitted, subject to the following requirements.

With respect to the major equipment or material items listed in the bid, unless the Bidder clearly indicates in its bid that it is proposing to use an "equal" product, its bid shall be considered as offering a product referred to by the brand name specified for the major equipment or material items listed in the bid. The brand name if any, of the proposed substitute product shall be inserted in the space provided in the bid or shall be otherwise clearly identified in the bid. The awarding of this Contract to a Bidder who has indicated in its bid that it is proposing to use an "equal" product shall not constitute an admission by the District of the equality of that product. It is expressly understood and agreed by the Bidder that, in so awarding this Contract, the District reserves the right to reject any such proposed substituted product. It is further expressly understood and agreed by Bidder that in the event the District rejects a proposed "equal" product, the Bidder will then supply either a product designated by brand name in the Specifications or a substitute therefor, which meets with the approval of the District.

With respect to articles or materials other than the major equipment or material items listed in the Bid, whenever the Specifications permit the substitution of a similar or equivalent material or article and the Bidder wishes to substitute such a similar or equivalent product, it need not so indicate in its Bid. However, within seven (7) days after the award of Contract, the Bidder to whom the contract has been awarded shall notify the District in writing of all proposed substitutions of such similar or equivalent materials or articles.

With respect to all proposed substitutions of "equal" products, both major items of equipment and materials listed in the Bid and other nonlisted items, the Bidder to whom the Contract has been awarded shall submit all pertinent and appropriate data substantiating its request for said substitutions within thirty-five (35) days after the award of the Contract. In this regard, Bidders should note that neither the District nor the Engineer is responsible for locating or securing any information, which is not included in such substantiating data. Bidders should
further note that the burden of proof as to the quality or suitability of proposed alternative products should be borne by the bidder.

In making “or equal” submittals, all manufacturer’s data shall be submitted to the Engineer for review and acceptance and shall clearly identify each proposed substitute with the corresponding contract drawing, detail or specification section. If the Engineer determines to accept a proposed substitution for use on the project, which is not equal to, that specified, substitution should be accomplished through issuance of a deductive Change Order, with appropriate monetary allowance for the difference in value.

The Engineer shall determine whether the material or equipment offered is equivalent to that specified. Any revision to structures, piping, mechanical, electrical, instrumentation, or any other Work made necessary by such substitution must be approved by the Engineer, and the entire cost, both direct and indirect of such revisions shall be borne solely by the Contractor.

Any materials, process, piece of equipment or article may be requested as a substitution by the Contractor, in lieu of that specified, under the following conditions.

1. The Contractor must demonstrate that the proposed substitution meets the salient characteristics of the article specified, in the sole judgement of the Engineer.

2. The Contractor agrees to pay for all engineering and design services, if any are required, to make all changes and adjustments in material and Work of all trades directly or indirectly affected by the substitution, to the satisfaction of the Engineer, at no cost to the District.

3. All requests for substitution shall be made solely through the Contractor. Submissions by the Contractor shall mean that the Contractor has reviewed and approved such substitution.

4. No requests for substitution shall be considered during the bidding period.

5. The Contractor shall furnish adequate data with each substitution request to enable the Engineer to evaluate the proposed substitution. Failure to submit adequate data will result in disapproval of the substitution request.

6. The Contractor shall assume all liability and responsibility for any material or equipment substitution proposed and accepted and shall hold the District harmless against the failure of any substituted item.

The Engineer shall be the sole judge as to the quality and suitability of proposed alternative articles or materials, and decision of the Engineer shall be final and conclusive. Unless extended by the mutual agreement of the parties, the
Engineer shall notify the successful Bidder of the decision concerning the proposed substitution of "equal" items within thirty (30) days after the submission by the Bidder of the bidder's substantiating data. All such decisions by the Engineer shall be in writing, and no proposed alternative product shall be deemed approved unless the Engineer has so indicated in writing.

The time limitations contained in this Paragraph 7E shall be complied with strictly, and in no case will an extension of time for completion be granted because of the Contractor's failure to request the substitution of an alternative item at the times and in the manner set forth herein.

F. Equipment Protective Devices - All equipment furnished or installed shall meet the requirements of all applicable codes, particularly the regulations of the State of California Division of Industrial Safety, the William Steiger Occupational Safety and Health Act of 1970, and the California Occupational Health and Safety Act. Mechanical and electrical equipment shall have all required protection devices, including but not limited to belt and shaft guards, and heat protection. Such devices shall be indicated on shop drawings.

SECTION 8. PROSECUTIONS AND PROGRESS

A. Commencement - The Contractor shall commence work on or before the tenth (10th) day after receiving the Notice to Proceed, and shall complete all work under the Contract within the period of time specified in the Contract Documents. Notice to Proceed will be issued not later than forty-five (45) days after the Contract has been awarded unless otherwise agreed upon in writing, or as may be specified in the Special Provisions.

B. Assignment Forbidden - The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of its rights, title or interest in or to the same or any part thereof, without the previous consent in writing of the District. The Contractor shall not assign, by power of attorney or otherwise, any of the monies to become due and payable under the Contract unless by and with the like consent signified in like manner. If the Contractor shall, without previous written consent, assign, transfer, convey, sublet or otherwise dispose of the Contract or its right, title or interest therein, or of any of the monies to become due under the Contract, to any other person, company, or other corporation, such attempted or purported assignment, transfer, conveyance, sublease or other disruption shall be null, void and of no legal effect whatsoever. In such event the Contract may, at the option of the District, be terminated, revoked and annulled, and the District shall thereupon be relieved and discharged from any and all liability and obligations growing out of the same to the Contractor, and to its purported assignee or transferee. No right under the Contract, nor any right to any money to become due hereunder, shall be asserted against the District in law or equity by reason of any purported assignment of the Contract, or any part thereof, or by reason of the purported assignment of any monies to become due hereunder, unless authorized as set forth herein by written consent of the District.
C. **Subcontract**

1. At the discretion of the District, and subject to the provisions of subparagraph 2 hereof, subcontractors may be permitted to such extent as shall be shown to be necessary or definitely advantageous to the Contractor in the prosecution of the Work, and without injury to the interests of the District. The resubletting of Work by a subcontractor shall be subject to the same limitations as an original subletting.

In general, the brokering of Work will not be favored, and the subletting of the entire Contract or of substantial complete units of it will be permitted only upon an adequate showing of necessity, involving some new condition not reasonably foreseeable at the time of the Proposal. Unless otherwise approved by the District, the Contractor shall perform on the site and with its own organization not less than fifty percent (50%) of the total Contract price, unless a different percentages is set forth in the Invitation to Bid.

No subcontract will be permitted which has the effect of avoiding the residence or wage requirements or any other provisions of the Contract Documents. Individual subcontractors, or members of contracting or subcontracting organizations engaged in any way upon the Work, shall be subject to all the requirements of these Contract Documents including but not limited to wages, hours of work per day and per week, employment of aliens and character of workers, and to all other conditions of the Contract Documents applicable to employees working for wages and it shall be the obligation of the Contractor to provide the foregoing information to such entities or persons in writing.

2. In accordance with California Business and Professions Code Section 7059, if the Contractor is designated as a "specialty contractor" (as defined in Section 7058 of the Public Contract Code), all of the Work to be performed outside of the Contractor's license specialty shall be performed by a licensed subcontractor in compliance with the Subletting and Subcontracting Fair Practices Act, California Public Contract Code Section 4100, et seq.

3. Reference is hereby made to the provisions of Section 4100, et seq., of the Public Contract Code of the State of California. As required by such provisions, each Bidder shall set forth in its proposal the name and location of the place of business of each subcontractor who will perform work of labor or render service to the Contractor in or about the construction of the Work or improvement in an amount in excess of one half of one percent (1/2 of 1%) of the Contractor's total Bid, and the portion of the Work which will be done by each subcontractor. The Contractor shall list only one subcontractor for each portion as is defined.
by the Contractor in its Bid. If the Contractor fails to specify a subcontractor, or if the Contractor specifies more than one subcontractor for the same portion of Work to be performed under the Contract in excess of one half of one percent (1/2 of 1%) of the Contractor's total Bid, the Contractor agrees that it is fully qualified to perform that portion itself, and that it shall perform that portion itself. The attention of the Bidder is directed to the other provisions of the above provisions of the Public Contract Code, and the penalties therein provided. Notwithstanding the compliance therewith, the District's acceptance of the Bid shall not constitute authority to the Contractor to sublet or subcontract any of the Work to any subcontractor so named in the Proposal, but permission to subcontract any portion of the Work to any subcontractor so named in the Proposal shall be within the discretion of the District, as provided in subparagraph 1 hereof.

4. A copy of each subcontract, if in writing, or, if not in writing, then a written statement signed by the Contractor giving the name of the subcontractor and the terms and conditions of such subcontract, shall be filed with the District before the subcontractor begins work. Each subcontract shall contain a reference to the Contract between the District and the Contractor and the terms of that Contract and all parts of the Contract Documents shall be made a part of such subcontract insofar as applicable to the Work covered thereby. Each subcontract shall provide for its annulment or termination by the Contractor at the order of the Engineer if in the Engineer's opinion the subcontractor fails to comply with the requirements of the principal Contract insofar as the same may be applicable to this Work. Nothing herein contained shall create any contractual relation between any subcontractor or the District, or relieve the Contractor of any liability or obligation hereunder.

5. The Contractor shall be responsible in all respects for the actions or inaction of all subcontractors, suppliers and materialmen, at all tiers, regardless of whether they are MBE, WBE, or DBE firm or are stipulated subcontractors or sole source subcontractors or suppliers. No claim, request for equitable adjustment or Change Order request shall be submitted to the District for any action of any subcontractor, supplier or materialmen, at any tier, unless the Contractor can demonstrate that the District is the proximate cause of the change or delay alleged in such request. The District will not accept any responsibility or liability for any action or inaction of any subcontractor, supplier or materialmen, at any tier, except to the extent that the District is the proximate cause of the change or delay.

D. Superintendence by Contractor - Contractor shall keep on the Work at all times during its progress a competent resident superintendent, acceptable to the Engineer, who shall not be replaced without written notice to the Engineer except under extraordinary circumstances. The superintendent shall be Contractor's
representative at the site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given by Contractor.

E. Character of Workers - The Contractor shall employ none but competent foremen, laborers, and mechanics. If any subcontractor, superintendent, foreman, laborer or other person employed on the Work by the Contractor fails or refuses to carry out any direction of the Engineer, or shall appear to the Engineer to be intemperate, incompetent, troublesome or otherwise undesirable, he or she shall be discharged immediately by District on the request of the Engineer, and such person shall not again be employed on the Work.

F. Temporary Suspension of Work - The Engineer may direct the Contractor in writing to suspend, delay or interrupt all or any part of the Work for such period of time as they may determine to be appropriate for the convenience of the District. The Contractor shall immediately comply with the written order of the Engineer to suspend the Work wholly or in part, shall not cease Work beyond that directed in the Engineer’s notice, and shall not resume the Work until ordered to do so in writing by the Engineer.

In the event that a suspension of Work is ordered because of failure on the part of the Contractor to carry out orders given or to perform any provisions of the Work, such suspension of Work shall not either relieve the Contractor of its responsibility to complete the Work within the time limit set forth in the Contract Documents and shall not be considered cause for extension of the time for completion, and further, such suspension of Work shall not entitle the Contractor to any additional compensation.

If the performance of all or any part of the Work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the District in administration of this Contract, or by a failure to act within the time specified in this Contract, an adjustment shall be made for an increase in the cost of performance of this Contract (excluding profit) necessarily caused by such unreasonable suspension, delay or interruption, and the Contract modified in writing accordingly. However, no adjustment shall be made under this Section for any suspension, delay or interruption to the extent:

1. That performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or any subcontractor or supplier at any tier, or

2. For which an equitable adjustment is provided for or excluded under any other provision of this contract.

No claim under this Section shall be allowed:
1. For any cost incurred more than twenty (20) days before the Contractor shall have given written notice to the District of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a written suspension order from the Engineer), and

2. Unless the claim, in an amount specifically stated, is asserted in writing within forty five (45) days after the termination of such suspension, delay or interruption, but not later than the date of final payment under the contract.

G. Extension of Time - The Engineer may extend, in writing, the time fixed for completion of the Work under the Contract. The procedures applicable to the requesting and granting of extensions of time are as set forth in Paragraph I of this Section. Any extension of time shall not release the sureties upon any bond required under the Contract.

H. Time for Completion - The Contractor shall complete the Work called for under the Contract in all parts and requirements within the number of calendar days set forth in the Contract Documents.

I. Liquidated Damages - The Contractor agrees that the Work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed by and between the Contractor and the District that the time for the completion of the Work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

Pursuant to Section 53069.85 of the Government Code, if the Contractor neglects, fails or refuses to complete the Work within the time herein specified, or within any proper extension thereof granted by the District, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the District the amount specified in the Contract Documents, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents for completing the Work. The District may deduct the amount of such liquidated damages from any payments due or which may become due the Contractor under the Contract.

This amount of liquidated damages is fixed and agreed upon by and between the Contractor and the District because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the District would in such event sustain; such amount is agreed to be the amount of damages which the District would sustain, and such amount shall be retained from time to time by the District from current periodic estimates.
It is further agreed that time is of the essence of each and every portion of the Contract Documents wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract.

The Contractor will be granted an extension of time and will not be assessed with liquidated damages for any portion of the delay in completion of the Work beyond the time set forth in the Contract Documents for the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor or their subcontractors or suppliers, at any tier, including but not restricted to acts of God, acts of the public enemy, acts of the Government in its sovereign capacity, fire, floods, epidemics, quarantine restrictions, strike, shortage of materials, freight embargoes, utility relocations as provided in Underground Services Alert section of the General Provisions of these Contract Documents, or unusually severe weather.

The Contractor shall, within ten (10) days from the beginning of any such delay (unless the Engineer shall grant a further period of time prior to the date of final settlement of the Contract), notify the Engineer in writing of the cause of delay, as set forth herein below, whereupon the Engineer shall ascertain the facts and extent of the delay and extend the time for completing the Work if in the Engineer's judgment the findings of fact justify such an extension. The Engineer's findings of fact thereon shall be final and conclusive on the parties hereto.

When the Contractor experiences delays and a time extension is requested, the Contractor shall submit to the Engineer, a written time impact analysis illustrating the influence of all changes or all delays on the current project completion date. The time impact analysis shall be constructed on an As-Built Schedule Analysis approach. The As-Built Schedule that is created will incorporate all actual start and finish dates, actual durations of activities, actual sequences of construction (referred to as the As-Built Logic) current as of the time the time impact analysis is performed. The time impact analysis shall incorporate all delays (including District, Contractor and third party delays without exception) in the time frame that they actually occurred with actual logic ties. The As-Built Schedule data shall be obtained from the most recent approved monthly schedule update. The As-Built Schedule shall be created as an early start schedule with the actual start and finish dates coinciding with the early start and finish dates from the most recent approved monthly schedule update. The As-Built Schedule shall show the original activity durations equal to the actual duration and the actual logic driving all activities. The As-Built Schedule will be validated by the Engineer. All requests for time extension shall be based upon an analysis of the As-Built Schedule. The critical path will be established and all District caused delays on the critical path will be identified. The time extension will be based solely upon the cumulative duration of all District and third party caused delays (as set forth in Liquidated Damages section of these Contract Documents), which are on the
critical path. Any time extensions to the project’s Interim Milestone Dates, if any, shall be non-compensable time extensions only.

Each time impact analysis shall demonstrate the estimated time impact based on the events of delay, the date the Change Order was given to the Contractor, the status of construction at that point in time, and the event time computation of all activities affected by the change or delay. The event times used in the analysis shall be those included in the latest approved update of the project schedule, in effect at the time the change or delay was encountered.

SECTION 9. LEGAL RELATIONS AND RESPONSIBILITIES

A. Observing Laws and Ordinances - The Contractor shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the conduct of the Work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency is discovered in the Contract Documents in relation to any such law, ordinance, regulation, order or decree, the Contractor shall forthwith report the same to the Engineer in writing. The Contractor shall at all times observe and comply with and shall cause all its agents and employees to observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall to the full extent permitted by law protect, indemnify and defend the District, the Engineer, and all of their respective officers, employees, and representatives against any claim or assertion of liability, or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor or its employees.

1. Labor Code of California - The Contractor’s attention is directed to Division 2, Part 7, Chapter 1 of the Labor Code of the State of California and especially to Article 2 (Wages); and Article 3 (Working Hours), thereof.

   a. In accordance with Section 1773 of the Labor Code, the Board of Directors of the District has found and determined the general prevailing rates of wages in the locality in which the public Work is to be performed are applicable and are contained in that certain document entitled GENERAL PREVAILING WAGE DETERMINATION, copies of which are maintained at the District's principal office, and are available to any interested party on request. Contractor shall post a copy of said document at each job site.

   b. (Reserved)

   c. The Contractor is aware of and will comply with the provisions of Labor Code Section 1776, including the keeping of payroll records and furnishing certified copies thereof in accordance with said
section. In accordance with Labor Code Section 1771.4, the Contractor shall furnish the records specified in Labor Code Section 1776 directly to the California Labor Commissioner at least monthly (or more frequently if specified in the Special Provisions) using the Department of Industrial Relations’ (DIR’s) electronic certified payroll reporting (eCPR) system, or otherwise in such a format that may be prescribed by the Labor Commissioner. The Contractor shall also submit certified payrolls to the Engineer, including certified payrolls for all Subcontractors, at any tier, performing work on the site, regardless of the dollar amount or type of subcontract, if required by the Special Provisions.

d. Pursuant to Labor Code Section 1810, it is stipulated hereby that eight (8) hours labor constitutes a legal day’s work hereunder.

e. Pursuant to Labor Code Section 1813, it is stipulated hereby that the Contractor shall, as a penalty to the District, forfeit $25 for each worker employed in the execution of this Contract by the Contractor or by any subcontractor hereunder for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one (1) calendar week in violation of the provisions of Article 3 (commencing with Section 1810), Chapter 1, Part 7, Division 2 of the Labor Code.

f. The Contractor is aware of and will comply with the provisions of Labor Code Sections 1777.5 and 1777.6 with respect to the employment of apprentices. Pursuant to Section 1777.5 it is hereby stipulated that the Contractor will be responsible for obtaining compliance therewith on the part of any and all subcontractors employed by him or her in connection with this Contract.

g. Pursuant to Labor Code Section 1775, it is hereby stipulated that the Contractor shall, as a penalty to District, forfeit not more than $200 for each calendar day, or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of the Department of Industrial Relations for the work or craft in which the worker is employed for the Work under the contract by Contractor or by any subcontractor under the Contractor. The Contractor shall be responsible to ensure that all contracts executed between the Contractor and the subcontractor for the performance of Work on the project shall include a copy of the provisions of Labor Code Sections 1771, 1775, 1776, 1777.5, 1813, and 1815.

h. Pursuant to Labor Code Section 1771.4, the performance of the Work is subject to compliance monitoring by and enforcement by
the California Department of Industrial Relations, and the Contractor shall post job site notices, as prescribed by regulation.

2. **License Classification of Contractors** - Before submitting a bid, Contractor shall be licensed in accordance with the provisions of Chapter 9, Division 3 of the Business and Professions Code of the State of California and the Contractor shall at all times be in compliance with Section 3300 of the California Public Contract Code and Section 7059 of the California Business and Professions Code.

3. **Registration of Contractors** – Before submitting a bid, Contractor and all Subcontractors listed in the Bid, shall be registered and qualified to perform public work pursuant to Labor Code Section 1725.5.

4. **Compliance with IRCA** - The Contractor shall at all times during the performance of the Work be in full compliance with the provisions of the Immigration Reform and Control Act of 1986 ("IRCA") in the hiring of its employees, and the Contractor shall indemnify, hold harmless and defend the District from and against any and all actions, proceedings, penalties or claims arising out of the Contractor's failure to comply strictly with the IRCA.

5. **Equal Opportunity** - During the performance of this Contract, the Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, marital status or national origin.

B. **Sales and Use Taxes** - The Contractor shall pay all sales and use taxes assessed by Federal, State and local authorities on materials furnished by the Contractor in performance of the Work. Changes in such taxes shall not be justification for an adjustment to the Contract.

C. **Permits and Licenses** - Unless otherwise specified in the Contract Documents, the Contractor shall procure all permits and licenses, pay all charges and fees, and give all notice necessary and incident to the due and lawful prosecution of the Work. The Contractor shall comply with all provisions of all permits whether obtained by the District or by the Contractor. Fines, fees or penalties incurred by the Contractor due to violation of any permit shall not be justification for an adjustment to the contract.

D. **Patents** - The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes used on or incorporated in the Work and shall indemnify, defend and save the District, the Engineer and their respective officers, employees and representatives, harmless from and against all suits, actions, penalties, damages, claims, fees or costs of every nature for or on account of the use of any patented materials, equipment, devices or processes.
E. District Ownership of Proprietary Information - All proprietary information developed by Contractor in connection with or resulting from this contract, including but not limited to inventions, discoveries, improvements, copyrights, patents, maps, reports, textual material, or software programs, shall be the sole and exclusive property of the Orange County Water District. The Contractor agrees that the compensation to be paid pursuant to this contract includes adequate and sufficient compensation for any proprietary information developed in connection with or resulting from this contract. The Contractor further understands and agrees that full disclosure of all proprietary information developed in connection with or resulting from this contract shall be made to the Orange County Water District and that Contractor shall do all things necessary and proper to perfect and maintain Orange County Water District's ownership of such proprietary information.

F. Cal/OSHA and Safety Requirements – In the performance of this contract, the Contractor shall comply with all applicable federal, state and local statutory and regulatory requirements including, but not limited to, California Department of Industrial Relations (Cal/OSHA) regulations; and the U.S. Department of Transportation Omnibus Transportation Employee Testing Act, related to their scope of work and operations. In case of conflict in regulations, the most stringent shall apply. The Contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. Safety precautions shall include, but shall not be limited to: adequate life protection and life saving equipment; adequate illumination; instructions in accident prevention for all employees, such as the use of machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, fall protection, and other safety devices; equipment and wearing apparel as are necessary or lawfully required to prevent accidents, injuries or illnesses (including, but not limited to exposure to the Coccidioides fungus and Valley Fever); and adequate facilities for the proper inspection and maintenance of all safety measures.

Contractor must obtain all applicable Division of Occupational Safety and Health (Cal/OSHA) permit(s) and others required by California Labor Code and California Government Code, prior to the initiation of any practices, work, method, operation, or process related to the work covered in the contract. Permits required by governmental authorities will be obtained at Contractor's expense.

It is a condition of this contract, and shall be made a condition of each subcontract which the Contractor enters into pursuant to this contract, that the Contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary,
hazardous or dangerous to his/her health or safety, as determined under Cal/OSHA safety and health standards.

The Contractor shall be responsible for the safeguarding of all utilities. At least two working days before beginning work, the Contractor shall call the Underground Service Alert (USA) in order to determine the location of substructures. The Contractor shall immediately notify the District and the utility owner if he/she disturbs, disconnects, or damages any utility.

In accordance with Section 6705 of the California Labor Code, the Contractor shall submit to the District specific plans to show details of provisions for worker protection from caving ground during excavations of trenches of five feet or more in depth. The excavation/trench safety plan shall be submitted to and accepted by the District prior to starting excavation. The trench safety plan shall have details showing the design of shoring, bracing, sloping or other provisions to be made for work protection from the hazard of caving ground. If such a plan varies from the shoring system standards established by the Construction Safety Orders of the California Department of Industrial Relations (Cal/OSHA), the plan shall be prepared by a California Registered Civil or Structural Engineer. As part of the plan, a note shall be included stating that the Registered Civil or Structural Engineer certifies that the plan complies with the Cal/OSHA Construction Safety Orders, or that the Registered Civil or Structural Engineer certifies that the plan is not less effective than the shoring, bracing, sloping or other provisions of the Safety Orders. In no event shall the Contractor use a shoring, sloping, or protective system less effective than that required by said Construction Safety Orders. Submission of this plan in no way relieves the Contractor of the requirement to maintain safety in all areas. If excavations or trench work requiring a Cal/OSHA permit are to be undertaken, the Contractor shall submit his/her permit with the excavation/trench work safety plan to the District before work begins.

For purposes of this Contract neither the District, neither the Engineer nor their respective officers, employees, consultants and inspectors are to be considered experts in safety, and all job safety will be the responsibility of the Contractor. The Contractor shall hire or designate a qualified safety officer who shall have overall safety responsibility for the Work and job site. This responsibility shall include public safety as well as workers' safety.

G. Public Convenience - The Contractor shall so conduct its operations as to cause the least public obstruction and inconvenience to public travel. The Contractor shall furnish, erect and maintain such fences, barriers, lights and signs as are reasonable to give adequate warning to the public at all times of a dangerous condition to be encountered as a result of the construction Work. The Contractor shall furnish the Engineer with the name, address and local telephone number of the person responsible for the maintenance of barriers, signs, lights and all other accident prevention devices.
H. **Sanitation** - The Contractor shall provide all necessary privy accommodations for the use of its employees on the Work and shall maintain the same in a clean and sanitary condition.

The Contractor shall provide for its employees an adequate supply of clean, potable drinking water, which shall be dispensed through approved sanitary facilities.

The Engineer may from time to time prescribe rules and regulations for maintaining sanitary conditions at the Work and the Contractor shall enforce observance of the same by its employees and the employees of the subcontractors, and, if the Contractor fails to enforce these rules and regulations, the Engineer shall have authority to enforce them and reduce the Contract price by any reasonable cost associated with taking such actions.

The Contractor shall obey and enforce such sanitary regulations as may be prescribed by the State Department of Public Health and all other governmental authorities having jurisdiction.

I. **Contractor's Liability** - The District, its officers, employees, agents and representatives, the Board of Directors and the Engineer shall not be answerable or accountable in any manner, either individually or collectively for any loss or damage that may happen to the Work or any part thereof, or for any of the materials or other things used or employed in performing the Work, or for injury or damage to any person or persons, either workers, employees of Contractor or its subcontractors or the public, or for damage to adjoining or other property, from any cause whatsoever arising out of or in connection with the performance of the Work. The Contractor shall be responsible for any damage or injury to any person or property resulting from defects or obstructions or from any cause whatsoever arising out of or in connection with the performance of the Work, except the active negligence or willful misconduct of District, its agents, servants or independent contractors who are directly responsible to District.

Contractor shall indemnify District, the Engineer, and their respective Boards of Directors, officers, employees, agents and representatives, against, and hold and save them and each of them harmless from, any and all actions, claims, damages to persons or property, penalties, obligations or liabilities that may be asserted or claimed by any person, firm, entity, corporation, political subdivision or other organization arising out of or in connection with the Work, operation or activities of Contractor, its agents, employees, subcontractors or invitee, provided for herein, whether or not there is concurrent passive negligence on the part of the District, its officers, directors, employees, agents, representatives, or the Engineer, but excluding such actions, claims, damages to persons or property, penalties, obligations or liabilities arising from the active negligence or willful misconduct of District or its officers, directors, employees, agents, representatives or independent contractors who are directly responsible to District; and in connection therewith:
1. Contractor shall defend any action or actions filed in connection with any of such claims, damages, penalties, obligations or liabilities, and shall pay all costs and expenses, including attorneys' fees, incurred in connection therewith.

2. Contractor shall promptly pay any judgment rendered against Contractor or District covering such claims, damages, penalties, obligations and liabilities arising out of or in connection with such work, operations, or activities of Contractor hereunder, and Contractor shall save and hold the District harmless therefrom.

3. In the event District is made a party to any action or proceeding filed or prosecuted against Contractor for such damages or other claims arising out of or in connection with the Work, operation or activities of Contractor hereunder, Contractor shall pay to District any and all costs and expenses incurred by District in such action or proceeding, together with reasonable attorneys' fees. If the District is so named as a party to any such action, the District can elect to be represented by counsel of its choosing and Contractor shall be responsible to reimburse District for all reasonable fees and costs associated with that representation.

4. So much of the money due to the Contractor under and by virtue of the Contract as shall be considered necessary by the District may be retained by the District until disposition has been made of such actions or claims for damages as aforesaid.

J. Personal Liability - Neither the District, the Engineer, nor any other officer or authorized assistant or agent of the District shall be personally responsible for any liability arising under the Contract.

K. Contractor's Responsibility for Work - Until the formal acceptance of the Work by the District, the Contractor shall have the charge and care thereof and shall bear the risk of injury or damage to any part thereof by the action of the elements or from any other cause whether arising from the execution or from the nonexecution of the Work. The Contractor shall have the responsibility of protecting all Work from playing children, trespassers and vandalism and shall employ watchmen, guards, fences, gates and other means as may be required under the circumstances. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the Work occasioned by any of the above causes before its completion and acceptance and shall bear the expense thereof; provided, however, that nothing contained herein shall require the Contractor to rebuild, repair, restore or make good damage to the Work caused by an act of God when such a requirement would be prohibited by Public Contract Code Section 7105. In case of suspension of Work from any cause whatever, the Contractor shall be responsible for all materials and shall properly store them if necessary and shall erect temporary structures where necessary.
L. **Responsibility of the District** - The District will not be held responsible for the care or protection of any material or parts of the Work prior to final acceptance except as expressly provided in the Contract Documents.

M. **Use of Explosives** - When the use of explosives is necessary for the prosecution of the Work, the Contractor shall use the utmost care not to endanger life or property.

All explosives shall be stored in accordance with the provisions of Division 11, Part 1, Chapter 6 of the Health and Safety Code of the State of California.

N. **Contract Bonds** - The Contractor, simultaneously with the execution of the Agreement, shall furnish a Labor and Materials Bond in an amount equal to one hundred percent (100%) of the Contract Price and a Faithful Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price. Said bonds shall be secured from an admitted surety company and the premiums thereon shall be paid by the Contractor. Contractor shall not commence Work until the bonds have been filed with and approved by District or its authorized representatives.

O. **Mutual Responsibility of Contractors** - The District reserves the right to award other contracts in connection with other portions of the Work or other projects. When separate contracts are awarded for different portions of the Work, “the Contractor” in the contract documents in each case shall be the Contractor who signs each separate contract. Each contractor is the intended third party beneficiary of all other contracts for the Work. Accordingly, the Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on or near the Work. If the performance of any contract for the work is likely to be interfered with by the simultaneous execution of some other separate contract or contracts, the Engineer will decide which contractor may proceed. The District will not be responsible for any damages suffered or extra cost incurred by the Contractor resulting directly or indirectly from the award or performance or attempted performance of any other separate contract or contracts on the Work, or caused by any decision or omission of the District respecting the order of precedence in the performance of the separate contracts awarded for completion of the Work. Any costs caused by defective or ill-timed work shall be borne solely by the contractor responsible therefor.

If through acts of neglect on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage on the Work, the Contractor shall settle with such other contractor or subcontractor by agreement or arbitration, if such other contractor or subcontractor will so settle.

If such other contractor or subcontractor asserts any claim against the District on account of any damage alleged to have been so sustained, the District shall notify the Contractor, who shall indemnify and save harmless to the extent
permitted by law, including all fees, costs and judgments, the District against any such claim. The Contractor must ascertain to its own satisfaction the scope of the project and the nature of any other contracts that have been or may be awarded by the District in the prosecution of the project, to the end that the Contractor may perform this Contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to the Contractor exclusive occupancy of the construction site for the Work. The Contractor shall not cause any unnecessary hindrance or delay to any other contractor working on the project. If the performance of any contract for the project is likely to be interfered with by the simultaneous performance of some other contract or contracts the District shall decide which contractor shall continue or whether the Work under the contracts can be coordinated so that the contractors may proceed simultaneously.

The District shall not be responsible for any damages suffered or extra costs incurred by the Contractor resulting directly or indirectly from the award or performance or attempted performance of any other contract or contracts on the Work or caused by a decision or omission of the District respecting the order of precedence in the performance of the Contract.

P. Notice and Service Thereof - Any notice required or given by one party to the other under or pursuant to the Contract Documents shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notices shall not be effective for any purpose whatsoever unless served in the following manner, namely:

If the notice is given to the District, by personal delivery thereof to the Engineer at 18700 Ward Street, Fountain Valley, CA 92708; or by depositing the same in the United States mail, enclosed in a sealed envelope registered and with postage prepaid, addressed to:

Orange County Water District
P.O. Box 8300
Fountain Valley, CA 92728-8300
Attention: Project Manager

If the notice is given to the Contractor, by personal delivery thereof to said Contractor or to its authorized representative at the site of the Work, or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to the legal address of Contractor, or such other address as may have been agreed to in writing by the District and Contractor, postage prepaid and registered.

If the notice is given to the Surety, or any other person, by personal delivery to said Surety or other person; or by depositing the same in the United States mail, enclosed in a sealed envelope addressed to such Surety or persons at the
address of such Surety or persons last communicated by it to the party giving the notice, postage prepaid and registered.

Notices delivered by personal delivery shall be deemed effective when delivered. Notices delivered by registered mail shall be deemed effective as acknowledged by the receipt of the registered letter.

Q. Warranty of Title - No materials, supplies or equipment for the Work under this Contract shall be purchased subject to any security interest or chattel mortgage or under conditional sale contract or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants clear and good title to all materials, supplies and equipment installed and incorporated in the Work and shall, upon completion of all Work, deliver the premises, together with all improvements and appurtenances constructed or placed thereon by it, to the District free from and clear of any claims, liens, encumbrances or charges. Contractor further agrees that neither it nor any person, firm or corporation furnishing any material or labor for any Work covered by the Contract shall have any right to a lien upon the premises or any improvement or appurtenance thereon, provided that this shall not preclude the Contractor from installing metering devices or other equipment of utility companies the title of which is commonly retained by the utility company. Nothing contained in this Paragraph 9Q, however, shall defeat or impair the right of such person furnishing materials or labor under any bond given by the Contractor for their protection of any right under any law permitting such persons to look to funds due the Contractor, in the hands of the District.

The provisions of this Paragraph 9Q shall be inserted in all subcontracts and material contracts, and notices of its provisions shall be given to all persons furnishing materials for the Work when no formal contract is entered into for such materials.

R. Termination for Breach - If the Contractor refuses or fails to prosecute the Work or any separable part thereof with such diligence as will insure its completion within the time specified herein, or any extension thereof, or fails to complete such Work within such time, or if the Contractor should be adjudged a bankrupt, make a general assignment for the benefit of its creditors, or if a receiver should be appointed on account of its insolvency, or if the Contractor or any of its subcontractors should violate any of the provisions of the Contract Documents, the District may serve written notice upon the Contractor and its Surety of the District's intention to terminate this Contract, which notice shall contain the reasons for such intention to terminate this Contract, and state that unless within ten (10) days after the service of such notice such violations shall cease and satisfactory arrangements for the corrections thereof be made, this Contract shall upon the expiration of said ten (10) days cease and terminate.

In the event of any such termination, the District shall immediately serve written notice thereof upon the Surety and the Contractor and the Surety shall have the
right to take over and perform the Contract; provided, however, that if the Surety, within fifteen (15) days after the serving upon it of a notice of termination does not give the District written notice of its intention to take over and perform the Contract, or does not commence performance thereof within thirty (30) days from the date of serving said notice, the District may take over the Work and prosecute the same to completion by contract or by any other method it may deem advisable for the account and at the expense of the Contractor, and its Surety shall be liable to the District for any excess cost or other damage occasioned by District thereby, and in such event the District may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plants, and other property belonging to the Contractor that may be on the site of the Work and be necessary therefor. Prior to conducting any Work on the project, Surety must secure written approval from the District of the contractor chosen for such work.

In the event of any action between the District and the Contractor and/or the Surety seeking enforcement or interpretation of any of the provisions of the Contract Documents, or otherwise in connection with the Work, the prevailing party in such action shall be awarded, in addition to such damages, injunctive or other relief granted by the court, its reasonable costs and expenses, including but not limited to attorneys' fees.

S. Termination of Contract for Convenience of District – The District may terminate the Contract upon ten (10) days written notice to the Contractor for the convenience of the District. Upon receipt of such written notice, the Contractor shall cease Work immediately. In such case, the Contractor shall have no claim against the District except for the value of the Work performed to the date the contract is terminated and for the cost of materials and equipment on site or in transit, plus reasonable expenses related directly to the termination action, including, but not limited to, the cost of demobilization. To the costs identified above, the Contractor is entitled to the mark ups for overhead and profit as set forth in these Contract Documents.

T. Provisions for Emergencies - Unusual conditions may arise on the Work which will require that immediate and unusual provisions be made to protect the public from danger or loss or damage to life and property, due directly or indirectly to the prosecution of the Work, and it is part of the service required of the Contractor to make such provisions and to furnish such protection.

The Contractor shall use such foresight and shall take such steps and precautions as its operations make necessary to protect the public from danger or damage, or loss of life or property, which would result from the interruption or contamination of public water supply, irrigation or other public service, or from the failure of partly completed Work.

The cost and expense of said labor and material together with the cost and expense of such repairs as may be deemed necessary shall be borne by the
Contractor, and if it shall not pay said cost and expense upon presentation of the bills therefor, duly certified by the Engineer, then said costs and expense will be paid by the District and shall thereafter be deducted from any amounts due, or which may become due said Contractor. Failure of the District, however, to take such precautionary measure shall not relieve the Contractor of its full responsibility for public safety.

The foregoing provisions are in addition to and not in limitation of any other rights or remedies available to the District.

U. **Assignment of Title** - In accordance with Section 7103.5 of the Public Contract Code, the Contractor and the District agree and acknowledge as follows: "In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgment by the parties."

V. **Audit And Access To Records Clause** - The Contractor shall maintain all books, records, documents, and other evidence directly pertinent to the performance of the work under this Contract in accordance with generally accepted accounting principles and practices consistently applied. The Contractor shall also maintain all financial information and data used by the Contractor in the preparation or support of any cost submission, including the Contractor’s original Bid, required for this Contract, or any Change Order, claim or other request for equitable adjustment, and a copy of the cost summary or information submitted to the District. The District’s representatives shall have access upon twenty four (24) hours advanced written notice, at all times during normal business hours, to all such books, records, documents, financial information, and all other evidence for the purpose of inspection, audit, and copying. The Contractor shall, at no cost to the District, provide proper facilities for such access, inspection and copying purposes.

The Contractor agrees to make the provisions of this Section applicable to this Contract, and all Change Orders, claims or other requests for equitable adjustment affecting the Contract time or price. The Contractor agrees to include the provisions of this Section in all subcontracts and sub-subcontracts or purchase orders, at any tier, and make this Section applicable to all subcontracts, at any tier, in excess of $10,000 and to make the provisions of this Section applicable to all Change Orders, claims, and other requests for equitable adjustment related to project performance.
Audits conducted under this Section shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit agency.

The Contractor agrees to the disclosure of all information and reports resulting from access to records under the provisions of this Section, to the District.

Records under the provisions of this Section shall be maintained and made available during the performance of the work under this Contract until three (3) years past final payment, and until final settlement of all disputes, claims, or litigation, whichever occurs later. In addition, those records which relate to any portion of this Contract, to any Change Order, to any dispute, to any litigation, to the settlement of any claim arising out of such performance, or to the cost or items to which an audit exception has been taken, shall be maintained and made available until final payment or final resolution of such dispute, litigation, claim, or exception, which ever occurs later.

This right of access Section applies to all financial records pertaining to this Contract and all Change Orders and claims. In addition, this right of access applies to all records pertaining to all Contracts, Change Orders and Contract Amendments:

1. To the extent the records pertain directly to Contract performance;

2. If there is any indication that fraud, gross abuse, or corrupt practices may be involved; and

3. If the Contract is terminated for default or convenience.

Access to records is not limited to the required retention periods. The authorized representatives of the Owner shall have access to records at any reasonable time for as long as the records are maintained.

W. Price Reduction For Defective Cost Or Pricing Data - If the District determines that any price, including profit or fee, negotiated in connection with any Change Order or claim settlement under this Contract, or any cost reimbursable under this Contract, was increased because:

1. The Contractor furnished cost or pricing data, which was not accurate, complete and current as certified in the Contractor’s Certificate of current Cost or Pricing Date;

2. A Subcontractor, supplier, materialman, or prospective Subcontractor, at any tier, furnished cost or pricing data in support of a subcontract cost estimate furnished by the Contractor but which was not accurate, complete and current as of the date certified in the Contractor’s Certificate of Current Cost or Pricing Data; or,
3. The Contractor or a Subcontractor, supplier, materialman, or prospective Subcontractor, at any tier, furnished any data not within (1) or (2) above, which was not accurate as submitted.

The price shall be reduced accordingly and the Contract shall be modified in writing as may be necessary to reflect such reduction. However, any reduction in the Contract price due to defective subcontract data of a prospective Subcontractor, when the subcontract was not subsequently awarded to such Subcontractor, will be limited to the amount (plus applicable overhead and profit) by which the actual subcontract or actual cost to the Contract if there was no Subcontract, was less than the prospective subcontract cost estimate submitted by the Contractor; provided that the actual subcontract price was not affected by defective cost or pricing data.

The following certification from the Contractor is required to be provided on all Change Order cost quotations or requests or all requests for equitable adjustment in excess of $5,000.00.

CERTIFICATE OF CURRENT COST AND PRICING DATA

This is to certify that, to the best of my knowledge and belief, cost or pricing data submitted in writing, or specifically identified in writing if actual submission of the data is impracticable, to the District in support of (proposal quotation, request for equitable adjustment, or other submissions involved, giving appropriate identification) are accurate, complete, and current as of (date).

Contract No. ____________________
Proposed Change Order No. _______
Firm: ________________________________________________
Name: _______________________________________________
Title: _______________________________________________
Date: _________________________
Signature: ___________________________________________

X. Contractor Health & Safety Handbook – The Contractor shall comply with all requirements set forth in the District’s Contractor’s Health & Safety Handbook” included in these contract documents and submit all forms and comply with all District directives set forth in that handbook, or that are otherwise based on the District’s adopted Contractor Safety Program.

SECTION 10. ESTIMATES AND PAYMENTS

A. Scope of Payment - The Contractor shall accept the compensation as herein provided in full payment for the Work.

B. Payments for Extra Work - Payments for extra Work, when so ordered and accepted, shall be made on one or more of the bases set forth in Method of
Adjustments to Compensation Due the Contractor section of the General Provisions, and insofar as agreed to by the District and the Contractor, in accordance with the procedures for progress payments and final payment set forth herein.

C. **Progress Payments** - Once each month the District will process the Contractor's request for partial payment on the basis of an estimate prepared by the Contractor and approved by the Engineer for work completed during the preceding month. The estimate will cover the work performed by the Contractor during the preceding month plus eighty percent (80%) of the paid invoice cost of material suitably stored at the site of the project if the Contractor desires payment for material stored; provided that, (1) each individual item of material or piece of equipment will become a permanent part of the Work and has a value in excess of $5,000; and (2) the material or equipment is required by the specifications and is specifically manufactured for the project and can not be readily diverted to another job.

The District will retain and withhold not more than five percent (5%) of the amount otherwise due the Contractor.

Cost of material stored will be based on vendors' paid invoices, which shall be listed by the Contractor. A copy of each such invoice shall accompany the first estimate in which payment is requested for material covered by the invoice. This list shall be revised and brought up-to-date by the Contractor for each estimate. The revised list shall show the total amount of each invoice, the invoice amount that has been incorporated in the Work, and the remaining invoice amount that is stored for which payment is requested that month. Only those materials that will become an integral part of the completed work may be included for partial payment as material stored.

The Engineer shall submit to the District the partial payment request within fifteen (15) days following the Progress Payment Request meeting with the Contractor, and after verifying the Contractor has met all the requirements in the Contract Documents.

Pursuant to Public Contract Code Section 20104.50, whenever the Contractor properly files a request for payment, and the validity of the claim is not disputed or has been settled or agreed upon, payment of the claim by the District shall include interest at the legal rate set forth pursuant to Section 685.010 of the Code of Civil Procedure if payment has not been made by the thirtieth (30th) day after the proper submission of the claim. If a request for payment has not been properly filed at an earlier date, then the request shall be deemed to be properly filed on the next business day after the Contractor provides written notification to the District or Engineer that the Contractor accepts the final estimate as prepared by the District.
D. **Substitution of Securities** - Pursuant to Section 22300 of the California Public Contract Code, the Contractor shall have the option to deposit qualified securities in an escrow account with an escrow agent as a substitute for retention of Contractor earnings required to be withheld by the District pursuant to the Contract Documents; provided, however that the Contractor meets the conditions specified hereinbelow. The following conditions are expressly agreed by the parties to be consistent with, in addition to, and not in any way contradictory with, the requirements of Section 22300 of the California Public Contract Code:

1. The escrow agent selected by the Contractor shall be approved by the District and both the escrow agent and escrow account shall be located within the State of California.

2. The securities eligible for deposit into the escrow account shall include those listed in Section 16430 of the California Government Code, or any other security mutually agreed to in writing by the Contractor and the District.

3. In the event that the qualified securities deposited in the escrow account decrease in value to an amount less than the cash amount then required by the Contract Documents to be withheld as retention by the District, the escrow agent shall notify the District of the deficiency within five (5) days and the Contractor shall deposit, to the extent of the deficiency, additional qualified securities with the escrow agent within five (5) days of District notification to the Contractor of such deficiency.

Upon the expiration of the five (5) day notice period to the Contractor, the District shall have the right to:

a. Cause the escrow agent to immediately convert the qualified securities deposited in the escrow account to cash and to immediately remit such cash amount to the District;

b. Cause the escrow agent to terminate the escrow account upon satisfaction of provision a) of this paragraph; and

c. Satisfy any withholding deficiency by retaining amounts necessary to satisfy such deficiency from any funds due or to become due to the Contractor under the Contract Documents.

Notwithstanding any of the foregoing provisions, the Contractor shall have the right to establish another escrow account complying with the requirements of California Public Contract Code Section 22300 and these Contract Documents even though such a previous escrow account has been terminated pursuant to this Paragraph 10D.
4. The Contractor shall bear all of the expense of the District and the escrow agent in connection with the establishment of the escrow account, the deposit of qualified securities into the escrow account, all statements and accounting relating to the escrow account, and the maintenance of the escrow account.

The Contractor shall, upon written notification to the District that the Contractor intends to open an escrow account with the escrow agent to deposit qualified securities as a substitute for retention of Contractor earnings required to be withheld by the District, notify the Surety in writing of such intention, and furnish the District with the written consent of the Surety to the utilization of such escrow account in lieu of periodic retention.

E. Deductions from Payment - In addition to any deductions pursuant to Paragraph 8I (Liquidated Damages) the District or Engineer may, at its option and at any time, retain out of any amounts due the Contractor, sums sufficient to cover any unpaid claims, provided that sworn statements of such claims shall have been filed in the office of the District.

F. Final Payment - The Engineer shall, after the satisfactory completion of the Work, make a final estimate of the amount of Work done thereunder and the value of said Work, and the District shall pay the entire sum so found to be due after deducting therefrom all previous payments and all amounts to be retained under the provisions of the Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. Acceptance of final payment by the Contractor shall waive all claims.

The payment of all amounts retained shall not be due and payable until the expiration of thirty-five (35) days from the date of acceptance of the Work by the District, which acceptance shall be by formal action of the Board of Directors, and until the Contractor satisfies the District by affidavit that all bills for labor and materials incorporated in the Work have been paid, and that the Contractor has submitted to the District a Certification relinquishing any and all claims or right of lien under, in connection with, or as a result of, the work under the Contract.

No certificate given or payments made under the Contract except the final certificate or final payment shall be conclusive evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be an acceptance of any defective Work or improper materials.

G. No Waiver of Liquidated Damages - The payment of any progress payments by the District to the Contractor shall not constitute a waiver of the District's rights under the Contract Documents to assess and collect liquidated damages due to delay in the completion of the Work.
H. Clerical Errors - For a period of three (3) years after acceptance of the Work by the District, all estimates and payments made pursuant to this section, including all progress payments, Change Orders, and the final estimate and payment, shall be subject to correction and adjustment for clerical errors in the calculations involved in the determination of quantities and payments. Except for such clerical errors, the final payment shall be binding. The Contractor and the District agree to pay to the other any sum due under the provisions of this Section; provided, however, that if the sum due is less than one hundred dollars ($100.00), no such payment need be made.

SECTION 11. GUARANTEES

In addition to guarantees required elsewhere, the Contractor shall and hereby does guarantee all Work for a period of one (1) year after the date of acceptance of the Work by the District and shall repair and replace any and all such Work, together with any other work which may be displaced in so doing that may prove defective in workmanship and/or materials within the one (1) year period from date of acceptance, without expense whatsoever to the District, ordinary wear and tear and usual abuse or neglect excepted. In the event of failure to comply with the above mentioned conditions within five (5) days after being notified in writing, the District is hereby authorized to proceed to have the defects repaired and made good at the expense of the Contractor, who shall pay the cost and charges therefor immediately on demand.

SECTION 12. DISPUTES

A. General - All disputes regarding Contractor payments or extensions of time arising out of or in relation to this Contract shall be determined in accordance with this Section. As provided in Control of Work section of the General Provisions of the Contract Documents, the Contractor shall pursue the Work to completion in accordance with the instructions of the Engineer notwithstanding the existence of any question or dispute.

B. Filing of Claim –

1. For purposes of this Section 12 only, the term “Claim” shall mean a separate demand by the Contractor, sent to the Engineer by registered or certified mail with return receipt requested, with reasonable documentation to support the Claim, for one or more of the following:

   a. A time extension, including without limit, for relief from damages or penalties for delay assessed by the District.

   b. Payment by the District of money or damages arising from work done by, or on behalf, the Contractor and payment for which is not otherwise expressly provided or for which the Contractor has not otherwise entitled.
c. Payment of an amount that is disputed by the District.

2. The Contractor shall submit a Claim to the Engineer, and furnish all Claim documentation, no later than forty five (45) days after the event or situation causing or giving rise to the Claim, unless a different deadline is otherwise stated in the Contract or in law for such claim. A notarized False Claim certification, in accordance with Section 12.J below, must be filed with the Claim. Failure by the Contractor to submit a Claim and furnish the required False Claim certification and Claim documentation within the time set forth above shall constitute waiver of the Contractor's right of compensation or extra time for such Claim.

3. Claim documentation shall conform to Generally Accepted Accounting Principles and shall be in the following format:

   a. General Introduction.

   b. General Background Discussion.

   c. Issues:

      1) Index of Issues (listed numerically).

      2) For each issue.

         a) Background.

         b) Chronology.

         c) Contractor’s position (reason for District’s potential liability).

         d) Supporting documentation of merit or entitlement.

         e) Supporting documentation of damages.

         f) Begin each issue on a new page.

   d. All critical path method schedules, both as-planned, monthly updates, schedule revisions, and as-built along with the computer disks of all schedules related to this claim.

   e. Productivity exhibits (if appropriate).

   f. Summary of Issues and Damages.

4. References, photocopies, or explanation shall cite supporting documentation of merit for each issue. Supporting documentation may include, but shall not be limited to, general conditions; general requirements; technical specifications; drawings; correspondence; conference notes; shop drawings and submittals; shop drawing logs; survey books; inspection reports; delivery schedules; test reports; daily reports; subcontracts; fragmentary CPM schedules or time impact...
analyses; photographs; technical reports; requests for information; field instructions; and all other related records necessary to support the Contractor’s Claim.

5. Supporting documentation of damages for each issue shall be cited, photocopied and explained. Supporting documentation may include, but shall not be limited to, any or all documents related to the preparation and submission of the bid; certified, detailed labor records including labor distribution reports; material and equipment procurement records; construction equipment ownership cost records or rental records; subcontractor or vendor files and cost records; service cost records; purchase orders; invoices; project as-planned and as-built cost records; general ledger records; variance reports; accounting adjustment records; and any other accounting materials necessary to support the Contractor’s Claim.

C. Administrative Review of Claim – Upon receipt of a Claim, the District shall conduct a reasonable review of the Claim and, within 45 days, provide the Contractor with a written statement identifying what portion of the Claim is disputed and what portion is undisputed. The District and the Contractor may, by mutual agreement, extend the time period for the District’s administrative review of the Claim. The District shall pay to the Contractor any undisputed portion of the Claim within 60 days after issuing its written statement.

D. Meet and Confer Process – If the Contractor disputes the District’s written response, or if the District fails to respond to a Claim within the 45-day time period, the Contractor may transmit a written demand, by registered or certified mail, return receipt requested, for an informal conference to meet and confer for settlement of the issues in dispute. The District shall schedule a meet and confer conference within 30 days of its receipt of the written demand. Within 10 business days following the conclusion of the meet and confer conference, if any portion of the Claim remains in dispute, the District shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute, and the portion that is undisputed. The District shall make payment on any portion of the Claim that is undisputed within 60 days after issuing its written statement.

E. Non-Binding Mediation – In the event that any portion of the Claim remains in dispute, the Contractor may, by written notice to the Engineer, submit any disputed portion of the Claim to non-binding mediation (including, but not limited to, non-binding neutral evaluation or a dispute review board) with the District and Contractor sharing the costs equally. The District and the Contractor shall mutually agree to a mediator within 10 business days after the District receives the Contractor’s written demand for mediation. If the District and Contractor are unable to agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim.
F. **Judicial Review** – In the event that any portion of the Claim remains in dispute following the conclusion of the non-binding mediation, the Contractor may file a claim pursuant to Government Code Section 900, *et seq.*, as a prerequisite to filing suit. The running of the period of time within which a claim must be filed under Government Code Section 900, *et seq.*, shall be tolled from the time the Contractor submits the Claim until the conclusion of the non-binding mediation.

G. **Subcontractor Claims** – The Contractor may present to the District a Claim on behalf of a subcontractor, provided that the Contractor furnishes reasonable documentation to support the subcontractor’s Claim. Any such claim filed by the Contractor on behalf of a subcontractor shall be processed in accordance with, and shall be subject to, the requirements of this Section 12.

H. **Total Cost Claims** – Claims shall not be computed by merely subcontracting bid price from the total cost of the affected work nor shall they be calculated by subtracting payments from the District from actual costs incurred by the Contractor, but instead computed as established by the information required of and submitted by Contractor under this section.

If any Claims are based upon the Total Cost Method, then, to be considered by the District, they shall be supported by evidence furnished by the Contractor that:

1. The nature of the dispute(s) makes it impossible or impracticable to determine cost impacts of specific incidents, events or action with a reasonable degree of accuracy; and

2. The Contractor’s bid estimate was realistic and free of any material errors; and

3. The Contractor’s actual costs were reasonable; and

4. That none of the added expenses or cost overruns resulted from actions of the Contractor or any subcontractor, supplier or materialman, at any tier.

If the Contractor elects to file a Total Cost Claim under the provisions above, the Contractor shall immediately make available all documents related in any way whatsoever to the preparation and submission of the Contractor’s bid and all job cost records (including at a minimum all as-planned or budget costs, all actual cost reports on a monthly basis, all labor distribution reports, all subcontractor, supplier and vendor records, and all variance reports).

I. **Measured Mile Study** – Any request for equitable adjustment seeking additional compensation for loss of productivity or loss of efficiency shall be supported by submittal of a Measured Mile Study, prepared by the Contractor and submitted to the District, of the Work so impacted. The Measured Mile Study shall identify
those activities impacted and shall show by use of contemporaneous project
documentation, what was the actual level of efficiency or productivity achieved by
the Contractor’s forces before and after a known event or set of events. In the
event that different activities on the project were impacted, staffed by different
trades, the Contractor shall submit a separate Measured Mile Study for each set
of activities so impacted. The Contractor shall also submit a written narrative
detailing the cause of such labor productivity or efficiency and demonstrating that
the District was the proximate cause of the event(s), which caused such loss.
Failure to provide such Measured Mile Study or Studies to the District in a timely
manner shall constitute waiver of any and all claims related, in any way
whatsoever, and to loss of productivity or loss of efficiency.

J. False Claim Certification – A notarized certificate containing the following
language shall accompany each Claim submitted by the Contractor:

Under the penalty of law for perjury or falsification and with specific
reference to the California False Claims Act, Government Code Section
12650, the undersigned,

___________________________________________
(Name)

___________________________________________
(Title)

___________________________________________
(Company)

hereby certifies that the claim for the additional compensation and time, if
any, made herein for the work on this Contract is a true statement of the
actual costs incurred and time sought, and is fully documented and
supported under the Contract between the parties.

(Attach California All-purpose Acknowledgement form to
certification)

Failure to submit the notarized certificate will be cause for denying
the claim.

K. Liability For False Claims – Should the Contractor be unable to support any part
of the Claim and it is determined that such inability is attributable to falsity of such
certification or misrepresentation of fact or fraud on the part of the Contractor, the
Contractor shall be liable to the District as provided for under California
Government Code Section 12650.

SECTION 13. INTEGRATION
A. **Oral Modifications Ineffective** - No oral order, objection, claim or notice by any party to the other shall affect or modify any of the terms or obligations contained in any of the Contract Documents and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed waiver or modification thereof in writing, and no evidence shall be introduced in any proceeding of any other waiver or modification. Contractor hereby acknowledges that no oral statement can be reasonably relied on and shall not be relied on for any equitable claim.

B. **Contract Documents Represent Entire Agreement** - The Contract Documents represent the entire understanding of the District and Contractor as to those matters contained therein, and no prior oral or written understanding shall be of any force or effect with respect to those matters covered by the Contract Documents.

**SECTION 14. CONFLICT OF INTEREST**

Contractor shall take all necessary actions to ensure compliance with all applicable conflict of interest codes.

**SECTION 15. INDEPENDENT CONTRACTOR STATUS**

District hereby engages Contractor as an independent contractor for the sole purpose of performing the Work related to the project. Contractor shall perform the Services on the terms and conditions set forth herein. Contractor is an independent contractor, and nothing in this Contract or in the relationship between District and Contractor shall constitute a partnership, joint venture, agency or any other similar relationship.

**SECTION 16. MISCELLANEOUS PROVISIONS**

A. **Governing Laws** - This Contract shall be construed and interpreted in accordance with and shall be governed and enforced in all respects according to the laws of the State of California.

B. **No Waiver** - The waiver by any party of a breach of any provision of this Contract shall not be deemed a continuing waiver or a waiver of any subsequent breach whether of the same or of another provision hereof.

C. **Attorneys’ Fees** - If any legal action is necessary to enforce or interpret the terms of this Contract, the prevailing party shall be entitled to reasonable attorney's fees, expert witness fees, costs, and necessary reimbursements in addition to any other relief to which said party may be entitled.

D. **Authority to Execute** - The persons executing this Contract on behalf of each party warrant that he/she is duly authorized to execute and deliver this Contract
on behalf of the respective party for whom he/she signs, and that by so executing
this Contract, each party is bound by the provisions of this Contract.

E. **Severability** - If any term, provision, covenant or condition of this Contract is held
to be invalid, void or otherwise unenforceable, to any extent, by any court of
competent jurisdiction, the remainder of this Contract shall not be affected
thereby, and each term, provision, covenant or condition of this Contract shall be
valid and enforceable to the fullest extent permitted by law.

F. **No Third-Party Rights** - Except for rights expressly set forth in this Contract,
execution and delivery of this Contract shall not be deemed to confer any rights
upon, directly, indirectly or by way of subrogation, nor obligate either of the
parties hereto to any person or entity other than each other and their respective
affiliates.

G. **Headings** – The headings in this Contract are for convenience of reference only,
and shall not limit or otherwise affect the meaning of this Contract.

H. **Modifications and Communications** – Neither this Contract nor any provision
hereof may be changed, waived, discharged or terminated orally or in writing,
except that any provision of this Contract may be amended by a writing signed by
the parties, in the observance of any provision of the Contract may be waived
(either generally or in a particular instance in either retroactively or prospectively)
by a writing signed by the party against whom such waiver is to be asserted. Any
action, including but not limited to any request, approval, change in work request,
extension request, and any communication, called out for by this Contract shall
only be binding on the respective parties if made a writing signed by the parties
consistent with the terms of this Contract.
SPECIAL PROVISIONS
INTRODUCTION TO SPECIAL PROVISIONS

These Special Provisions amend or supplement the General Provisions and other provisions of the Contract Documents as indicated below. These provisions are organized in the same order as the General Provisions, and all paragraphs or subparagraphs referenced herein are to the General Provisions section. General Provisions requirements which are not amended or supplemented by these Special Provisions remain in full force and effect.

The terms used in these Special Provisions have the meaning stated in the General Provisions. Additional terms used in these Special Provisions have the meanings stated below, which are applicable to both the singular and plural thereof.

SECTION 1 INTENT
The intent of the Contract Documents is as described in the General Provisions.

SECTION 2 PRECEDENCE OF CONTRACT DOCUMENTS
2.1 The decreasing order of precedence shall be revised as follows:

A. Agreement

B. California State Water Resources Control Board – Clean Water State Revolving Fund Davis Bacon Requirements (if applicable)

C. Compliance Guidelines for Clean Water State Revolving Fund (CWSRF) Program, Disadvantaged Business Enterprise (DBE) and Approval of Award (AOA) (if applicable)

D. Special Provisions

E. General Provisions

F. Addenda

G. Specifications

H. Drawings

I. Standard Plans

J. Standard Specifications
K. Reference Specifications

L. Reference Drawings

All other provisions in this section remain unchanged.

SECTION 3 DEFINITIONS OF TERMS

3.1 In Paragraph H, the definition of Change Order shall be revised as follows:

H. Change Order - A written order issued by the Engineer to the Contractor authorizing an addition, deletion or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time, which is issued after the effective date of the Contract and effects less modification than is effected by a Supplemental Agreement. A Change Order may or may not (in the case of a Unilateral Change Order) also be signed by the Contractor.

3.2 In Paragraph J, the definition of Contract Documents shall be revised as follows:

J. Contract Documents - The Contract Documents consist of the Notice Inviting Bids; the Information for Bidders; the Insurance Conditions; the accepted Bid; the Examination of Proposed Work; the Summary and Bid Schedule; the Firm Identification; the List of Subcontractors; the Equipment/Material Source Information; the Noncollusion Declaration to be Executed by Bidder and Submitted with Bid; the Bid Bond; the Contractor’s License Declaration; the Firm’s Experience; the Firm’s References; the pipeline Installation Contractor’s license and experience; the Selected Disadvantaged Business Enterprise Forms 6100-3 and 6100-4; the Contractor Safety Program; this Agreement; the Faithful Performance Bond; the Labor and Materials Bond; the Escrow Agreement for Security Deposits in Lieu of Retention; the General Provisions; the Special Provisions; the Compliance Guidelines For Clean Water State Revolving Fund (CWSRF) Program Disadvantaged Business Enterprise (DBE) and Approval of Award (AOA); the California State Water Resources Control Board – Clean Water State Revolving Fund Davis Bacon Requirements; the Technical Specifications; the Plans and Specifications; Subsurface Geotechnical Investigation Report; Environmental Impact Report; Mitigated Negative Declaration; and any Addenda issued prior to the submittal of the Bid. Also included shall be any and all Change Orders or supplemental written agreements approved as required by these Contract Documents amending the scope or cost or extending the time of completion of the Work contemplated and which may be required to complete the Work in a substantial and acceptable manner.

3.3 In Paragraph K, the definition of Contract Time shall be revised as follows:

K. Contract Time - The number of calendar days for final completion of the Work as defined in the Bid Form, including time extensions authorized by executed Change Orders. In case a calendar date of completion is specified in the proposal in lieu of the
number of calendar days, the Work shall be completed by the specified date. In the event of conflict between a calendar date and the number of calendar days, the number of calendar days shall govern.

3.4 In Paragraph L, the definition of Contractor shall be revised as follows:

L. Contractor - The individual, firm or corporation licensed by the State of California entering into Contract with the District for the performance of Work required by these Contract Documents.

3.5 In Paragraph M, the definition of Days shall be revised as follows:

M. Days - When used to designate a period of time, shall mean consecutive calendar days unless otherwise specifically stated.

3.6 In Paragraph Q, the definition of Engineer shall be revised as follows:

Q. Engineer - District Engineer, or consultant authorized to act for District Engineer. Engineer shall include the Construction Manager (Butier & Associates) and the Design Engineer (Black & Veatch Corporation). The authority and responsibility of the Construction Manager and of the Design Engineer shall be as specifically designated and authorized by the District Engineer.

3.7 In Paragraph S, the definition of Inspector shall be modified as follows:

S. Inspector - Any person acting on behalf of the Engineer or as required by the Contract Documents to perform inspection during construction of the Work.

3.8 In Paragraph HH, the definition of Work shall be modified as follows:

HH. Work – All the work as described in the Notice Inviting Bids and as specified, indicated, shown or contemplated by the Contract Documents, including all alterations, amendments or extension thereof made by Change Order or other written orders of the Engineer and/or the District

3.9 Add the following definitions to Section 3 of the General Provisions:

JJ. Contract Price – The total monies payable by the District to the Contractor under the terms and conditions of the Contract Documents.

KK. Effective Date of Agreement – The date indicated in the Agreement on which it becomes effective. If no such date is indicated it means the date on which the Agreement is signed and delivered by the District after it was first signed and delivered by the Contractor to the District.
LL. **Field Order** – A written order, or other written directive, issued by the Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or Contract Times.

MM. **Final Completion** – Refers to the date identified in the Notice of Final Completion, executed by the Engineer and Contractor, notifying the District that all Work is complete. All Work shall be completed and accepted by the Engineer before establishing the Final Completion date.

NN. **Inclement Weather** – Abnormal weather conditions which, as determined by the Engineer, prevent the Contractor from proceeding with at least 75 percent of the normal labor and equipment force engaged on the Work for at least 60 percent of the total daily time being currently spent on the Work. For weather conditions to be considered abnormal, the weather condition must be both abnormally severe in intensity and unusually long in its duration. The Contractor’s Schedule shall include a total of 25 inclement weather days.

OO. **Without Exception** - The term "without exception", when used in the Contract Documents following the name of a Supplier or a proprietary item of equipment, product, or material, shall mean that the sources of the product are limited to the listed Suppliers or products and that no like, equivalent, or "or-equal" item and no substitution will be permitted.

PP. **Substantial Completion** - A stage of a construction of a project or a designated portion of the project that is sufficiently complete, in accordance with the construction contract documents, so that the owner may use or occupy the project or designated portion thereof for the intended purpose.

Substantial completion is defined as when all new project components and systems have been tested and confirmed to be capable of continuous operation producing 30 mgd of product water consistently meeting effluent permit requirements. Controls, system monitoring provisions and alarms shall be fully tested and operational. All safety provisions shall be in place and fully functional.

QQ. **Supplemental Agreement** - A written amendment of the Contract Documents, signed by the Contractor and District.

1. Make Significant (>25% of the value of a Section or Plan) Plan and Specification Additions, Deletions or Changes
2. Settle a claim with exceptions. After settling as many claims as possible. Remaining claims can be brought up for alternative dispute resolution.
3. Claim at end of Project. For multiple claims and issues settled at the end of a project.

SECTION 3A  PRELIMINARY MATTERS
3A1. To receive the Notice to Proceed and to start the Work, the Contractor is required to submit several items to the Engineer and/or Owner for review. These items include the following and are described in detail elsewhere in the Contract Documents:

**Bond and Insurance Certificates** - At the time of Agreement Execution, the Contractor shall present certificates(s) of insurance, a Faithful Performance Bond, and a Labor and Materials Bond evidencing the coverage required by the Information to Bidders and Insurance Conditions Sections. Bonds shall be presented on the forms included in the Contract Documents. These certificates and bonds are required for Contractor to receive the Notice to Proceed.

**Preliminary Schedules** - The Contractor shall submit Initial CPM Construction Schedule and associated documents as specified in the Construction Progress Schedule section, a preliminary schedule of values as specified in the Construction Progress Documentation section. The Contractor shall also submit in writing the qualifications and references of the responsible scheduling person as defined in and within the time requirements of the Construction Progress Schedule section.

**List of Substitutions** - As part of the Bid Form, the Contractor submitted the equipment/material source information form, summarizing the manufacturers of all major pieces of equipment included as part of the Work. For all other equipment, articles, or materials other than the major equipment or materials listed in the Bid Form, the Contractor shall prepare an additional List of Substitutions to notify the District in writing of substitutions and shall submit pertinent and appropriate data substantiating its request for said substitutions for review by the Engineer. This shall be done in accordance with schedule and other requirements described in Section 7 of the General Provisions.

**Draft Master Submittal List** - The Contractor shall submit for review to the Engineer a draft Master Submittal List of all required submittals. The list shall include submittal details and shall be delivered within the time defined in the Submittals Section.

3A2. After receiving the Notice to Proceed and prior to starting the Work, the Contractor shall coordinate the following two meetings:

**Preconstruction Conference** - Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the construction schedule, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on
behalf of each respective party. The Pre-Construction Conference is separate and distinct from the Pre-Construction Scheduling Conference.

Subcontractor Mobilization Meeting - Prior to the start of each major Subcontractor’s site Work, the Contractor, the involved Subcontractor, and the Engineer shall attend a pre-start meeting to discuss the schedule, coordination, procedures and other administrative activities.

Schedule of Payments - The Contractor shall submit a preliminary schedule of payments in the time required and as specified in the Construction Progress Documentation Section.

The Contractor shall also submit a written safety plan to the Engineer for review prior to any work being commenced on site. This plan is discussed further in the Special Provisions and in the Measurement and Payment Section.

SECTION 4 SCOPE OF WORK

4.1 Replace Paragraph A, Work To Be Done, with the following:

A. Work to be Done - The work to be performed under this Contract shall consist of furnishing all tools, equipment, materials, supplies and manufactured articles, all transportation, services, including fuel, power and water, and essential communications, and the performance of all labor, Work, required calculations testing, inspections or operations, or operations required for the fulfillment of the Contract, in strict accordance with the specifications, schedules, and Plans, all of which are made a part hereof, and including such detail sketches as may be furnished by the Engineer from time to time during the construction in explanation of said Plans. The Work shall be complete and all material, and services incidentals, quality or not specifically called for quality and conditions noted, in the Specifications, or not shown on the Plans, which may be necessary for complete and proper construction to carry out the Contract in good faith and a satisfactory manner shall be performed, furnished, and installed by the Contractor at no increase in cost to the District.

The Contract Documents describe the Work to be constructed in accordance with the Contract Documents. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning unless a definition has been provided.

4.2 Replace Paragraph B, Progress Schedule, with the following:

B. Progress Schedule - The Contractor shall submit work schedules as specified, in the Construction Progress Schedule Section. The Contractor shall assume the full
responsibility for performing the Work in an orderly procedure under the Contract Documents.

4.3 Replace Paragraph E, Drawings and Specifications on the Work, with the following:

E. Drawings and Specifications on the Work - The Contractor shall at all times keep one (1) hard copy of all design and/or record drawings and specification on the Work at the job site. These drawings and specifications shall be updated daily to reflect changes or verifications in the installation from the Contract Documents, maintained in good order, and made available for review by the Engineer or their representatives at all times. These documents will serve as the hard copy for as-built production and are the responsibility of the Contractor to maintain. Upon completion of the Work, and as a condition precedent to the reduction of retainage or the Contractor’s receipt of final payment for the Work, the completed record drawings and specifications shall be submitted to the District.

4.4 The terms and conditions of Paragraph H, Public Utilities, shall refer to existing District-owned utilities as well as publicly owned utilities. Replace Paragraph H, subsection 3 with the following:

3. The Contract Documents show the approximate positions of known utilities in the immediate vicinity of the Work, but the District does not guarantee that all existing utilities are shown. The Contractor shall fully cooperate with the public agency and utility and shall notify Underground Services Alert (USA) at least 48 hours prior to excavating any public right of way. The Contractor shall perform any potholing at all work areas a minimum of thirty (30) before excavation. The Contractor, before commencing any excavation, shall ascertain, from records or otherwise, the existence, horizontal and vertical position, and ownership of all existing facilities and service connections.

If the Contractor discovers any utility in the line of the Work, which is not shown on the Plans, it shall notify, in writing, the District within one business day of the existence of it. The District will not be liable for any consequences arising because of a service connection being incorrectly located in the field by the agency having jurisdiction over the service connection. The Contractor’s failure to give notice of such underground utilities within the time specified of their discovery shall constitute a waiver of all Requests for Change Orders or claims in connection therewith, whether direct or consequential in nature.

4.5 In Paragraph I, Differing Site Conditions, subparagraph 1, add the following new paragraphs:
d. Work effort, construction requirements, or subsurface or latent physical conditions at the site of the Work differing materially from that presented in the Geotechnical Investigation presented above;

e. Reference is made to details of existing structures and existing utilities that have been used in the preparation of the Contract Documents. These details are based on record drawings provided by the District. As referenced in the Contract Documents, the Contractor is responsible for field verification of these items.

4.6 In Paragraph I, Differing Site Conditions, add the following new paragraph:

6. The Contractor’s failure to give notice of such differing site conditions within one business day of their discovery shall constitute a waiver of all Requests for Change Orders or claims in connection therewith, whether direct or consequential in nature.

4.7 In Paragraph I, Differing Site Conditions, add the following new paragraph:

7. In the preparation of the Contract Documents, the following reports of explorations and tests of subsurface conditions at the Site were prepared for the District and used in the design development:

   a. Limited Environmental Site Assessment Groundwater Replenishment System Final Expansion; prepared by Shannon & Wilson, Inc., April 10, 2019


   c. Report of Foundation Investigation Proposed Interplant Pipeline and Utility Corridor (Job I-9) Adjacent to Santa Ana River Between Plant No. 1 and Plant No. 2 Fountain Valley and Huntington Beach, California for the Orange County Sanitation District. LeRoy Crandall and Associates

The geotechnical data in the referenced reports with respect to soil borings can be relied upon only to the extent of those soils being at the location of the test holes.

The presence and elevation of groundwater is seasonal and may vary from that indicated in the soils borings.

The geotechnical data contained in the Reports tabulated above are part of the Contract Documents. The availability of the geotechnical data contained herein in no way relieves the Contractor from examining and making such independent surveys and investigations of the Work Site, including investigation of subsurface or latent physical
conditions at the Work Site, as the Contractor may deem necessary or prudent for the performance of the Work at the Contract Price and within the Contract Time within the terms of the Contract Documents.

4.8 Add new Paragraph J, OCSD Effluent Junction Box Access, as follows:

J. **OCSD Effluent Junction Box Access.** OCSD owns and operates an existing Effluent Junction Box (EJB) immediately south of Garfield Avenue and adjacent to the Santa Ana River levee and will require continuous access to this facility. The Contractor will also have Work activities in the vicinity of the existing EJB. The Contractor shall conduct his operations to avoid impacts to OCSD operation and maintenance activities. OCSD may require periodic heavy equipment access to the existing EJB site as part of its maintenance work. If requested by the Owner or OCSD, the Contractor shall immediately terminate an ongoing activity, relocate or remove conflicting equipment, or take other actions necessary to facilitate full and unrestricted OCSD access to the existing EJB.

4.9 Add new Paragraph K, P2 Conveyance Pipeline Demobilization and Remobilization, as follows:

K. **P2 Conveyance Pipeline Demobilization and Remobilization.** The existing 66-inch pipeline that extends from OCSD Plant 2 to OCSD Plant 1 is being rehabilitated to provide conveyance of secondary effluent to GWRS. The existing pipeline also functions as an emergency stormwater conveyance conduit for OCSD during wet weather periods.

The Work under this contract includes demolition of sections of the 66-inch pipeline to allow insertion of the slip lining material and for connection to the remaining unlined sections (two locations) of 66-inch pipeline. Up to eleven (11) total locations (pits) are expected to facilitate the slip lining and connection work.

In an emergency wet weather event during which OCSD determines the existing pipeline is needed for stormwater conveyance, the Contractor shall immediately (working around the clock, if necessary) demobilize from its pipeline connection work and install temporary pipeline sections (at the demolished sections of 66-inch pipeline), blind flanges, plugs, and other provisions as necessary to allow recommissioning of the 66-inch pipeline for continuous, gravity stormwater flow through the existing pipeline to the ocean discharge. If such emergency work is called upon by OCSD, then the work to provide this temporary demobilization and gravity pipeline components will be monitored on a time and materials basis by the Engineer for payment to the Contractor.

4.10 Add new Paragraph L, Responsibility of the Contractor, as follows:

L. **Responsibility of the Contractor.** If any part of the Work depends for proper execution or results upon the work of others, the Contractor shall inspect and promptly report to the Engineer any apparent discrepancies or defects in such work of others that
render it unsuitable for such proper execution and results. Failure of the Contractor to
so inspect and report shall constitute an acceptance of the work of others as fit and
proper except as to defects which may develop in the work of others after execution of
the Work by the Contractor.

4.11 Add new Paragraph M, Delivery of Certified Payroll, as follows:

M. Delivery of Certified Payroll. This public works contract is funded by a State or
Federal Grant or Loan. Effective January 1, 2016, ALL general contractors and
subcontractors must submit certified payroll records to the Labor Commissioner using
the Department of Industrial Relations’ (DIR’s) electronic certified payroll reporting
(eCPR) system. It shall be the responsibility of each general contractor and
subcontractor to comply with its obligation under this Section.

4.12 Add new Paragraph N, Project Meetings and Reports, as follows:

N. Project Meetings and Reports. Contractor shall include as part of its execution plan
the following project meetings and reports.

1. Preconstruction Conference - Upon receipt of the Notice to Proceed, or at an
earlier time if mutually agreeable, the Engineer will arrange a preconstruction
conference to be attended by the Contractor's superintendent, the District, the
Engineer, and representatives of utilities, all subcontractors, and others involved
in the execution of the Work.

The purpose of this conference shall be to establish a working understanding
between the parties and to discuss the Construction Schedule, shop drawing
submittals and processing, cost breakdown of major lump sum items, applica-
tions for payment and their processing, and such other subjects as may be
pertinent to the execution of the Work.

The Engineer may also schedule a preconstruction scheduling conference to be
attended by the Engineer, the Contractor’s superintendent and scheduler, and
representatives of all major subcontractors. The purpose of this conference shall
be to review the scheduling requirements of this Contract.

2. Progress Meeting - The Engineer shall arrange and conduct progress meetings.
These meetings shall be conducted at least once every week as a minimum and
shall be attended by the Contractor's superintendent and scheduler, and
representatives of all subcontractors, utilities, and others that are active in the
execution of the Work. The purpose of these meetings shall be to expedite the
work of any subcontractor or other organization that is not up to schedule,
resolve conflicts, and in general, coordinate and expedite the execution of the Work.
3. **Review of Progress Payment Request** - On the last Thursday of each month, the Contractor and Engineer shall meet to review the progress payment request submitted by the Contractor for that month. The Contractor shall have its copy of the payment request form and all other data required by the Contract Documents filled in and completed prior to the meeting. The Engineer will process Contractor's payment request after satisfactory review of the schedule update and as-built drawings.

4. **Daily Reports** - Daily progress and manpower reports shall be submitted to the Engineer on a weekly basis for both the Contractor and its subcontractors. The Contractor shall prepare and maintain Daily Inspection Records to document the progress of the Work daily. Such daily records shall include a daily accounting of all labor and all equipment on the site for the Contractor and all subcontractors, at any tier. Such daily records will make a clear distinction between Work being performed under Change Order, base scope Work and/or disputed Work.

   If any labor or equipment is idled, solely as a result of District actions, the daily records shall record which laborers and equipment were idled and for how long. If specific work activities were stopped, solely as a result of District actions, and labor and equipment was reassigned to perform Work on other activities, the daily records will make a clear record of which activities were stopped and where labor and equipment was redirected to.

   Such daily records shall be copied and provided to the Engineer at the end of every workday, or the beginning of the following workday.

5. **Review of Schedule Update** - After each monthly schedule update, the Contractor shall submit to the Engineer one print of the last accepted Critical Path Method (CPM) Construction Schedule, marked up in red in accordance with the Progress Payment Request meeting; and one sepia, and three blueline copies incorporating the updated schedule information.

4.14 Add new Paragraph P, Santa Ana River Trail Access, as follows:

J. **Santa Ana River Trail Access.** Safe public pedestrian and bicycle access shall be maintained at all times via Garfield Avenue to the Santa Ana River Trail during pipeline work within and just south of Garfield Avenue. The Contractor shall provide the necessary structures, signage, and if necessary flagman for the safe travel of the public through the work zone from Ward Avenue to the Santa Ana River Trail on Garfield Avenue.
SECTION 5. CHANGES IN WORK

5.1 In Paragraph A, Changes Initiated by the District, add the following new paragraphs:

If the method or amount of payment cannot be agreed upon prior to performing the Change Order Work, the Engineer may issue a Unilateral Change Order in the amount determined reasonable by the Engineer for the Change Order Work and direct the Contractor to proceed immediately. The Engineer also has the option to issue a Time and Materials Change Order directing the Change Order Work be performed on a time and materials basis with the Contractor providing all labor, equipment, and materials necessary to complete the Change Order Work in a satisfactory manner and within a reasonable period of time. Estimates for lump sum quotations and accounting for Time and Materials Work shall be limited to direct expenditures necessitated specifically by the subject Change Order Work.

5.2 Replace the CHANGE ORDER FORM on page GP-13 with the following new CHANGE ORDER FORM:
CHANGE ORDER FORM

Pursuant to this section of the General Provisions, the Contractor shall use this Change Order Form for all Change Orders associated with the Work. No additions or deletions to this form shall be allowed.

CHANGE ORDER NO.  
CONTRACT NO.

TO:

You are hereby directed to provide the extra work necessary to comply with this Change Order.

DESCRIPTION OF CHANGE:

IS THIS A UNILATERAL CHANGE?  YES ☐  NO ☐

PAYMENT:

CONTRACT TIME:

ACCEPTANCE:

Contractor accepts the terms and conditions stated above as full and final settlement of any and all claims arising from this Change Order and acknowledges that the compensation (time and cost) set forth in the Change Order comprises the total compensation due for the work or change defined in the Change Order, including all impact on any unchanged work. By signing the Change Order, the Contractor acknowledges and agrees that the stipulated compensation includes payment for all Work contained in the Change Order, plus all payment for the interruption of schedules, extended overhead costs, delay, and all impact, ripple effect or cumulative impact on all other Work under this Contract. The signing of the Change Order acknowledges full mutual accord and satisfaction for the change, and that the time and/or cost under the Change Order constitute the total equitable adjustment owed the Contractor as a result of the change. The Contractor agrees to waive all rights, without exception or reservation of any kind whatsoever, to file any further claim or request for equitable adjustment of any type, for any reasonably foreseeable cause that shall arise out of or as a result of this Change Order or the impact of this Change Order on the remainder of the Work under this contract.

Contractor agrees to perform the above-described work in accordance with the above terms and in compliance with applicable sections of the Contract Documents.

This Change Order is hereby agreed to, accepted and approved, all in accordance with the General Provisions of the Contract Documents.

ORANGE COUNTY WATER DISTRICT

By:  Project Manager  Date

By:  Director of Engineering  Date

By:  Executive Director of Engineering and Local Resources  Date

By:  General Manager  Date

CONTRACTOR  

*Contractor Signature Not Required if Unilateral

By:  ____________________________  Date

Title:  ____________________________

By:  ____________________________  Date

Title:  ____________________________
5.3 Add new Paragraph F as follows:

The Contractor shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time(s) with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by a Change Order.

5.4 Add new Section 5.4 Value Engineering as follows:

Section 5.4 Value Engineering

Value Engineering-Construction

1. (a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP’s) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP’s, in accordance with paragraph (f) of this clause.

2. (b) Definitions. “Collateral costs,” as used in this clause, means District costs of operation, maintenance, logistic support, or District-furnished property.

“Collateral savings,” as used in this clause, means those measurable net reductions resulting from a VECP in the District’s overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

“Contractor’s development and implementation costs,” as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by District acceptance of a VECP.

“District costs,” as used in this clause, means those District costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

“Instant contract savings,” as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor’s development and implementation costs, including subcontractors’ development and implementation costs (see paragraph (h) of this clause).

“Value engineering change proposal (VECP)” means a proposal that-

a. (1) Requires a change to the contract, to implement; and
b. (2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change-
   i. (i) In deliverable end item quantities only; or
   ii. (ii) To the contract type only.

3. (c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in paragraphs (c)(1) through (7) of this clause. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:
   a. (1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item’s function or characteristics are being altered, and the effect of the change on the end item’s performance.
   b. (2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.
   c. (3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor’s allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) of this clause.
   d. (4) A description and estimate of costs the District may incur in implementing the VECP, such as test and evaluation and operating and support costs.
   e. (5) A prediction of any effects the proposed change would have on collateral costs to the District.
   f. (6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.
   g. (7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous District actions, if known.
4. (d) Submission. The Contractor shall submit VECP’s to the Construction Manager at the worksite, with a copy to the District.

5. (e) District action.

a. (1) The Construction Manager will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Construction Manager will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The District will process VECP’s expeditiously; however, it will not be liable for any delay in acting upon a VECP.

b. (2) If the VECP is not accepted, the Construction Manager will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the District. The Construction Manager may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

c. (3) Any VECP may be accepted, in whole or in part, by the Construction Manager’s award of a modification to this contract citing this clause. The Construction Manager may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Construction Manager.

6. (f) Sharing-

a. (1) Rates. The District’s share of savings is determined by subtracting District costs from instant contract savings and multiplying the result by-

   i. (i) 45 percent for fixed-price contracts; or

   ii. (ii) 75 percent for cost-reimbursement contracts.

b. (2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to-

   i. (i) Accept the VECP;

   ii. (ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

   iii. (iii) Provide the Contractor’s share of savings by adding the amount calculated to the contract price or fee.
7. (g) Collateral savings. If a VECP is accepted, the Construction Manager will increase the instant contract amount by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any District costs not previously offset. However, the Contractor’s share of collateral savings will not exceed the contract’s firm-fixed-price or estimated cost, at the time the VECP is accepted, or $100,000, whichever is greater. The Construction Manager is the sole determiner of the amount of collateral savings.

8. (h) Subcontracts. The Contractor may include an appropriate value engineering clause in any subcontract of $70,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract’s price under paragraph (f) of this clause, the Contractor’s allowable development and implementation costs shall include any subcontractor’s allowable development and implementation costs clearly resulting from a VECP accepted by the District under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the District’s share of the savings resulting from the VECP.

9. (i) Data. The Contractor may restrict the District’s right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

These data, furnished under the Value Engineering-Construction clause of contract GWRS 2019-01, shall not be disclosed outside the District or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the District’s right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations.

If a VECP is accepted, the Contractor hereby grants the District unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the District shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data.

SECTION 6. CONTROL OF THE WORK

6.1 Replace Paragraph A, Authority of the Engineer, with the following:

A. Authority of the Engineer - The Engineer will be the District’s representative during the construction period. The Engineer or an authorized representative will be on-site full time during construction. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Contract Documents, including the Plans and Specifications. The Contractor shall promptly comply with instructions from the
Engineer or an authorized representative. The Engineer will receive, process, monitor, and return all Contractor submittals. The Engineer will issue such written clarifications or interpretations of the requirements of the Contract Documents as the Engineer may determine necessary. As authorized by the District, the Engineer may issue Change Orders to increase, decrease or modify the scope of work. The Engineer may authorize variations in the Work from the Contract Documents with District approval. The Engineer also has the authority to reject Work that the Engineer believes to be defective and will also have authority to require special inspection or additional testing of the work. Allocation of cost for reexamination of the Work is defined in Section 6 under Reexamination of Work.

A1. Limitation on Engineer Authority - Neither the Engineer’s authority to act under this section or other provisions of the Contract Documents, nor any decision made by the Engineer in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any Supplier, any Surety for any of them, or any other person or organization performing any of the Work.

The Engineer’s review of submittal shall not release Contractor from Contractor’s responsibility for performance of requirements of Contractor Documents. The purpose of submittals is to demonstrate how Contractor intends to conform to the Contract Documents and design concept; they are not to be considered Contract Documents.

The Engineer will not supervise, direct, control, or have authority over or be responsible for the Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the Contractor to comply with laws and Regulations applicable to performance of the Work. The Engineer will not be responsible for the Contractor’s failure to perform the Work in accordance with the Contract Documents.

6.2 Replace Paragraph C, Authority of the Board, with the following:

C. Authority of the Board - The Board of Directors has the final authority in all matters affecting the Work covered by the Contract. As specified in Paragraph 6A above, the Engineer has authority to issue such written clarifications or interpretations of the requirements of the Contract Documents as the Engineer may determine necessary, but the Engineer may only authorize variations in the Work from the Contract Documents with District and/or Board approval. In accordance with the Disputes Section of the Contract Documents, the Board of Directors shall determine, after completion of the Work and prior to final payment, all questions and disputes arising out of the instructions of the Engineer. Notwithstanding the existence of any such questions or dispute the Contractor shall diligently pursue the Work to completion.

6.3 Replace Paragraph D, Plans, with the following:
D. Plans and Specifications - As shown on the Plans or described in the Specifications, each element of the Work must be furnished complete, finished and functional. Whether shown or not, include all materials and ancillary equipment necessary to provide a complete installation. The Plans, Specifications and other Contract Documents are intended to be complementary and cooperative to describe and provide for a complete project. Anything in the Specifications and not on the Plans, or on the Plans and not in the Specifications, shall be as though shown or mentioned in both. Details shown for an item of Work are typical and shall apply to similar items of Work.

Do not deviate from the Plans and Specifications without written authorization from the Engineer. The Engineer does not warrant the accuracy of scaled dimensions. Dimensions indicated by figures or numerals shall govern. Larger scale drawings shall take precedence over smaller scale drawings. Detailed drawings will take precedence over general drawings. The Engineer may furnish additional details pertaining to the Work and the same shall be considered part of the Contract. References made to other specifications and codes refer to the edition including amendments in effect and published at the time of advertising the project, unless specifically referred to by edition, volume, or date as noted in the Contract Documents. The organization of the Technical Sections of the Project Manual into Division, Sections, and articles shall not control or limit the CONTRACTOR in dividing the work among Subcontractors, a Sub-subcontractor, or to establish the extent of work to be performed by any trade. The CONTRACTOR shall be solely responsible for all subcontract arrangements of work regardless of the Project Manual organization.
6.4 Replace Paragraph E, Conformity with Plans and Allowable Deviations, with the following:

E. Accuracy of Plans and Specifications - Omissions from the Plans and Specifications shall not relieve the Contractor from the responsibility of furnishing, making, or installing all items required by law or usually furnished, made, or installed in a project of the scope and character indicated by the Plans and Specifications.

The Plans show conditions as they are supposed or believed by the Engineer to exist, but it is not intended or to be inferred that the conditions as shown thereon constitute a representation or warranty, expressed or implied, by the District or its representatives, that such conditions are actually existent, nor shall the District, or any of its representatives, be liable for any loss sustained by the Contractor as a result of any variance between conditions as shown on the Plans, and the actual conditions revealed during progress of the Work or otherwise, except as indicated in “Differing Site Conditions” of these General Conditions.

6.5 Add the following new paragraph to the end of Paragraph F, Request for Information:

The Engineer's review shall not relieve Contractor from the entire responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called attention to each such variation at the time of each RFI submittal and Engineer has given written approval of each such variation by specific written notation thereof incorporated in the RFI review.

Additional requirements regarding RFI procedures are included in the Requests for Information and Clarifications section.

6.6 Replace Paragraph G, Reference Points, with the following:

G. Reference Points - The Contractor shall use the reference points and benchmarks as described in the Field Engineering Section. The Contractor shall establish all other lines and grades necessary for the execution of the Work. The Contractor shall carefully preserve all reference points, benchmarks, and other survey points, and shall be liable for and charged with the cost of their replacement and of any expense resulting from their loss or disturbance.

6.7 Add the following new paragraph at the end of Paragraph H, Inspection:

Additional requirements regarding Inspection requirements either by the Engineer or by an independent inspector are included in the Quality Control and Inspection Section.
6.8 Replace the first subparagraph of section 1, Paragraph O, Shop Drawings, with the following:

Wherever shop drawings are called for in the Contract Documents, or where required by the Engineer, the Contractor shall furnish to the Engineer at an address provided by the Engineer to the Contractor for review eight (8) prints of each shop drawing. The term "shop drawing" as used herein shall be understood to include, but not be limited to, drawings, diagrams, schedules, and other data specially prepared for the Work to illustrate some portion of the Work. Shop Drawings is further defined in the Submittals Section of the Contract Documents.

6.9 Replace the first subparagraph of section 2, Paragraph O, Shop Drawings, with the following:

All shop drawing submittals shall be accompanied by a transmittal form using the format included in the Submittals Section. Any shop drawing submittal not accompanied by such a form, or where all applicable items on the form are not completed, will be returned for resubmittal. In accordance with the Submittals Section, the Contractor shall check all subcontractor’s shop drawings regarding measurement, size of members, materials, and details prior to submittal to the Engineer to verify that they conform to the intent of the Drawings and Submittals as ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor.

6.10 Add the following at the end of Paragraph O, Shop Drawings, section 4:

Two copies of each reviewed submittal shall be returned to the Contractor.

Additional requirements regarding Submittal content and procedures are detailed in the Submittals section.

6.11 Add the following to Paragraph Q, Cleaning:

Construction materials, such as concrete forms and scaffolding, shall be neatly stacked by Contractor when not in use. Contractor shall promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

Volatile wastes shall be properly stored in covered metal containers and removed daily. Wastes shall not be buried or burned on the Site or disposed of into storm drains, sanitary sewers, streams, or waterways. All wastes shall be removed from the Site and disposed of in a manner complying with local ordinances and antipollution laws.

Adequate cleanup will be a condition for recommendation of progress payment applications.
SECTION 7. CONTROLS OF MATERIALS

7.1 Add the following to Paragraph D, Storage of Materials and Equipment:

Additional requirements for storage of materials and equipment are included in the Delivery, Handling, and Storage Section.

7.2 Add the following new Paragraph G, Asbestos Materials:

G. Asbestos Materials - Asbestos materials shall be excluded from the Work. No product or material containing asbestos is to be incorporated in the Work.

If existing asbestos materials are encountered during the Work, the Contractor shall promptly notify the Engineer in writing. A Contractor registered by Cal/OSHA and certified by the State Contractors Licensing Board for asbestos removal shall perform removal of existing asbestos material. Copies of the certification shall be submitted to the Engineer prior to the commencement of any asbestos removal activities. The Contractor or subcontractor shall comply with all State and Federal laws regarding handling and removal of asbestos materials. The Contractor shall be responsible for the proper removal and disposal of all asbestos material.

7.3 Add the following new Paragraph H, Connection to Existing Asbestos Cement Pipe:

H. Connection to Existing Asbestos Cement Pipe - In the specific instance of making piping connections to existing asbestos cement pipe, the Contractor shall disconnect, at the nearest joints, a length of asbestos cement pipe from the pipeline to which a connection is to be made. The new pipe making the tie-in connection will replace the length of existing asbestos cement pipe that was removed.

SECTION 8. PROSECUTIONS AND PROGRESS

8.1 Add the following to Paragraph H, Time of Completion:

The time for completion is defined in the Bid Form portion of the Agreement and may only be modified through agreed Change Orders.

8.2 Replace the fifth paragraph in Paragraph I, Liquidated Damages, with the following:

The Contractor will be granted a non-compensable extension of time and will not be assessed with liquidated damages for any portion of the delay in completion of the Work beyond the time set forth in the Contract Documents for the completion of the Work due to unforeseeable causes beyond the control and without the fault or
negligence of the Contractor or their subcontractors or suppliers, at any tier, including but not restricted to acts of God, acts of the public enemy, acts of the Government in its sovereign capacity, fire, floods, epidemics, quarantine restrictions, strike, shortage of materials, freight embargoes, utility relocations as provided in Underground Services Alert section of the General Provisions of these Contract Documents, or unusually severe weather.

8.3 Add new Paragraph J, Substantial Completion:

J. Substantial Completion - Substantial Completion of the Work means the Work has progressed to the point that District can beneficially occupy or utilize the Work for the purpose for which it is intended, and the Work complies with applicable codes and regulations, including if required, issuance of certificates of occupancy, or certificate of suitability for use from the appropriate governmental agencies, as determined by the Engineer at his/her sole discretion.

When the Contractor considers that Substantial Completion has been achieved, the Contractor shall notify the Engineer that the Work is substantially complete to the required stage and is ready for inspection and shall include with its Notice of Substantial Completion of the Work a list of minor items, (including the Contractor’s punch list) to be completed or corrected that would not affect Beneficial Occupancy or suitability for use. After receipt of the Contractor’s Notice of Substantial Completion of Work, the Engineer and Contractor, and any other representative as the Engineer deems appropriate, shall inspect the Work to determine whether the Work has been completed in accordance with the Contract Documents and to review the Contractor’s punch list. If, in the Engineer’s sole opinion, the Work has not achieved Substantial Completion, the parties shall cease the inspection and all costs incurred by District as a result of the premature inspection shall be deducted from the payments due the Contractor. Contractor shall thereafter perform all remaining Work to reach Substantial Completion, and re-submit its Notice of Substantial Completion of Work. The inspection of the Work will re-commence as set forth above. If the Work has achieved Substantial Completion, a punch list shall be prepared by the Engineer and consist of those items listed by the Contractor to be completed or corrected as supplemented by those items observed during the inspection. Failure to include any items on the punch list shall not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents, nor shall the punch list amend the Contract Documents. All deficiencies and/or items identified on the punch list must be corrected within 30 days of said initial inspection conducted at the Substantial Completion phase, unless otherwise specified in writing by the Engineer.

Specific items of the Work, which shall be completed prior to declaration of the Substantial Completion date, shall include, but not be limited to, the following:

- Pressure testing (and disinfections – if required) of all pipelines
- Removal of test bulkheads and construction of closure/joints
- Installation of all cathodic test stations and facilities
• Replacement in-kind, or to the satisfaction of the District, the District or jurisdictional agency, of improvements removed or damaged during the prosecution of this Project. This does not include final paving or landscape repair within the last 2,000 feet of the working heading or final slurry seal and street paving.
• Commissioning and acceptance testing of the facility

Acceptable Submittals (including electronic copies) of the following items:
• Record documents.
• Shop drawings and samples
• Operation and maintenance manuals
• Equipment data forms
• Manufacturer’s certifications of proper installation (if required)
• Factory test reports
• All testing and startup required by the Specifications
• All special accessories have been provided to place each item of equipment in full operation. Such items include, but are not limited to, specified spare parts, adequate oil and grease or other lubrication, air filters, light bulbs, fuses, special tools, valve operators, and other expendable items required for startup and operation of operating facilities or systems.
• All additional warranty or insurance coverage requirements have been provided.

SECTION 9. LEGAL RELATIONS AND RESPONSIBILITIES

9.1 Add the following statements to Paragraph C, Permits and Licenses:

Additional requirements for permitting and further clarifications regarding payment of licenses are included in the Regulatory Requirements and Permits Section.

9.2 Add the following statement to Paragraph G, Cal/OSHA Requirements:

The Contractor shall submit a written safety plan to the Engineer and OCSD for review and acceptance prior to commencement of any work on site. The Engineer shall not assume any responsibility for safety in connection with the Work or at the site of the Work because of Engineer’s review and acceptance of the safety plan. The Contractor shall be solely responsible for implementing the safety plan and for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

9.3 Add the following statements to Paragraph N, Contract Bonds:
If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Work is located, the Contractor shall within 7 calendar days thereafter substitute another bond and Surety, which will be acceptable to the Owner.

9.4 Add new Paragraph Y, Partial Acceptance:

A. Partial Acceptance - The District shall have the right to utilize or place into service any item of equipment or other usable portion of the Work prior to completion of the entire project. The Engineer will notify the Contractor in writing identifying the specific portion or portions of the Work to be so utilized or otherwise placed into service. Following inspection by the Engineer and Inspector and completion of a Partial Final Inspection Correction List, a “Statement of Partial Completion” will be issued.

It shall be understood by the Contractor that until a “Statement of Partial Completion” is issued, all responsibility for care and maintenance of all items or portions of the Work to be placed in use shall be borne by the Contractor. Upon issuance of a “Statement of Partial Completion”, the District will accept responsibility for the protection and maintenance of all such items or portions of the Work described in the written notice, and it is further understood that the manufacturer's warranties of any affected equipment will commence not later than the date for commencement of the warranties indicated on the “Statement of Partial Completion”. However, the Contractor shall retain full responsibility for satisfactory operation of the total project and the Contractor’s guarantee period shall commence only after the issuance of the Statement of Completion. Such guarantee of total systems operation shall include that portion or portions of work covered by the “Statement of Partial Completion”. The issuance of a “Statement of Partial Completion” for any part of the Work shall not relieve the Contractor of its obligation to promptly remedy any omissions and latent or unnoticed defects in the Work covered by the “Statement of Partial Completion”. The District shall have the right to restrict the Contractor’s use of the occupied portion of the Work but shall allow the Contractor reasonable access to complete or correct items required by the Contract Documents.

The District may, if the Work is progressing satisfactorily, release part of the retention on portions of the Work for which a “Statement of Partial Completion” has been issued, provided that the following conditions have been met:

1. Partial Final Inspection corrections have been completed to the satisfaction of the Engineer and Inspector on the portions of work to be utilized or placed into service;
2. The Contractor submits a written request to the Inspector for release of retention which includes a verifiable valuation of the identified portions of the Work covered by the “Statement of Partial Completion”;
3. Impacted Subcontractors, major suppliers and the Contractor’s Surety all agree in writing to release of retention;
4. There are no Stop Notices on file with the District against the Contractor involving any portion of the affected Work; and
5. Both the Engineer and Inspector agree that a portion of the retention should be released for the affected Work.

SECTION 10. ESTIMATES AND PAYMENTS

10.1 Add the following statement to Paragraph B, Payment for Extra Work:

Payments for Extra Works that are identified by unit price in the Bid Form shall be paid in accordance with these agreed costs.

SECTION 11. GUARANTEES

The guarantee of the Work by the Contractor is as described in the General Provisions.

SECTION 12. DISPUTES

The resolution of disputes in relation to this Contract is as described in the General Provisions.

SECTION 13. INTEGRATION

The impact of oral modifications and the representation of the Contract Documents is as described in the General Provisions.

SECTION 14. CONFLICT OF INTEREST

Implementation of conflict of interest codes is as described in the General Provisions.

SECTION 15. INDEPENDENT CONTRACTOR STATUS

The status of the Contractor is as described in the General Provisions.

SECTION 16. MISCELLANEOUS PROVISIONS

The status of the Contractor is as described in the General Provisions.
Exhibit A

Guidelines for Meeting the California State Revolving Fund (CASRF) Programs (Clean Water and Drinking Water) Disadvantaged Business Enterprise (DBE) Requirements Including DBE Subcontractor Participation Form, Performance Form, Utilization Form and DBE Subcontractor Certification
Guidelines for Meeting the California State Revolving Fund (CASRF) Programs
(Clean Water and Drinking Water SRF)
Disadvantaged Business Enterprise Requirements

How to Achieve the Purpose of the Program

Recipients of CWSRF/DWSRF financing that are subject to the DBE requirements (recipients) are required to seek, and are encouraged to use, DBEs for their procurement needs. Recipients should award a "fair share" of sub-agreements to DBEs. This applies to all sub-agreements for equipment, supplies, construction, and services.

The key functional components of the DBE Program are as follows:

- Fair Share Objectives
- DBE Certification
- Six Good Faith Efforts
- Contract Administration Requirements
- DBE Reporting

Disadvantaged Business Enterprises are:

- Entities owned and/or controlled by socially and economically disadvantaged individuals as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note) (10% statute), and Public Law 102-389 (42 U.S.C. 4370d) (8% statute), respectively;
- Minority Business Enterprise (MBE) - entities that are at least 51% owned and/or controlled by a socially and economically disadvantaged individual as described by Title X of the Clean Air Act Amendments of 1990 (42 U.S.C. 7601 note), and Public Law 102-389 (42 U.S.C. 4370d), respectively;
- Women Business Enterprise (WBE) - entities that are at least 51% owned and/or controlled by women;
- Small Business Enterprise (SBE);
- Small Business in a Rural Area (SBRA);
- Labor Surplus Area Firm (LSAF); or
- Historically Underutilized Business (HUB) Zone Small Business Concern or a concern under a successor program.

Certifying DBE Firms:

Under the DBE Program, entities can no longer self-certify and contractors and sub-contractors must be certified at bid opening. Contractors and sub-contractors must provide to the CASRF recipient proof of DBE certification. Certifications will be accepted from the following:

- The U.S. Environmental Protection Agency (USEPA)
- The Small Business Administration (SBA)
- The Department of Transportation’s State implemented DBE Certification Program (with U.S. citizenship)
- Tribal, State and Local governments
- Independent private organization certifications

If an entity holds one of these certifications, it is considered acceptable for establishing status under the DBE Program.
**Six Good Faith Efforts (GFE)**

All CWSRF/DWSRF financing recipients are required to complete and ensure that the prime contractor complies with the GFE below to ensure that DBEs have the opportunity to compete for financial assistance dollars.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practical through outreach and recruitment activities. For Tribal, State and Local Government Recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

2. Make information on forthcoming opportunities available to DBEs. Posting solicitations for bids or proposals for a minimum of 30 calendar days in a local newspaper, before the bid opening date.

3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs.

4. Encourage contracting with a group of DBEs when a contract is too large for one firm to handle individually.

5. Use the services of the SBA and/or Minority Business Development Agency (MBDA) of the US Department of Commerce.

6. If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

The forms listed in the table below and attached to these guidelines; must be completed and submitted with the GFE:

<table>
<thead>
<tr>
<th>FORM NUMBER</th>
<th>FORM NAME</th>
<th>REQUIREMENT</th>
<th>PROVIDED BY</th>
<th>COMPLETED BY</th>
<th>SUBMITTED TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWRCB Form 4500-2 or EPA Form</td>
<td>DBE Sub-Contractor Participation Form</td>
<td>As Needed to Report Issues</td>
<td>Recipient</td>
<td>Sub-contractor</td>
<td>EPA DBE Coordinator</td>
</tr>
<tr>
<td>SWRCB Form 4500-3 or EPA Form</td>
<td>DBE Sub-Contractor Performance Form</td>
<td>Include with Bid or Proposal Package</td>
<td>Prime Contractor</td>
<td>Sub-Contractor</td>
<td>SWRCB by Recipient</td>
</tr>
<tr>
<td>SWRCB Form 4500-4 or EPA Form</td>
<td>DBE Sub-Contractor Utilization Form</td>
<td>Include with Bid or Proposal Package</td>
<td>Recipient</td>
<td>Prime Contractor</td>
<td>SWRCB by Recipient</td>
</tr>
</tbody>
</table>

The completed forms must be submitted with each Bid or Proposal. The recipient shall review the bidder’s documents closely to determine that the GFE was performed prior to bid or proposal opening date. Failure to complete the GFE and to substantiate completion of the GFE before the bid opening date could jeopardize CWSRF/DWSRF financing for the project. The following situations and circumstances require action as indicated:

1. If the apparent successful low bidder was rejected, a complete explanation must be provided.

2. Failure of the apparent low bidder to perform the GFE prior to bid opening constitutes a non-responsive bid. The construction contract may then be awarded to the next low, responsive, and responsible bidder that meets the requirements or the Recipient may re-advertise the project.

3. If there is a bid dispute, all disputes shall be settled prior to submission of the Final Budget Approval Form.

**Administration Requirements**

- A recipient of CWSRF/DWSRF financing must require entities receiving funds to create and maintain a Bidders List if the recipient of the financing agreement is subject to, or chooses to follow, competitive bidding requirements.
- The Bidders list must include all firms that bid or quote on prime contracts, or bid or quote on subcontracts, including both DBEs and non-DBEs.
• Information retained on the Bidder’s List must include the following:
  1. Entity’s name with point of contact;
  2. Entity's mailing address and telephone number;
  3. The project description on which the entity bid or quoted and when;
  4. Amount of bid/quote; and
  5. Entity’s status as a DBE or non-DBE.

• The Bidders List must be kept until the recipient is no longer receiving funding under the agreement.

• The recipient shall include Bidders List as part of the Final Budget Approval Form.

• A recipient must require its prime contractor to pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor’s receipt of payment from the Recipient.

• A recipient must be notified in writing by its prime contractor prior to any termination of a DBE subcontractor by the prime contractor.

• If a DBE subcontractor fails to complete work under the subcontract for any reason, the recipient must require the prime contractor to employ the six GFES if soliciting a replacement subcontractor.

• A recipient must require its prime contractor to employ the six GFES even if the prime contractor has achieved its fair share objectives.

**Reporting Requirements**

For the duration of the construction contract(s), the recipient is required to submit to the State Water Resources Control Board DBE reports annually by October 10 of each fiscal year on the attached Utilization Report form (UR-334). Failure to provide this information as stipulated in the financial agreement language may be cause for withholding disbursements.

**CONTACT FOR MORE INFORMATION**

SWRCB, CASRF – Barbara August (916) 341-6952 barbara.august@waterboards.ca.gov
US EPA, Region 9 – Joe Ochab (415) 972-3761 ochab.joe@epa.gov
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Disadvantaged Business Enterprise (DBE) Program

DBE Subcontractor Participation Form

A Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE\(^1\) subcontractor\(^2\) the opportunity to describe work received and/or report any concerns regarding the funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the DBE Coordinator at any time during the project period of performance.

<table>
<thead>
<tr>
<th>Subcontractor Name</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid / Proposal No.</td>
<td>Assistance Agreement ID No. (if known)</td>
</tr>
<tr>
<td>Address</td>
<td>Telephone No.</td>
</tr>
<tr>
<td>Prime Contractor Name</td>
<td>Issuing/Funding Entity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contract Item Number</th>
<th>Description of Work Received from the Prime Contractor Involving Construction, Services, Equipment or Supplies</th>
<th>Amount Received by Prime Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

\(^1\) A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.2015 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

\(^2\) Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.
Please use the space below to report any concerns regarding the above funded project:

<table>
<thead>
<tr>
<th>Subcontractor Signature</th>
<th>Print Name</th>
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</thead>
<tbody>
<tr>
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<th>Title</th>
<th>Date</th>
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</table>

The public reporting and record keeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency’s need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Do not send the completed form to this address.

Send completed Form 4500-2 to:
Mr. Joe Ochab, DBE Coordinator
US EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105

**FORM 4500-2 (DBE Subcontractor Participation Form)**

Revised 12/2016
**Disadvantaged Business Enterprise (DBE) Program**

**DBE Subcontractor Performance Form**

This form is intended to capture the DBE\(^1\) subcontractor’s\(^2\) description of work to be performed and the price of the work submitted to the prime contractor. A Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractor’s bid or proposal package.

<table>
<thead>
<tr>
<th>Subcontractor Name</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid / Proposal No.</td>
<td>Assistance Agreement ID No. (if known)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone No.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Prime Contractor Name</th>
<th>Issuing/Funding Entity</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Contract Item Number</th>
<th>Description of Work Submitted from the Prime Contractor Involving Construction, Services, Equipment or Supplies</th>
<th>Price of Work Submitted to the Prime Contractor</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

DBE Certified By:  ____ DOT  ____ SBA

___ Other: ______________________________________________________

Meets/exceeds EPA certification standards?

___ YES  ___ NO  ___ Unknown

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\(^2\) Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

**FORM 4500-3 (DBE Subcontractor Performance Form)**

Revised 12/2016
I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

<table>
<thead>
<tr>
<th>Prime Contractor Signature</th>
<th>Print Name</th>
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<tbody>
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<tr>
<td>Title</td>
<td>Date</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Subcontractor Signature</th>
<th>Print Name</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>Title</td>
<td>Date</td>
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</tr>
</tbody>
</table>
Disadvantaged Business Enterprise (DBE) Program

DBE Subcontractor Utilization Form

This form is intended to capture the prime contractor’s actual and/or anticipated use of identified certified DBE\(^1\) subcontractors\(^2\) and the estimated dollar amount of each subcontract. A Financial Assistance Agreement Recipient must require its prime contractors to complete this form and include it in the bid or proposal package. Prime contractors should also maintain a copy of this form on file.

<table>
<thead>
<tr>
<th>Prime Contractor Name</th>
<th>Project Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid / Proposal No.</td>
<td>Assistance Agreement ID No. (if known)</td>
</tr>
<tr>
<td>Address</td>
<td>Email Address</td>
</tr>
<tr>
<td>Telephone No.</td>
<td></td>
</tr>
<tr>
<td>Issuing/Funding Entity</td>
<td></td>
</tr>
</tbody>
</table>

I have identified potential DBE certified subcontractors. ___ YES  ___ NO

If yes, please complete the table below. If no, please explain:

<table>
<thead>
<tr>
<th>Subcontractor Name/ Company Name</th>
<th>Company Address / Phone / Email</th>
<th>Estimated Dollar Amount</th>
<th>Currently DBE Certified?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
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</tbody>
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\(^2\) Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an award of financial assistance.

FORM 4500-4 (DBE Subcontractor Utilization Form)

Revised 12/2016
I certify under penalty of perjury that the forgoing statements are true and correct. Signing this form does not signify a commitment to utilize the subcontractors above. I am aware that in the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302 (c).

<table>
<thead>
<tr>
<th>Prime Contractor Signature</th>
<th>Print Name</th>
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*FORM 4500-4 (DBE Subcontractor Utilization Form)*

Revised 12/2016
1. Grant/Finance Agreement Number:

2. Annual Reporting Period: 10/1/ through 09/30/

3. Purchase Period of Financing Agreement:

4. Total Payments Paid to Prime Contractor or Sub-Contractors During Current Reporting Period: $

5. Recipient’s Name and Address:

6. Recipient’s Contact Person and Phone Number:

7. List All DBE Payments Paid by Recipient or Prime Contractor During Current Reporting Period:

<table>
<thead>
<tr>
<th>Payment or Purchase Paid by Recipient or Prime Contractor</th>
<th>Amount Paid to Any DBE Contractor or Sub-Contractor For Service Provided to Recipient</th>
<th>Date of Payment (MM/DD/YY)</th>
<th>Procurement Type Code** (see below)</th>
<th>Name and Address of DBE Contractor of Sub-Contractor or Vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBE</td>
<td>WBE</td>
<td></td>
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</table>

8. Initial here if no DBE contractors or sub-contractors paid during current reporting period:

9. Initial here if all procurements for this contract are completed:

10. Comments:

11. Signature and Title of Recipient’s Authorized Representative

12. Date

Email Form UR-334 to:
DrinkingWaterSRF@waterboards.ca.gov OR CleanWaterSRF@waterboards.ca.gov

Questions may be directed to:
Barbara August, SWRCB
Barbara.August@waterboards.ca.gov
Phone: (916) 341-6952
Fax: (916) 327-7469

**Procurement Type:
1. Construction
2. Supplies
3. Services (includes business services; professional services; repair services and personnel services)
4. Equipment
Box 1  Grant or Financing Agreement Number.

Box 2  Annual reporting period.

Box 3  Enter the dates between which you made procurements under this financing agreement or grant.

Box 4  Enter the total amount of payments paid to the contractor or sub-contractors during this reporting period.

Box 5  Enter Recipient’s Name and Address.

Box 6  Enter Recipient’s Contact Name and Phone Number.

Box 7  Enter details for the **DBE purchases only** and be sure to limit them to the current period.  
1) Use either an “R” or a “C” to represent “Recipient” or “Contractor.”  
2) Enter a dollar total for DBE and total the two columns at the bottom of the section.  
3) Provide the payment date.  
4) Enter a product type choice from those at the bottom of the page.  
5) List the vendor name and address in the right-hand column

Box 8  Initial here if no DBE contractors or sub-contractors were paid during this reporting period.

Box 9  Initial this box only if all purchases under this financing agreement or grant have been completed during this reporting period or a previous period. If you initial this box, we will no longer send you a survey.

Box 10 This box is for explanatory information or questions.

Box 11 Provide an authorized representative signature.

Box 12 Enter the date form completed.
EXHIBIT B

DAVIS-BACON REQUIREMENTS
Davis-Bacon Requirements for CWSRF Projects

For purposes of this Exhibit only, “subrecipient” or “sub recipient” means the Recipient as defined in this Agreement.

For purposes of this Exhibit only, “recipient” or “State recipient” means the State Water Board.

I. Requirements Under the Water Resources Reform and Development Act of 2014 (WRRDA) For Sub recipients That Are Governmental Entities:

If a sub recipient has questions regarding when Davis-Bacon (DB) applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State Water Board at DavisBacon@waterboards.ca.gov or phone (916) 327-7323. The recipient or sub recipient may also obtain additional guidance from DOL’s web site at http://www.dol.gov/whd/

1. Applicability of the Davis-Bacon (DB) prevailing wage requirements.

Under the Water Resources Reform and Development Act of 2014 (WRRDA), DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund. If a sub recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the sub recipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Sub recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the sub recipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The sub recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the sub recipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the sub recipient.
(ii) If the sub recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the sub recipient, obtains an extension of the 90-day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The sub recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the sub recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the sub recipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Sub recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a sub recipient’s contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the sub recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the sub recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL’s wage determination retroactive to the beginning of the contract or ordering instrument by change order. The sub recipient’s contractor must be compensated for any increases in wages resulting from the use of DOL’s revised wage determination.


(a) The Recipient shall insure that the sub recipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF - financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or -FY 2014 Water Resource Reform and Development Act, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is
attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer’s payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.


(ii)(A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient(s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the
State award official or will notify the State award official within the 30-day period that additional
time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the
classification or their representatives, and the sub recipient(s) do not agree on the proposed
classification and wage rate (including the amount designated for fringe benefits, where
appropriate), the award official shall refer the request and the local wage determination,
including the views of all interested parties and the recommendation of the State award official,
to the Administrator for determination. The request shall be sent to the EPA DB Regional
Coordinator concurrently. The Administrator, or an authorized representative, will issue a
determination within 30 days of receipt of the request and so advise the contracting officer or
will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to
paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the
classification under this contract from the first day on which work is performed in the
classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or
mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor
shall either pay the benefit as stated in the wage determination or shall pay another bona fide
fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the
contractor may consider as part of the wages of any laborer or mechanic the amount of any
costs reasonably anticipated in providing bona fide fringe benefits under a plan or program.
Provided, That the Secretary of Labor has found, upon the written request of the contractor, that
the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may
require the contractor to set aside in a separate account assets for the meeting of obligations
under the plan or program.

(2) Withholding. The sub recipient(s), shall upon written request of the EPA Award Official or an
authorized representative of the Department of Labor, withhold or cause to be withheld from
the contractor under this contract or any other Federal contract with the same prime
contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage
requirements, which is held by the same prime contractor, so much of the accrued payments
or advances as may be considered necessary to pay laborers and mechanics, including
apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full
amount of wages required by the contract. In the event of failure to pay any laborer or
mechanic, including any apprentice, trainee, or helper, employed or working on the site of
the work, all or part of the wages required by the contract, the (Agency) may, after written
notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary
to cause the suspension of any further payment, advance, or guarantee of funds until such
violations have ceased.
(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the subgrant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at https://www.dol.gov/whd/forms/index.htm or its successor site.

The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).
(B) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship
Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or sub contractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may be appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).


(a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work
Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of $25 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

3. Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and
actual wages paid. Further, the Sub recipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification

(a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(3), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor’s submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The sub recipient shall periodically review contractors and subcontractor’s use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at http://www.dol.gov/whd/america2.htm.
EXHIBIT C

DAVIS-BACON WAGE RATE DETERMINATIONS FOR ORANGE COUNTY, CALIFORNIA
"General Decision Number: CA20200024 03/06/2020

Superseded General Decision Number: CA20190024

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

County: Orange County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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ASBE0005-002 09/01/2019

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<th>Rates</th>
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<tr>
<td>Asbestos Workers/Insulator</td>
<td>$ 43.77 22.48</td>
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<tr>
<td>Fire Stop Technician</td>
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https://beta.sam.gov/wage-determination/CA20200024/3#document
ASBE0005-004 07/01/2019

Rates Fringes

Asbestos Removal
worker/hazardous material
handler (Includes
preparation, wetting,
stripping, removal,
scrapping, vacuuming, bagging
and disposing of all
insulation materials from
mechanical systems, whether
they contain asbestos or not)....$ 20.63 12.17

* BRCA0004-010 05/01/2018

Rates Fringes

BRICKLAYER; MARBLE SETTER.......$ 39.98 14.90

*The wage scale for prevailing wage projects performed in
Blythe, China lake, Death Valley, Fort Irwin, Twenty-Nine
Palms, Needles and 1-15 corridor (Barstow to the Nevada
State Line) will be Three Dollars ($3.00) above the
standard San Bernardino/Riverside County hourly wage rate

BRCA0018-004 06/01/2019

Rates Fringes

MARBLE FINISHER..................$ 33.43 14.11
TILE FINISHER....................$ 28.23 12.65
TILE LAYER.......................$ 40.07 18.36

BRCA0018-010 09/01/2018

Rates Fringes

TERRAZZO FINISHER................$ 31.25 13.41
TERRAZZO WORKER/SETTER...........$ 38.39 14.18

CARP0409-001 07/01/2018

Rates Fringes

CARPENTER
(1) Carpenter, Cabinet
Installer, Insulation
Installer, Hardwood Floor
Worker and acoustical
installer.........................$ 41.84 19.17
(2) Millwright....................$ 42.91 19.17
(3) Piledrivermen/Derrick
Bargeman, Bridge or Dock
Carpenter, Heavy Framer,
Rock Bargeman or Scowman,
Rockslinger, Shingler
(Commercial)..................$ 42.54 19.17
(4) Pneumatic Nailer,
Power Stapler...............$ 40.09 19.17
(5) Sawfiler...............$ 39.83 19.17
(6) Scaffold Builder.......$ 31.60 19.17
(7) Table Power Saw
Operator....................$ 40.93 19.17

FOOTNOTE: Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre-drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): $0.13 per hour additional.

----------------------------------------------------------------
CARP0409-005 07/01/2015

Rates Fringes
Drywall
DRYWALL INSTALLER/LATHER....$ 37.35 11.08
STOCKER/SCRapper............$ 10.00 7.17
----------------------------------------------------------------
CARP0409-008 08/01/2010

Rates Fringes
Modular Furniture Installer......$ 17.00 7.41
----------------------------------------------------------------
ELEC0011-002 12/31/2018

COMMUNICATIONS AND SYSTEMS WORK

Rates Fringes
Communications System
Installer.......................$ 36.07 3%+14.43
Technician.....................$ 33.30 3%+27.82

SCOPE OF WORK:
Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings. Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems. Does not cover work performed at China Lake Naval Ordnance Test Station. Fire alarm work shall be performed at the current inside wireman total cost package.

----------------------------------------------------------------
* ELEC0441-001 02/24/2020

Rates Fringes
CABLE SPLICER...................$ 48.28 21.90
ELECTRICIAN......................$ 46.16            21.83

* ELEC0441-003 12/01/2019

COMMUNICATIONS & SYSTEMS WORK (excludes any work on Intelligent Transportation Systems or CCTV highway systems)

Rates Fringes

Communications System
- Installer...................$ 36.72            14.81
- Technician..................$ 31.23            15.39

SCOPE OF WORK The work covered shall include the installation, testing, service and maintenance, of the following systems that utilize the transmission and/or transference of voice, sound, vision and digital for commercial, education, security and entertainment purposes for TV monitoring and surveillance, background foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call system, radio page, school intercom and sound, burglar alarms and low voltage master clock systems.

A. Communication systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems SCADA (Supervisory control/data acquisition PCM (Pulse code modulation) Inventory control systems Digital data systems Broadband & baseband and carriers Point of sale systems VSAT data systems Data communication systems RF and remote control systems Fiber optic data systems


C. *Fire Alarm Systems-installation, wire pulling and testing.


*Fire Alarm Systems
1. Fire Alarms-In Raceways: Wire and cable pulling in raceways performed at the current electrician wage rate and fringe benefits.
2. Fire Alarms-Open Wire Systems: installed by the Technician.
ELECTRICIAN (TRANSPORTATION SYSTEMS, TRAFFIC SIGNALS & STREET LIGHTING)

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<tr>
<td>Cable Splicer/Fiber Optic Splicer</td>
<td>$46.76</td>
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<td>Electrician</td>
<td>$46.16</td>
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<tr>
<td>Technician</td>
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SCOPE OF WORK: Electrical work on public streets, freeways, toll-ways, etc, above or below ground. All work necessary for the installation, renovation, repair or removal of Intelligent Transportation Systems, Video Surveillance Systems (CCTV), Street Lighting and Traffic Signal work or systems whether underground or on bridges. Includes dusk to dawn lighting installations and ramps for access to or egress from freeways, toll-ways, etc.

Intelligent Transportation Systems shall include all systems and components to control, monitor, and communicate with pedestrian or vehicular traffic, included but not limited to: installation, modification, removal of all Fiber optic Video System, Fiber Optic Data Systems, Direct interconnect and Communications Systems, Microwave Data and Video Systems, Infrared and Sonic Detection Systems, Solar Power Systems, Highway Advisory Radio Systems, highway Weight and Motion Systems, etc.

Any and all work required to install and maintain any specialized or newly developed systems. All cutting, fitting and bandaging of ducts, raceways, and conduits. The cleaning, rodding and installation of "fish and pull wires". The excavation, setting, leveling and grouting of precast manholes, vaults, and pull boxes including ground rods or grounding systems, rock necessary for leveling and drainage as well as pouring of a concrete envelope if needed.

JOURNEYMAN TRANSPORTATION ELECTRICIAN shall perform all tasks necessary to install the complete transportation system. JOURNEYMAN TECHNICIAN duties shall consist of: Distribution of material at job site, manual excavation and backfill, installation of system conduits and raceways for electrical, telephone, cable television and communication systems. Pulling, terminating and splicing of traffic signal and street lighting conductors and electrical systems including interconnect, detector loop, fiber optic cable and video/data.

**ELEC1245-001 01/01/2020**

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<td>LINE CONSTRUCTION</td>
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<td>(1) Lineman; Cable splicer</td>
<td>$58.09</td>
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<td>(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead &amp; underground distribution line equipment)</td>
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<td>(3) Groundman</td>
<td>$35.47</td>
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(4) Powderman..........$ 51.87 18.79


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* ELEV0018-001 01/01/2020

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<tr>
<td>ELEVATOR MECHANIC...........$ 57.40</td>
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FOOTNOTE:

a. PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

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ENGI0012-003 07/01/2018

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<td>GROUP 1..............$ 45.30</td>
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<td>GROUP 2..............$ 46.08</td>
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OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)

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GROUP 11....................$ 50.65            25.25  
GROUP 12....................$ 51.65            25.25  
GROUP 13....................$ 52.65            25.25  

OPERATOR:  Power Equipment  
(Tunnel Work)  
GROUP  1....................$ 47.15            25.25  
GROUP  2....................$ 47.93            25.25  
GROUP  3....................$ 48.22            25.25  
GROUP  4....................$ 48.39            25.25  
GROUP  5....................$ 48.58            25.25  
GROUP  6....................$ 48.69            25.25  
GROUP  7....................$ 48.81            25.25  

PREMIUM PAY:  
$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: $2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel
Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oildfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scrapers (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure water jet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcocre gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpiller, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy;
Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less than 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth-moving equipment operator (multiple engine, Euclid, caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self-loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: $1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50
yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired
earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up
to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County
boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1S, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM.

$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point which is the SW corner of Section 34.T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a thin strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:
That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE 1/4 of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECEIVES BASE RATE

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ENGI0012-004 08/01/2015

Rates Fringes

OPERATOR: Power Equipment
(DREDGING)

(1) Leverman................$ 49.50 23.60
(2) Dredge dozer.............$ 43.53 23.60
(3) Deckmate................$ 43.42 23.60
(4) Winch operator (stern winch on dredge)..........$ 42.87 23.60
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.................$ 42.33 23.60
(6) Barge Mate..............$ 42.94 23.60

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IRON0377-002 07/01/2019

Rates Fringes

Ironworkers:
Fence Erector.................$ 33.58 24.66
Ornamental, Reinforcing and Structural.............$ 40.00 33.30

PREMIUM PAY:

$6.00 additional per hour at the following locations:
China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland,

$4.00 additional per hour at the following locations:
Army Defense Language Institute - Monterey, Fallon Air Base, Naval Post Graduate School - Monterey, Yermo Marine Corps Logistics Center

$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

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LABO0300-005 01/01/2018

Rates Fringes

Asbestos Removal Laborer.......$ 33.19 17.78

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos-containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

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LABO0345-001 07/01/2019

Rates Fringes

LABORER (GUNITE)

GROUP 1 .........................$ 44.05 18.42
GROUP 2 .........................$ 43.10 18.42
GROUP 3 .........................$ 39.56 18.42

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen
GROUP 2: Gunmen
GROUP 3: Reboundmen

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LABO0652-001 07/01/2019

Rates Fringes

LABORER (TUNNEL)

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<td>19.07</td>
</tr>
</tbody>
</table>

**LABORER CLASSIFICATIONS**

**GROUP 1:** Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader,piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

**GROUP 2:** Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellerower

**GROUP 3:** Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials (""applying"" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services;
Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Changehouse person; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.)

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Vibrator person, jack hammer, pneumatic tools (except driller); Bull gang mucker, track person; Concrete crew, including rodder and spreader

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

<table>
<thead>
<tr>
<th>Rates</th>
<th>Fringes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brick Tender</td>
<td>$32.26</td>
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https://beta.sam.gov/wage-determination/CA20200024/3#document
LABO1184-001 07/01/2019

<table>
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<tr>
<td>Laborers: (HORIZONTAL DIRECTIONAL DRILLING)</td>
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<tr>
<td>(1) Drilling Crew Laborer...$ 36.70 15.05</td>
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<tr>
<td>(2) Vehicle Operator/Hauler.$ 36.87 15.05</td>
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</tr>
<tr>
<td>(3) Horizontal Directional Drill Operator...........$ 38.72 15.05</td>
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</tr>
<tr>
<td>(4) Electronic Tracking Locator...............$ 40.72 15.05</td>
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</table>

Laborers: (STRIPING/SLURRY SEAL)

GROUP 1.....................$ 37.91 18.06
GROUP 2.....................$ 39.21 18.06
GROUP 3.....................$ 41.22 18.06
GROUP 4.....................$ 42.96 18.06

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Stripper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

LABO1414-001 08/07/2019

<table>
<thead>
<tr>
<th>Rates</th>
<th>Fringes</th>
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<tr>
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<tr>
<td>PLASTER CLEAN-UP LABORER....$ 34.82 20.02</td>
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<tr>
<td>PLASTER TENDER...........$ 37.37 20.02</td>
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Work on a swing stage scaffold: $1.00 per hour additional.
<table>
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<tr>
<th>Rates</th>
<th>Fringes</th>
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</thead>
<tbody>
<tr>
<td><strong>Painters: (Including Lead Abatement)</strong></td>
<td></td>
</tr>
<tr>
<td>(1) Repaint (excludes San Diego County)..............$ 28.59</td>
<td>15.97</td>
</tr>
<tr>
<td>(2) All Other Work.............$ 32.12</td>
<td>16.09</td>
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</tbody>
</table>

REPAINT of any previously painted structure. Exceptions: work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities.

<table>
<thead>
<tr>
<th>Rates</th>
<th>Fringes</th>
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</thead>
<tbody>
<tr>
<td><strong>DRYWALL FINISHER/TAPER</strong>..............$ 42.18</td>
<td>19.52</td>
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* **PAIN0036-015 01/01/2020**

<table>
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<tbody>
<tr>
<td><strong>GLAZIER</strong>........................$ 43.45</td>
<td>23.39</td>
</tr>
</tbody>
</table>

FOOTNOTE: Additional $1.25 per hour for work in a condor, from the third (3rd) floor and up. Additional $1.25 per hour for work on the outside of the building from a swing stage or any suspended contrivance, from the ground up.

* **PAIN1247-002 01/01/2020**

<table>
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<tr>
<td><strong>SOFT FLOOR LAYER</strong>.............$ 37.55</td>
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**PLAS0200-009 08/07/2019**

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<td><strong>PLASTERER</strong>........................$ 43.73</td>
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**PLAS0500-002 07/01/2019**

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<tbody>
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<td><strong>CEMENT MASON/CONCRETE FINISHER</strong>...$ 37.00</td>
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**PLUM0016-001 09/01/2018**

<table>
<thead>
<tr>
<th>Rates</th>
<th>Fringes</th>
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</thead>
</table>
| **PLUMBER/PIPEFITTER**
Plumber and Pipefitter
All other work except work on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft.
of floor space and work on strip malls, light commercial, tenant improvement and remodel work..........................$ 50.13 22.16
Work ONLY on new additions and remodeling of bars, restaurant, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space..........................$ 48.58 21.18
Work ONLY on strip malls, light commercial, tenant improvement and remodel work..........................$ 37.10 19.51

PLUM0345-001 09/01/2019

Rates Fringes
PLUMBER
Landscape/Irrigation Fitter.$ 34.40 23.05
Sewer & Storm Drain Work...$ 34.40 23.05

ROOF0036-002 08/01/2019

Rates Fringes
ROOFER.........................$ 39.52 17.47

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive $1.75 per hour "pitch premium" pay.

SFCA0669-008 04/01/2019

DOES NOT INCLUDE SAN CLEMENTE ISLAND, THE CITY OF SANTA ANA, AND THAT PART OF ORANGE COUNTY WITHIN 25 MILES OF THE CITY LIMITS OF LOS ANGELES:

Rates Fringes
SPRINKLER FITTER.................$ 38.85 23.85

SFCA0709-003 01/01/2018

SAN CLEMENTE ISLAND, THE CITY OF SANTA ANA, AND THAT PART OF ORANGE COUNTY WITHIN 25 MILES BEYOND THE CITY LIMITS OF LOS ANGELES:

Rates Fringes
SPRINKLER FITTER (Fire).........$ 42.26 25.92

SHEE0105-003 01/01/2020

LOS ANGELES (South of a straight line drawn between Gorman and Big Pines) and Catalina Island, INYO, KERN (Northeast part, East of Hwy 395), MONO ORANGE, RIVERSIDE, AND SAN BERNARDINO COUNTIES
### SHEET METAL WORKER

<table>
<thead>
<tr>
<th>Rates</th>
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<tr>
<td>(1) Commercial - New Construction and Remodel work</td>
<td>$45.78</td>
</tr>
<tr>
<td>(2) Industrial work including air pollution control systems, noise abatement, hand rails, guard rails, excluding architectural sheet metal work, excluding A-C, heating, ventilating systems for human comfort</td>
<td>$45.78</td>
</tr>
</tbody>
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### TEAM0011-002 07/01/2019

<table>
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<tr>
<td>GROUP 1</td>
<td>$31.59</td>
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<td>GROUP 2</td>
<td>$31.74</td>
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<td>GROUP 3</td>
<td>$31.87</td>
</tr>
<tr>
<td>GROUP 4</td>
<td>$32.06</td>
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<tr>
<td>GROUP 5</td>
<td>$32.09</td>
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<tr>
<td>GROUP 6</td>
<td>$32.12</td>
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<tr>
<td>GROUP 7</td>
<td>$32.37</td>
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<tr>
<td>GROUP 8</td>
<td>$32.62</td>
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<tr>
<td>GROUP 9</td>
<td>$32.82</td>
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<tr>
<td>GROUP 10</td>
<td>$33.12</td>
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<tr>
<td>GROUP 11</td>
<td>$33.62</td>
</tr>
<tr>
<td>GROUP 12</td>
<td>$34.05</td>
</tr>
</tbody>
</table>

WORK ON ALL MILITARY BASES: PREMIUM PAY: $3.00 per hour additional.

- [29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB, El Centro Naval Facility, Fort Irwin, Marine Corps Logistics Base at Nebo & Yermo, Mountain Warfare Training Center, Bridgeport, Point Arguello, Point Conception, Vandenberg AFB]

### TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person ($0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work;
Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - $1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

------------------------------------------------------------------------------

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

===============================================================================

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).
a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.
1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

    Branch of Construction Wage Determinations  
    Wage and Hour Division  
    U.S. Department of Labor  
    200 Constitution Avenue, N.W.  
    Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

    Wage and Hour Administrator  
    U.S. Department of Labor  
    200 Constitution Avenue, N.W.  
    Washington, DC 20210

The request should be accompanied by a full statement of the interested party’s position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

    Administrative Review Board  
    U.S. Department of Labor  
    200 Constitution Avenue, N.W.  
    Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

================================================================
END OF GENERAL DECISION"
EXHIBIT D

STATE GENERAL PREVAILING WAGE
DETERMINATIONS ORA-2020-1 MADE BY THE
DIRECTOR OF INDUSTRIAL RELATIONS FOR ORANGE
COUNTY, CALIFORNIA
<table>
<thead>
<tr>
<th>CRAFT (JOURNEY LEVEL)</th>
<th>ISSUE DATE</th>
<th>EXPIRATION DATE</th>
<th>BASIC HOURLY RATE</th>
<th>HEALTH AND WELFARE</th>
<th>PENSION</th>
<th>VACATION/HOLIDAY</th>
<th>TRAINING</th>
<th>OTHER PAYMENTS</th>
<th>HOURS</th>
<th>TOTAL HOURLY RATE</th>
<th>DAILY</th>
<th>SATURDAY</th>
<th>SUNDAY AND HOLIDAY</th>
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<tr>
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<td>06/30/2020</td>
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<td>C</td>
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## LOCALITY: ORANGE COUNTY

**DETERMINATION: ORA-2020-1**

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**FOOTNOTES**
GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS
Pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1

LOCALITY: ORANGE COUNTY
DETERMINATION: ORA-2020-1

* EFFECTIVE UNTIL SUPERSEDED BY A NEW DETERMINATION ISSUED BY THE DIRECTOR OF INDUSTRIAL RELATIONS. CONTACT THE OFFICE OF THE DIRECTOR – RESEARCH UNIT AT (415) 703-474 for the new rates after ten days after the expiration date if no subsequent determination is issued.
** THE RATE TO BE PAID FOR WORK PERFORMED AFTER THIS DATE HAS BEEN DETERMINED. IF WORK WILL EXTEND PAST THIS DATE, THE NEW RATE MUST BE PAID AND SHOULD BE INCORPORATED IN CONTRACTS ENTERED INTO NOW. CONTACT THE OFFICE OF THE DIRECTOR – RESEARCH UNIT FOR SPECIFIC RATES AT (415) 703-474.

# INDICATES AN APPTENTICEABLE CRAFT. THE CURRENT APPTENTICE WAGE RATES ARE AVAILABLE ON THE INTERNET @ HTTP://WWW.DIR.CA.GOV/OPRL/PWAPPWAGE/PWAPPWAGESTART.ASP.

A INCLUDES AMOUNT WITHHELD FOR DUES CHECK OFF AND CONTRACT COMPLIANCE.
B INCLUDES AN AMOUNT FOR IMI TRAINING FUND.
C SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER, OR REASONS BEYOND THE CONTROL OF THE EMPLOYER.
D RATE APPLIES TO THE FIRST 2 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.
E THE RATIO OF BRICK TENDERS TO BRICKLAYERS SHALL BE AS FOLLOWS: ONE (1) BRICK TENDER TO NO MORE THAN THREE (3) BRICKLAYERS DURING THE INSTALLATION OF BLOCK ON A TYPICAL MASONRY PROJECT.
F INCLUDES AN AMOUNT PER HOUR WORKED FOR SUPPLEMENTAL DUES.
G INCLUDES AMOUNT WITHHELD FOR DUES CHECK OFF.
H RATE APPLIES TO THE FIRST 12 HOURS WORKED ON SATURDAY, ALL OTHER TIME IS PAID AT DOUBLE TIME. SATURDAY MAY BE WORKED AT THE STRAIGHT-TIME HOURLY RATE FOR THE FIRST 8 HOURS IF INCLEMENT WEATHER FORCES A SYNTHETIC/ARTIFICIAL TURF PROJECT TO SHUT DOWN DURING THE REGULAR WORK WEEK (MONDAY THOUGH FRIDAY).
I A MATERIAL HANDLER MAY BE UTILIZED IN RATIO OF ONE (1) MATERIAL HANDLER WITH ANY FIVE (5) JOYNEYMEN ON ANY GIVEN PROJECT.
J RATE APPLIES TO THE FIRST 12 HOURS ON SATURDAY, ALL OTHER TIME IS PAID AT DOUBLE TIME.
K RATE APPLIES TO FIRST 8 HOURS ONLY. DOUBLE TIME THEREAFTER. SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.
L IN ADDITION, AN AMOUNT EQUAL TO 3% OF THE BASIC HOURLY RATE IS ADDED TO THE TOTAL HOURLY RATE AND OVERTIME HOURLY RATES FOR THE NATIONAL EMPLOYEES BENEFIT BOARD.
M INCLUDED IN STRAIGHT-TIME HOURLY RATE.
N RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 8 HOURS WORKED ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE.
O INCLUDES AN AMOUNT FOR THE NATIONAL LABOR-MANAGEMENT COOPERATION FUND AND THE ADMINISTRATIVE MAINTENANCE FUND.
P RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 12 HOURS WORKED ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.
Q DICTIONARY OF OCCUPATIONAL TITLES, FOURTH EDITION, 1977, U.S. DEPARTMENT OF LABOR.
R INCLUDES AMOUNT WITHHELD FOR DUES CHECKOFF, WHICH IS FACTORED IN THE OVERTIME RATES. INCLUDES $2.00 OF VACATION THAT IS NOT FACTORED IN THE OVERTIME RATES.
S INCLUDES AN AMOUNT PER HOUR WORKED OR PAID TO DISABILITY FUND.
T INCLUDED IN STRAIGHT-TIME HOURLY RATE WHICH IS NOT FACTORED IN THE OVERTIME RATES.
U RATE APPLIES TO THE FIRST 2 OVERTIME HOURS MONDAY THROUGH FRIDAY AND THE FIRST 8 HOURS WORKED ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE.
V INCLUDES AMOUNT WITHHELD FOR ADMINISTRATIVE DUES.
W RATE APPLIES TO FIRST TWO DAILY OVERTIME HOURS WORKED; ALL OTHER OVERTIME IS PAID AT THE HOLIDAY OVERTIME HOURLY RATE.
X RATE APPLIES TO THE FIRST 8 HOURS WORKED ON A SIXTH OR SEVENTH CONSECUTIVE DAY DURING ANY ONE CALENDAR WEEK UP TO 50 HOURS IN ANY ONE CALENDAR WEEK. ALL HOURS IN EXCESS OF 10 HOURS DAILY OR 50 HOURS WEEKLY ARE PAID AT THE HOLIDAY RATE. SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.
Y RATE APPLIES TO WORK ON HOLIDAYS ONLY; SUNDAYS ARE PAID AT THE SATURDAY OVERTIME HOURLY RATE.
Z AN ADDITIONAL $0.25 PER HOUR WILL BE ADDED TO THE BASIC HOURLY RATE WHEN PERFORMING PAPERHANGING WORK.
AA INCLUDES AMOUNT WITHHELD FOR WORKING DUES.
AB DOUBLE TIME SHALL BE PAID FOR ALL HOURS WORKED OVER 12 HOURS IN ANY ONE DAY.
AC HOURS 15 WORKED IN 5 CONSECUTIVE DAYS (LEGAL HOLIDAYS WILL NOT BE COUNTED IN THE 5 CONSECUTIVE DAYS). FOR ALL WORK UNDER THIS CRAFT/CLASSIFICATION DOUBLE TIME SHALL BE PAID FOR ALL HOURS WORKED OVER 12 HOURS IN ANY ONE DAY.
AD RATE APPLIES AFTER 36 MONTHS OF EXPERIENCE
AE RATE APPLIES AFTER 12 MONTHS THROUGH 36 MONTHS EXPERIENCE
AF RATE APPLIES AFTER 12 MONTHS THROUGH 36 MONTHS EXPERIENCE
GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS

Pursuant to California Labor Code Part 7, Chapter 1, Article 2, Sections 1770, 1773 and 1773.1

LOCALITY: ORANGE COUNTY

DETERMINATION: ORA-2020-1

AG INCLUDES AN AMOUNT PER HOUR WORKED OR PAID FOR DUES CHECK OFF

AH SATURDAY IN THE SAME WORKWEEK MAY BE WORKED AT THE STRAIGHT-TIME HOURLY RATE IF IT IS NOT POSSIBLE TO COMPLETE FORTY HOURS OF WORK MONDAY THROUGH FRIDAY WHEN THE JOB IS SHUT DOWN DUE TO INCLEMENT WEATHER OR SIMILAR ACT OF GOD, OR BEYOND THE CONTRACTOR'S CONTROL.

A1 RATE APPLIES TO THE FIRST 8 HOURS WORKED; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

A2 THE RATIO OF PLASTER TENDERS TO PLASTERERS SHALL BE AS FOLLOWS: THERE SHALL BE 1 PLASTER TENDER ON THE JOBSITE WHENEVER THERE IS A PLASTERER PERFORMING WORK ON THE JOBSITE, EXCEPT ON SMALL PATCH WORK WHERE ONLY ONE PLASTERER IS PERFORMING WORK. FOR INSIDE BROWN COATINGS THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 3 PLASTERERS. ON OUTSIDE FINISH AND BROWN COATINGS AND FOR ALL OTHER WORK, THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 2 PLASTERERS.

A3 INCLUDES AN AMOUNT PER HOUR WORKED OR PAID FOR SUPPLEMENTAL DUES.

A5 ALL WORK PERFORMED AFTER TWELVE (12) HOURS IN A DAY SHALL BE PAID AT THE SUNDAY/HOLIDAY RATE.

AM RATE APPLIES TO THE FIRST EIGHT HOURS ON SATURDAY. ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME RATE. SATURDAY WORK MAY BE PAID AT THE STRAIGHT TIME RATE IF THE JOB IS SHUT DOWN DURING THE NORMAL WORK WEEK DUE TO INCLEMENT WEATHER.

AN INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED INTO OVERTIME AND AN AMOUNT FOR VACATION WHICH IS FACTORED AT 1.5 TIMES FOR ALL OVERTIME.

AO INCLUDES AMOUNT FOR NATIONAL PENSION AND RETIREE'S X-MAS FUND.

AP INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED IN THE OVERTIME RATES.

AR SATURDAYS IN THE SAME WORK WEEK MAY BE WORKED AT STRAIGHT-TIME IF JOB IS SHUT DOWN DURING THE NORMAL WORKWEEK DUE TO INCLEMENT WEATHER.

AS INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE AND THE CONTRACTOR EDUCATION & DEVELOPMENT FUND.

AT INCLUDES AN AMOUNT WITHHELD FOR ADMINISTRATIVE DUES WHICH IS NOT FACTORED IN THE OVERTIME RATES.

TRADESMEN SHALL ONLY BE USED IF THE FIRST WORKER ON THE JOB IS A LANDSCAPE/IRRIGATION FITTER, SECOND WORKER MUST BE A LANDSCAPE/IRRIGATION FITTER OR APPRENTICE.

AU LANDSCAPE/IRRIGATION FITTER. THE 3RD AND 4TH MAY BE A TRADESMAN. THE 5TH MUST BE A LANDSCAPE/IRRIGATION FITTER AND THEREAFTER TRADESMEN WILL BE REFERRED ON A 50-50 BASIS, TO JOURNEYMAN OR APPRENTICE.

AV INCLUDES AN AMOUNT FOR 401A PLAN.

AW INCLUDES AN AMOUNT FOR THE P.I.P.E. LABOR MANAGEMENT COOPERATION COMMITTEE TRUST FUND AND FOR PROMOTION FUND.

AX SATURDAY MAY BE PAID AT STRAIGHT TIME IF THE WORK WEEK IS TUESDAY THROUGH SATURDAY.

AY RATE APPLIES TO REMAINDER OF COUNTY.

AZ INCLUDES AN AMOUNT FOR SUPPLEMENTAL PENSION FUND.

RATE APPLIES TO ORANGE COUNTY, EXCEPT THE FOLLOWING CITIES OR COMMUNITIES: ALISO VIEJO, CAPISTRANO BEACH, COTO DE CAZA, DAINA POINT, EL TORO USMC AIR STATION, EMERALD BAY, LAGUNA BEACH, LAGUNA HILLS, LAGUNA NICUEL, LAKE FOREST, LEISURE WORLD (LAGUNA BEACH AREA), MISSION VIEJO, MODJESKA, RANCHO SANTA MARGARITA, SAN CLEMENTE, THREE ARCH BAY, SAN JUAN CAPISTRANO, SAN JUAN HOTSPRINGS, SILVERADO CANYON, SOUTH LAGUNA & TRABUCO CANYON.

BB AMOUNT IS FOR INDUSTRY PROMOTION FUND AND P.I.P.E. FUND.

BC RATE APPLIES TO THE FIRST 4 DAILY OVERTIME HOURS AND THE FIRST 10 HOURS ON SATURDAY; ALL OTHER TIME IS PAID AT THE SUNDAY AND HOLIDAY OVERTIME HOURLY RATE.

BD INCLUDE AMOUNTS FOR DUES CHECK OFF AND VACATION/HOLIDAY, WHICH ARE NOT FACTORED INTO OVERTIME.

BE INCLUDES AN AMOUNT PER HOUR WORKED FOR ANNUITY TRUST FUND.

BF INCLUDES AMOUNT FOR NATIONAL PENSION AND RETIREE'S X-MAS FUND.

BG INCLUDE AMOUNTS FOR ADMINISTRATIVE FUND, COMPLIANCE FUND, INDUSTRY FUND, AND RESEARCH AND EDUCATION TRUST FUND.

BH PURSUANT TO LABOR CODE SECTIONS 1773.1 AND 1773.8, THE AMOUNT PAID FOR THIS EMPLOYER PAYMENT MAY VARY RESULTING IN A LOWER TAXABLE BASIC HOURLY WAGE RATE, BUT THE TOTAL HOURLY RATES FOR STRAIGHT TIME AND OVERTIME MAY NOT BE LESS THAN THE GENERAL PREVAILING RATE OF PER DIEM WAGES.

BJ RATE APPLIES TO THE FIRST 8 HOURS WORKED ON A SIXTH OR SEVENTH CONSECUTIVE DAY DURING ANY ONE CALENDAR WEEK UP TO 50 HOURS IN ANY ONE CALENDAR WEEK. ALL OTHER TIME IS PAID AT THE SUNDAY/HOLIDAY RATE.

LOCALITY: ORANGE COUNTY
DETERMINATION: ORA-2020-1

TRAVEL AND/OR SUBSISTENCE PAYMENT: IN ACCORDANCE WITH LABOR CODE SECTIONS 1773.1 AND 1773.9, CONTRACTORS SHALL MAKE TRAVEL AND/OR SUBSISTENCE PAYMENTS TO EACH WORKER TO EXECUTE THE WORK. YOU MAY OBTAIN THE TRAVEL AND/OR SUBSISTENCE PROVISIONS FOR THE CURRENT DETERMINATIONS ON THE INTERNET @ HTTP://WWW.DIR.CA.GOV/OPRL/DPREMWAGEDETERMINATION.HTM. TRAVEL AND/OR SUBSISTENCE REQUIREMENTS FOR CURRENT OR SUPERSEDED DETERMINATIONS MAY BE OBTAINED FROM THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774.

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## General Prevailing Wage Determination

**Locality:** Orange County  
**Determination:** ORA-2020-1

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GENERAL PREVAILING WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS

PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773 AND 1773.1

LOCALITY: ORANGE COUNTY
DETERMINATION: ORA-2020-1

THE PREDETERMINED INCREASE SHOWN IS TO BE ALLOCATED TO WAGES AND/OR EMPLOYER PAYMENTS. PLEASE CONTACT THE OFFICE OF THE DIRECTOR - RESEARCH UNIT AT (415) 703-4774 WHEN THE PREDETERMINED INCREASE BECOMES DUE TO CONFIRM THE DISTRIBUTION. PLEASE ALSO EXAMINE THE IMPORTANT NOTICES TO SEE IF ANY MODIFICATIONS HAVE BEEN ISSUED, AS THERE MAY BE REDUCTIONS TO PREDETERMINED INCREASES.

A THE RATIO OF BRICK TENDERS TO BRICKLAYERS SHALL BE AS FOLLOWS: ONE (1) BRICK TENDER TO NO MORE THAN THREE (3) BRICKLAYERS DURING THE INSTALLATION OF BLOCK ON A TYPICAL MASONRY PROJECT.

B $1.20 TO THE BASIC HOURLY RATE, $0.15 TO HEALTH & WELFARE AND $0.10 TO VACATION/HOLIDAY.

C A MATERIAL HANDLER MAY BE UTILIZED IN RATIO OF ONE (1) MATERIAL HANDLER WITH ANY FIVE (5) JOURNEYMEN ON ANY GIVEN PROJECT.

D $1.00 TO THE BASIC HOURLY RATE, $0.15 TO HEALTH & WELFARE AND $0.10 TO VACATION/HOLIDAY.

E DICTIONARY OF OCCUPATIONAL TITLES, FOURTH EDITION, 1977, U.S. DEPARTMENT OF LABOR.

F AN ADDITIONAL $0.25 PER HOUR WILL BE ADDED TO THE BASIC HOURLY RATE WHEN PERFORMING PAPERHANGING WORK.

G $1.00 TO THE BASIC HOURLY RATE, $0.90 TO PENSION, $0.10 TO HEALTH AND WELFARE AND $0.15 TO TRAINING.

H $1.50 TO THE BASIC HOURLY RATE, $0.90 TO PENSION, $0.10 TO HEALTH AND WELFARE AND $0.15 TO TRAINING.

I THE RATIO OF PLASTER TENDERS TO PLASTERERS SHALL BE AS FOLLOWS: THERE SHALL BE A PLASTER TENDER ON THE JOBSITE WHENEVER THERE IS A PLASTERER PERFORMING WORK ON THE JOBSITE, EXCEPT ON SMALL PATCH WORK WHERE ONLY ONE PLASTERER IS PERFORMING WORK. FOR INSIDE BROWN COATINGS THERE SHALL BE 2 PLASTER TENDERS FOR UP TO EVERY 3 PLASTERERS. FOR INSIDE FINISH COATINGS THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 3 PLASTERERS. ON OUTSIDE FINISH AND BROWN COATINGS AND FOR ALL OTHER WORK, THERE SHALL BE 1 PLASTER TENDER FOR UP TO EVERY 2 PLASTERERS.

J PIPE TRADESMEN SHALL NOT BE PERMITTED ON ANY JOB WITHOUT A JOURNEYMAN.

K TRADESMEN SHALL ONLY BE USED IF THE FIRST WORKER ON THE JOB IS A LANDSCAPE/IRRIGATION FITTER, SECOND WORKER MUST BE A LANDSCAPE/IRRIGATION FITTER OR APPRENTICE LANDSCAPE/IRRIGATION FITTER. THE 3RD AND 4TH MAY BE A TRADESMAN. THE 5TH MUST BE A LANDSCAPE/IRRIGATION FITTER AND THEREAFTER TRADESMEN WILL BE REFERRED ON A 50-50 BASIS, TO JOURNEYMAN OR APPRENTICE.

L $1.90 TO WAGES AND/OR FRINGES AND $0.25 TO TRAINING

M RATE APPLIES TO REMAINDER OF COUNTY.

ORA-2020-1-INC
EXHIBIT E

AMERICAN IRON AND STEEL REQUIREMENTS
Appendix 4: Sample Construction Contract Language

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of _____ (“Purchaser”) and the _____________ (the “State”) that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as “American Iron and Steel;” that requires all of the iron and steel products used in the project to be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney’s fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.
EXHIBIT F

EQUAL EMPLOYMENT OPPORTUNITY
EXECUTIVE ORDER NUMBER 11246
EQUAL EMPLOYMENT OPPORTUNITY EXECUTIVE ORDER NO. 11246

BACKGROUND:
Through a series of Executive Orders, and a decision by the Equal Employment Opportunity Commission, the federal government has established a national policy designed to battle discrimination based on race, color, sex, religion, and national origin in federal assistance programs and to enhance hiring, training, and promotion opportunities for minorities and women in construction programs financed, in part, by federal dollars. Chief among these directives is Executive Order No. 11246, which requires all federal contracting agencies to include certain nondiscrimination and "affirmative action" provisions in all contracts and to require the recipients of federal contracts to include these provisions in subcontracts. The provisions commit the contractor or subcontractor to maintain a policy of non-discrimination in the treatment of employees, to make this policy known to employees, and to recruit, hire, and train employees without regard to race, color, sex, religion, or national origin.

Sec. 301 of EO 11246 requires that WIFIA borrowers undertake and agree to incorporate into contracts and subcontracts 8 principals and directives found in Sec. 202 of the EO:

“Each executive department and agency, which administers a program involving Federal financial assistance shall require as a condition for the approval of any grant, contract, loan, insurance, or guarantee thereunder, which may involve a construction contract, that the applicant for Federal assistance undertake and agree to incorporate, or cause to be incorporated, into all construction contracts paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to such grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the provisions prescribed for Government contracts by Section 202 of this Order or such modification thereof, preserving in substance the contractor’s obligations thereunder, as may be approved by the Secretary of Labor, together with such additional provisions as the Secretary deems appropriate to establish and protect the interest of the United States in the enforcement of those obligations.”

RESOURCES:
Department of Labor resources:

- Executive Order 11246 and amendments: https://www.dol.gov/ofccp/regs/compliance/ca_11246.htm
- Other DOL Resources: https://www.dol.gov/ofccp/regs/compliance/ofcpcomp.htm

RESPONSIBILITIES:
Borrower Responsibilities:

- Ensure the contract language in EEO Appendix 1 is included in all contracts
- Ensure contractors comply with the requirements of the contract language
• Ensure contractors prominently display “Equal Opportunity is the Law” posters: https://www.dol.gov/ofccp/regs/compliance/posters/ofccpost.htm

REQUIRED CONTRACT LANGUAGE:

During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of this nondiscrimination clause.

2. The contractor will, in all solicitations or advancements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

3. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee’s essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor’s legal duty to furnish information.

4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers’ representative of the contractor’s commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

5. The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

6. The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting
agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

7. In the event of the contractor’s noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

8. The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States. [Sec. 202 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966–1970 Comp., p. 684, EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230, EO 13665 of April 8, 2014, 79 FR 20749, EO 13672 of July 21, 2014, 79 FR 42971]
EXHIBIT G

Civil Rights Laws
CIVIL RIGHTS LAWS

BACKGROUND:
Three important laws prohibit discrimination in the provision of services or benefits, on the basis of race, color, national origin, sex, handicap or age, in programs or activities receiving federal financial assistance. These laws are:

- Title VI of the Civil Rights Act of 1964, as amended:
  “No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.”

- Section 504 of the Rehabilitation Act of 1973, as amended:
  “(n)o otherwise qualified individual with a disability in the United States...shall, solely by reason of his or her disability, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving federal financial assistance...”

- The Age Discrimination Act of 1975, as amended:
  “(n)o person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance.”

It is important to note that these laws do not only apply to the project funded by WIFIA, but apply to the entire operations of the system receiving funding.

RESOURCES:


Regulations on Nondiscrimination in Programs or Activities Receiving Federal Assistance from the Environmental Protection Agency: 40 CFR Part 7: https://www.law.cornell.edu/cfr/text/40/part-7

RESPONSIBILITIES:
Borrower Responsibilities:

- Comply with requirements of Civil Rights laws and EPA regulations
- Fill out EPA Form 4700-4 and certify compliance with laws and requirements

SUGGESTED LANGUAGE:
Contractor shall comply with the following federal non-discrimination requirements:
(1) Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency (LEP).
(2) Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination against persons with disabilities.

(3) The Age Discrimination Act of 1975, which prohibits age discrimination.
EXHIBIT H

OCWD Contractor Safety Program and Handbook
1 Purpose:

1.1. OCWD is committed to the safety of all employees, contractors, and visitors. All contractors and subcontractors must adhere to applicable Federal, State and Regional Environmental, Health and Safety (EHS) requirements, as well as OCWD EHS policies and procedures.

2 Scope:

2.1. This program shall apply to all contractors and subcontractors providing goods or services to OCWD.

3 Responsibilities:

3.1. Project Manager
   - Responsible for ensuring that safety related specifications are included in the design phase.
   - Coordinate Contractor Safety Orientation with Risk & Safety.
   - Conduct observations of contractor work and complete Appendix D (Notice to Correct) if unsafe conditions/imminent hazard are observed.
   - Engineering Project Manager is also responsible for ongoing communications with the Risk & Safety Department and is responsible for scheduling to meet with Risk & Safety at the ninety-five percent (95%) design review phase.

3.2. Purchasing Department
   - Send contractor the “Contractor Required Information Packet” (Appendix B forms).
   - Ensure the documents received from contractors are complete.
   - Maintain contractor signed documents from Appendix B.
   - Forward copies to the Risk & Safety Department.

3.3. Risk and Safety Department
   - Review the project at 95% design phase provided by the Engineering Project Manager.
   - Review Contractor Required Information (Appendix B).
   - Conduct a pre-project Contractor Safety Orientation with awarded contractor, subcontractor, project manager, OCWD construction inspector, and other applicable managers. (this could be included as part of the pre-construction meeting).

3.4. General Manager:
   - The General Manager or his designee shall approve changes to the Contractor Safety Program.

4 Definitions:

4.1. Types of Regulatory Violations (OSHA Classification of Violations & Definitions).
   - **Serious**: A serious violation exists when the workplace hazard could cause an accident or illness that would most likely result in death or serious physical harm, unless the employer did not know or could not have known of the violation.
   - **Willful**: A willful violation is defined as a violation in which the employer either knowingly failed to comply with a legal requirement (purposeful disregard) or acted with plain indifference to employee safety.
• **Repeat:** a violation where the employer has corrected, or indicated correction of an earlier violation, for which a citation was issued, and upon a later inspection is found to have committed the same violation again within a period of three years immediately preceding the latter violation.

4.2. **Experience Modification Rate (EMR or “X-Mod”)** - A Ratio of actual losses (workers compensation) versus expected losses over a rolling three-year period average. The EMR produces a metric in which the number “1” is considered the industry average, less than one is considered good experience and more than 1 is considered poor experience. The EMR is typically used by OSHA (Cal/OSHA) and by the Casualty Insurance Industry as a measure of a Contractor or Subcontractor’s “safety” performance.

4.3. **Injury and Illness Prevention Program (IIPP)** - Cal/OSHA requirement for employers to maintain and implement a safety program associated with the prevention of injury and illnesses. The IIPP standard is referenced within the California Code of Regulations (CCR) Title 8 Sections 1509 (Construction Safety Orders) and 3203 (General Industry Safety Orders).

4.4. Public Works Contract – Contracts for tasks which are construction related.

4.5. **Professional Services Agreement** – Agreement for consultants, services, and Public Works projects.

5 **Procedure:**

5.1. **Qualification**

• Appendix A & B shall be used for all contractors and those providing ongoing services to OCWD, such as but not limited to landscaping services, janitorial services, etc.

• Appendix B shall be added to the bid sheets in the bid specs (both the bid invitation and the information for bidders). Appendix B includes the following sections:
  a) Instructions for Contractors and Criteria Requirements
  b) Contractor Required Information
  c) Contractor’s EHS Agreement

5.2. **All Departments:**

• At the final selection process (contracts, service agreements):
  a) Purchasing Department shall send Appendix B forms and the Contractor EHS Handbook to the contractor. The Contractor shall review, complete, sign and return requested Appendix B forms.
  b) Purchasing will review completed documents and forward copies of Appendix B to Risk & Safety.
  c) Once the contract has been awarded, the Project Manager shall schedule a Pre-Project Orientation meeting with the contractor and Risk & Safety.
  d) The Project Manager and/or the OCWD Construction Inspector shall conduct periodic safety observations during the project. The Contractor Safety Inspection form can be utilized to document observations as needed.
  e) Unsafe conditions/behavior shall be communicated to the Contractor Representative. Serious conditions/imminent hazards shall also be documented on the Notice to Correct form (Appendix D) with copies sent to Risk & Safety.
  f) The Project Manager can utilize the Post Project Evaluation form (Appendix E) to evaluate the contractor for future job considerations.

5.3. **Engineering Department and Design Review Process:**

• In addition to section 5.2 (All Departments), the Project Manager shall schedule, at the 95% design review phase, a safety review with the Risk & Safety Department and applicable managers.

• Any changes shall be incorporated into the updated design.

6 **References:**

6.1. Cal OSHA, Title 8, Regulations of the Director of Industrial Relations, § 336.10 § 336.11.

6.2. Cal OSHA, Title 8, Regulations of the Director of Industrial Relations, § 1509.
Note - Authority cited: Sections 54 and 55, 50.7, 6317, 6400, 6401, 6402, 6403, 6404, 6405, 6406, and 6407 of the Labor Code.

7 Appendices:

7.1. Appendix A: OCWD Pre-Award Safety Review
7.2. Appendix B: Contractor Required Information
7.3. Appendix C: Post Award Orientation
7.4. Appendix D: Notice to Correct
7.5. Appendix E: Post-Project Evaluation

Chapter 3.2. California Occupational Safety and Health Regulations (CAL/OSHA)
Subchapter 1. Regulations of the Director of Industrial Relations

Article 4.5. Multi-Employer Worksites

§336.10. Determination of Citable Employer.

On multi-employer worksites, both construction and non-construction, citations may be issued only to the following categories of employers when the Division has evidence that an employee was exposed to a hazard in violation of any requirement enforceable by the Division:

(a) The employer whose employees were exposed to the hazard (the exposing employer);
(b) The employer who actually created the hazard (the creating employer);
(c) The employer who was responsible, by contract or through actual practice, for safety and health conditions on the worksite; i.e., the employer who had the authority for ensuring that the hazardous condition is corrected (the controlling employer); or
(d) The employer who had the responsibility for actually correcting the hazard (the correcting employer).

Note: The employers listed in subsections (b) through (d) may be cited regardless of whether their own employees were exposed to the hazard.

8 Revision History:

<table>
<thead>
<tr>
<th>Date</th>
<th>Author</th>
<th>Description</th>
</tr>
</thead>
</table>
**APPENDIX A: CONTRACTOR PRE-AWARD SAFETY**

<table>
<thead>
<tr>
<th></th>
<th>Building Access Needed?</th>
<th>□ Yes □ No</th>
<th>#badges needed:</th>
<th>List specific area(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Will hazardous waste be generated?</td>
<td>□ Yes □ No</td>
<td>If yes, list waste:</td>
<td>List specific area(s):</td>
</tr>
<tr>
<td>3</td>
<td>Will chemicals be brought onsite?</td>
<td>□ Yes □ No</td>
<td>If yes, list chemicals:</td>
<td>List specific area(s):</td>
</tr>
<tr>
<td>4</td>
<td>□ How will excess materials/wastes (hazardous or not) be removed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>□ Will Hot Work be performed?</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>□ Will Noise exceed 85 dB?</td>
<td></td>
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<tr>
<td>7</td>
<td>□ Will PPE be required for this project? (if yes, list below in line #21)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>8</td>
<td>□ Will work in confined space be required?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>□ Will Lockout/Tagout be required?</td>
<td></td>
<td></td>
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<tr>
<td>10</td>
<td>□ Will there be any demolition activities or work that generates dust?</td>
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<tr>
<td>11</td>
<td>□ Will there be work done on the roof?</td>
<td></td>
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<tr>
<td>12</td>
<td>□ Will the use of cranes (e.g. Hoisting/Rigging) be required?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>□ Will Trenching (over 5 feet)/Excavation be required?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>□ Will there be Powered Industrial Vehicles involved (e.g. forklift, dozer)?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>□ Will work on electrical systems/equipment be performed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>□ Will Traffic Control be required for work on Public Roadway?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>□ Will scaffolding/ladder/Platform/Fall protection be used?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>□ Will work affect fire detection/suppression equipment system/FM-200 or other fire suppressant systems in the computer room(s)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>□ Will work affect or interrupt the emergency equipment use/accessibility? (Alarms, Eyewashes, Exhaust ventilation, Phone services, Egress routes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>What equipment &amp; tools will be used for this project?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>List the type of PPE needed for the project:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

INSTRUCTIONS FOR CONTRACTORS

All licensed contractors interested in performing work for Orange County Water District (OCWD) must complete and provide the information requested in the “Contractor Required Information packet;” meet the criteria listed below and participate in a pre-project safety orientation meeting:

The Criteria below is required in order to comply with OCWD’s Contractor Safety Program and Cal/OSHA’s Multi-Employer Worksite Standard*

*California Labor Code Sections 6400, 6401, 6401.7, 6402 through 6404 and Title 8, California Code of Regulations, Sections 336.10 and 336.11

CONTRACTOR CRITERIA REQUIREMENTS:

☐ EMR equal to or greater than 1.25 for any year in the last three years.

☐ Received a regulatory citation (i.e. Cal/OSHA) and penalties assessed against your firm for any “serious,” “willful” or “repeat” violations of its safety or health regulations in the past three years?

   Yes ☐   No ☐

If “yes,” attach a separate signed page describing the citations, including information about the dates of the citations, the nature of the violation, the project on which the citation(s) was or were issued, the amount of penalty paid, if any. If the citation was appealed and a decision has been issued, state the case number and the date of the decision.

   NOTE: If you have filed an appeal of a citation, and the Appeals Board has not yet ruled on your appeal, you need not include information about it.

☐ Failure to provide all requested information

ONE OR MORE OF THESE CRITERIA SHALL DISQUALIFY A CONTRACTOR

DEFINITIONS:

- **Serious**: A serious violation exists when the workplace hazard could cause an accident or illness that would most likely result in death or serious physical harm, unless the employer did not know or could not have known of the violation.

- **Willful**: A willful violation is defined as a violation in which the employer either knowingly failed to comply with a legal requirement (purposeful disregard) or acted with plain indifference to employee safety.

- **Repeat**: a violation where the employer has corrected, or indicated correction of an earlier violation, for which a citation was issued, and upon a later inspection is found to have committed the same violation again within a period of three years immediately preceding the latter violation.

- **EMR**: Experience Modification Rate (EMR or “X-Mod”) - A Ratio of actual losses (workers compensation) versus expected losses over a rolling three - year period average. The EMR is issued by the Workers’ Compensation Insurance Carrier. The EMR produces a metric in which the number “1” is considered the industry average, less than one is consider good experience and more than 1 is considered poor experience. The EMR is typically used by OSHA & Cal/OSHA and by the Casualty Insurance Industry as a measure of a Contractor or Subcontractor’s “safety” performance. An EMR at 1.25 is red flagged by Cal/OSHA.
### APPENDIX B: CONTRACTOR REQUIRED INFORMATION

**Part 1: CONTRACTOR INFORMATION SECTION - To Be Completed By Contractor**

- Contractor’s Name: 
- Contractor’s License (copy of license): 
- California Registration Number: 
- Certificate of Insurance (copy of insurance) 
- Experience Modification Rate (EMR) for each of the past three premium years:
  - Current year: _______  Previous year: _______  Year prior to previous year: _______
- Copy of 3 Years of OSHA 300A Annual Summary (If greater than 10 employees) 
- How many serious injuries and/or fatalities has your company had in the last 3 years: __________
- How many Regulatory Violations has your company had in the last 3 years? __________

**Part 2: SAFETY PROGRAM SECTION - To Be Completed By Contractor**

<table>
<thead>
<tr>
<th>All Written Safety Programs &amp; Training Documentation must be available to OCWD upon request</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your company maintain a written Injury Illness Prevention Program (IIPP) in accordance with GISO, Title 8, Section §3203 or §1509 and Labor Code (LC §6401.7)?</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company maintain documentation on employees’ IIPP training? [§3203 or §1509(b)]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company maintain “Code of Safe Practices” documentation? [Title 8, §1509(b)]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company maintain disciplinary documentation for unsafe behavior of employees or subcontractors (if applicable)? [Title 8, §3203 or §1509]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company maintain a documented Hazard Communication Program that complies with GHS Labeling and Safety Data Sheets (SDS)? [8 CCR §5194]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company maintain inspection records and written evidence that safety and health concerns have been reviewed and corrective actions taken? [LC§6401.7(b) and (D)]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are procedures for communicating critical (hazardous) job activities (Job Safety Plan) written and reviewed with all employees and subcontractors? [LC 6401.7(a)(5)]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company have a written accident investigation program in which all accidents/incidents are investigated and corrective action implemented (including those of subcontractors, if applicable)? [8CCR §3203(a)(5) and (b) or §1509]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Does your company have a written Emergency Action Plan that is communicated to employees and subcontractors? (i.e., medical, fire, chemical spill, etc.)? [8 CCR §3220]</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Are the above written programs, including training documentations and safety meetings on file? [LC §6401.7© and 8CCR §1509(e)]?</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

If yes, where are the documentations maintained? ____________________________
| Part 2 – PROJECT SPECIFIC SAFETY PROGRAM SECTION - To Be Completed By Contractor |
| (check each section below that is applicable to the project and provide documentation information) |
| ☐ Our company has a written Confined Space Program that includes pre-entry monitoring, pre-entry permit, and employee training? [T8 CCR §5157] |
| Where is the documentation maintained? |
| ☐ Our company has a written Electrical Safety Program? [T8 CCR §2700 - §2989 and T8 CCR §2299 - §2599 and NFPA 70E] |
| Where is the documentation maintained? |
| ☐ Our company has a written Fall Prevention Program that includes Personal Fall Arrest Systems, Personal Fall Restraint Systems, Positioning Devices and employee training? [T8 CCR §1670] |
| Where is the documentation maintained? |
| ☐ Our company has written Trenching/Excavation Program that includes employee training? [T8 CCR §1541.1] |
| Where is the documentation maintained? |
| ☐ Our company has a written Lockout/Tagout Program that includes employee training? [T8 CCR §3314(j)] |
| Where is the documentation maintained? |
| ☐ Our company has a Hot Work Program that includes employee training? [T8 CCR §4848] |
| Where is the documentation maintained? |
| ☐ Our company has a Traffic Control Program that includes employee training? [T8 CCR, Construction Safety Orders, Article 11, 1597 - 1599] |
| Where is the documentation maintained? |

Other applicable programs (please list): |

Contractor shall ensure employees under his/her supervision (including subcontractors) have been trained in safe work practices necessary to safely perform their job. Contractors are responsible for communicating the Job Safety Plan to their employees & subcontractors.

**COMMENTS:**

Name of Contractor Representative (please print)

Contractor Representative’s Signature  Date Signed:

*A bidder’s failure to respond affirmatively to the questions listed in the “Part 2 - Safety Program Section” of Appendix B including the sections applicable to the work shall be grounds for the District to reject the bid as non-responsive.*
APPENDIX B: CONTINUED

CONTRACTOR’S ENVIRONMENTAL HEALTH & SAFETY (EHS) AGREEMENT

I have read the information stated in the OCWD’s Contractor Environmental Health & Safety (EHS) Handbook. I understand that the information provided covers brief highlights of the OCWD’s safety programs. It is my responsibility to review the updated programs and communicate the safety information & requirements to my employees.

I understand that the Contractor’s Environmental Health & Safety Handbook is not intended to replace Federal, State or Local regulations regarding Contractor performance. Contractor shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the activities of Contractor and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. Contractor (including contractor employees and subcontractors) shall at all times observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall protect and indemnify OCWD, its officers, directors, employees and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree.

Contractor Company:  
________________________________________

Contractor Name & Title (Please Print):  
________________________________________

Contractor Signature:  
________________________________________

Date:  
________________________________________
APPENDIX C: POST AWARD ORIENTATION

PART 1: Contractor Project Review

<table>
<thead>
<tr>
<th>OCWD Attendees:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor Name:</td>
<td>Cell #:</td>
</tr>
<tr>
<td>Duration of Project:</td>
<td></td>
</tr>
<tr>
<td>Project Name:</td>
<td>Start Date:</td>
</tr>
<tr>
<td>Contractor’s Main Representative:</td>
<td>☐ Cell #:</td>
</tr>
<tr>
<td>Method(s) of Communication:</td>
<td>☐ On-Site Office ☐ Cell #:</td>
</tr>
<tr>
<td>Contractor’s Onsite Supervisor/Lead:</td>
<td>☐ Cell #:</td>
</tr>
<tr>
<td>OCWD Project Manager:</td>
<td></td>
</tr>
</tbody>
</table>

**Instructions:** Check “yes” when requirements are applicable and arrangements/details have been discussed/reviewed. Check “no” if not applicable to work area or scope of project/service. Orientation must be completed before work begins.

**Distribution:** A copy of this form will be forwarded to the applicable Department Managers and Project Manager.

1. Building Access?  ☐ Yes  ☐ No  # of badges & access area:

2. ☐ Emergency Procedure, x3300 and Assembly areas
3. ☐ Chemicals and SDS for hazardous material
4. ☐ Spill/Leak reporting procedure
5. ☐ Hazardous waste generated/Removed
6. ☐ Live Electrical work (system/equipment)
7. ☐ Welding/Cutting/Open flames? (Review Hot Work/Permit Procedure)
8. ☐ Noise generated (louder than 85 dB)
9. ☐ Personal protective equipment for project
10. ☐ Work in confined space(s) (Program review required)
11. ☐ Lockout/Tagout? (Program review required)
12. ☐ Demolition Activities/Dust generated
13. ☐ Powered Industrial Vehicles (forklift, heavy equipment)
14. ☐ Cranes/Hoisting/Rigging
15. ☐ Trenching/Excavation (over 5 feet)
16. ☐ Ladder(s)/Platform(s)/Staging/Lift(s)/Fall Protection to be used
17. ☐ Roof access/work
18. ☐ Equipment and Tools needed for the project:
19. ☐ Public Roadway/Traffic Control
20. ☐ Work effecting fire detection/suppression equipment/FM-200 (Alarms/Sprinklers/Fire Pump/IS)
21. ☐ Interruption of emergency equipment use/accessibility  
   (Eye wash/shower; exhaust ventilation; phone service; evacuation/egress routes)
22. ☐ Sensitive area(s) affected (i.e. computer room) & protection
23. ☐ Potential impacts and accommodations (e.g. dust generated, odor, etc.) and protection for sensitive area(s) affected by project/work:
24. ☐ Other:
# PART 2: CONTRACTOR SAFETY ORIENTATION

The undersigned have reviewed and participated in the OCWD Contractor Safety Orientation.

The scope of services to be performed have been reviewed and discussed to minimize the potential for accidents, injuries, impacts to the environment, and workplace disruptions and interruptions.

Individuals below have received and reviewed the Contractor Health and Safety Handbook and information on OCWD’s emergency procedure.

<table>
<thead>
<tr>
<th>Name</th>
<th>Signature</th>
<th>Employer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>
APPENDIX D: NOTICE TO CORRECT

Your attention is directed to the issue pertaining to the following described site and your responsibility to utilize procedures in accordance with the applicable Federal, State, Local laws, Ordinances and Regulations including Construction Safety Orders.

<table>
<thead>
<tr>
<th>Project Title:</th>
<th>Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor Firm Name:</td>
<td>Observation Date:</td>
</tr>
<tr>
<td>Contractor Representative/Contact Person:</td>
<td>Issued by: ____________</td>
</tr>
<tr>
<td></td>
<td>Date: ____________</td>
</tr>
<tr>
<td></td>
<td>Time: ____________</td>
</tr>
</tbody>
</table>

Note: All work posing imminent hazards must be stopped immediately and corrected prior to resumption of the associated activity.

Description of Issue: __________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Actions Taken: ________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

Comments: ____________________________________________________
_________________________________________________________________

(Contractor Representative Name)  (Contract Representative Signature)  (Date)

“NOTICE TO CORRECT” form can be completed by OCWD Inspector, Project Manager, Risk & Safety and other applicable OCWD staff.
APPENDIX E: POST PROJECT EVALUATION

The Project Manager can utilize this form to evaluate the contractor for future job considerations.

1. Where there any significant safety issue/risk?

2. What was done to mitigate the safety issue/risk?

3. Why did the safety issue/risk occur?

4. What corrective action(s) will be implemented to prevent this issue/risk from occurring again?

CONTRACTOR RATING:

<table>
<thead>
<tr>
<th>Poor</th>
<th>Below Average</th>
<th>Average</th>
<th>Outstanding</th>
</tr>
</thead>
</table>

OCWD Project Manager

Date

OCWD Risk & Safety

Date
### CONTRACTOR SAFETY INSPECTION

**Contractor Name:** __________________________  **Company:** __________________________

**Project Manager:** __________________________  **Date:** __________________________

<table>
<thead>
<tr>
<th>GENERAL SAFETY INSPECTION</th>
<th>Y</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eye protection</strong> worn when working with power tools and when possible contact with flying particles, hazardous substances, projections or injurious light rays and in designated areas (i.e. lab).</td>
<td></td>
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</tr>
<tr>
<td><strong>Hard Hats</strong> worn in construction areas and where there is a potential for falling objects.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proper Attire</strong> worn (e.g. long pants and sturdy shoes or safety shoes) in required areas/construction sites.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hearing Protection</strong> worn in required areas or when noise is at or above 85 dB(A).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Emergency Equipment &amp; Exits</strong> are not blocked and easily accessible in case of an emergency.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aisles and Floors</strong> are kept free of obstruction that can cause slip, trip, &amp; falls (e.g. cords, tools, equipment).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tools</strong> are put away and stored properly after usage.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety Data Sheets</strong> provided for hazardous chemicals brought onsite.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hazardous Materials</strong> are clearly labeled in compliance with Hazard Communications &amp; GHS requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety Signs and Barriers</strong> used as required.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protection of OCWD Property &amp; Equipment</strong> during work (e.g. computers covered properly).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Proper housekeeping</strong> maintained; area cleaned up at end of shift.</td>
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OCWD PURCHASING CHECKLIST/VERIFICATION

To Be Completed By Purchasing Department

1. Send Contractor Forms (Appendix B packet and Contractor EHS Handbook)

2. Verify you received the following Information from the Contractor:

☐ Contractor’s Name: ______________________________________________

☐ Contractor’s CA Registration #: _________________________________

☐ Contractor’s License (Current, On File & Reviewed Quarterly) ______________

☐ Certificate of Insurance (Current, On File & Reviewed Quarterly) ______________

☐ Experience Modification Rate (EMR rating) ______________________________

If >1.25 please inform Risk & Safety Department.

(<1.0 = BETTER THAN AVG; 1.0 = INDUSTRY AVG; >1.25 = less than avg. & targeted by CAL OSHA)

☐ 3 Years of OSHA 300A Annual Summary (If greater than 10 employees)

☐ How many serious injuries and/or fatalities has your company had in the last 3 years: ______

☐ How many Regulatory Violations (e.g. Cal OSHA Citation) has your company had in the last 3 years: ______ can be verified on WWW.OSHA.GOV

Forward a copy of completed Appendix B and other applicable information to the Risk & Safety Department
Contractor Environmental Health & Safety (EHS) Handbook

Orange County Water District
18700 Ward Street
Fountain Valley, CA 92708
ATTENTION: Orange County Water District (OCWD) Contractors

This handbook is designed to help you understand and comply with OCWD’s Contractor Safety requirements.

This handbook is not intended to replace Federal, State or Local regulations regarding Contractor performance. Contractor shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the activities of Contractor and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. Contractor shall at all times observe and comply with all such existing laws, ordinances, regulations, orders and decrees, and shall protect and indemnify OCWD, its officers, directors, employees and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree.

Your full support and cooperation are required to comply with all the regulations including those contained in this handbook. References to “contractor” shall also include subcontractors, vendors, consultants and the like. OCWD reserves the right to change or waive the policies and provisions herein contained, at any time at its discretion.

Questions regarding OCWD Contractor Safety Program should be directed to your project manager.

Thank You For Your Cooperation.

OCWD Management
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XXI. CONTRACTOR’S ENVIRONMENTAL HEALTH & SAFETY (EHS) AGREEMENT
I. CONTRACTOR SAFETY REVIEW

Prior to initiating any contract work at any OCWD facility, contractors must:

• Agree to follow the requirements set forth herein and all additional applicable Federal, State and local safety and environmental rules, regulations, ordinances and the like.

• Complete a Safety Review Process (to include pre-work orientation). OCWD Project Manager and Risk & Safety will evaluate the information and forms for approval to perform work at OCWD.

II. SECURITY

Trespassing: Contractors, sub-contractors and their employees must confine themselves to the immediate site of their work, except when traveling between site and entrance or other places where they may have proper business.

Parking / Motor Vehicles / Deliveries: Contractor employees are permitted to park only in designated areas. The on-site speed limit is 15 miles per hour. All traffic signs must be obeyed. Pedestrians have the right-of-way. Contractors must arrange with the OCWD representative for the on-site delivery of materials, equipment and tools required for work performance. Contractors must obtain permission from the OCWD representative prior to using loading docks and platforms.

Alcoholic Beverages / Illegal Drugs: Alcoholic beverages and illegal or controlled drug substances are strictly prohibited on all OCWD premises.

Firearms / Explosives: Firearms and ammunition are not permitted on OCWD property. Explosive power tools are permitted with prior written approval from OCWD Project Manager. Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.

Emergency Alarms and Evacuation Routes: Contractors need to review the site evacuation map with the project manager and communicate the information to their staff.

Contractors Equipment: Contractors will supply all equipment, which will be maintained in good operating condition, for work required by the project. A contractor is not permitted to use forklift equipment, ladders, tools, etc. owned by OCWD.
III. EMERGENCY PROCEDURE

Emergencies that require a 911 call must be followed by a call to our internal emergency line for notification and building/area access for emergency personnel. OCWD’s internal emergency line is extension 3300 from an OCWD internal phone or 714-378-3300 from a cell phone.

When the fire alarm sounds leave the building by the nearest safe exit and go to the designated assembly area to report your presence so you can be accounted for. Do not re-enter the building until the “All Clear” has been given by emergency personnel.

IV. GENERAL DRESS AND CONDUCT

Contractor personnel will wear suitable clothing consistent with facility requirements. Shorts, tank tops, sandals and open toed shoes are not permitted.

Contractor personnel will behave in a mature and professional manner. Horseplay, foul language, fighting, or harassment of any kind will not be tolerated.

V. FOOD, BEVERAGES AND DRINKING WATER

Not all water systems at OCWD facilities are potable or suitable for drinking. Contractor personnel shall not drink from any non-potable sources. Water obtained from drinking fountains, bottled water sources and fresh water dispensing units are acceptable.

Contractor shall provide its own water to employees as required by the Heat Illness Prevention Program.

Eating is permitted in vending areas, lunchrooms and designated areas. Food and drinks are not allowed in laboratory areas at any time.
VI. SMOKING

Smoking (including cigarettes, pipes, cigars, electronic cigarettes, vaporizers, and vape pens) is not permitted in any buildings, facilities, vehicles, or any other indoor work area, under any circumstances. Smoking shall also be prohibited within 20 feet of entryways and windows of buildings and facilities leased or owned by the District as well as within 50 feet of all confined spaces (i.e. sewers, manholes, sewer lift stations, vaults, reservoirs, etc.) Cal/OSHA, §5148. Prohibition of Smoking in the Workplace.

VII. HOUSEKEEPING

Contract personnel must maintain proper housekeeping practices while onsite. At the end of each day, contractors must remove all rubbish, equipment, tools and machinery and leave the area clean. OCWD will provide a designated location to set up trailers, craft equipment and materials. These areas must be kept clean and orderly. All materials and equipment, including tools and toolboxes, are to be stored within the areas designated by OCWD representatives.

Refuse burning, and/or open fires are prohibited.

Do not mix contractor generated waste with OCWD facility waste.

Contractors are required to cover and/or use plastic barriers, e.g., Visqueen, as appropriate, to protect sensitive computer, laboratory, and other equipment, furniture, flooring, and office areas where dust, dirt, debris, etc. can be generated from work activities involving ceiling tiles, drywall, flooring, saw cutting, jackhammering and the like.

When generating dust indoors, (e.g. jackhammering, abrasive blasting, etc.) contractors must provide air filtration system or similar ventilation system to pull dust away from workers and occupied areas (similar to asbestos negative pressure ventilation).
VIII. UTILITIES AND SERVICES

Contractors must never dispose of paints, acids, caustics, cleaning agents, grease, or any other hazardous material down sinks, floor drains or storm drains.

All spills must be reported to the Risk & Safety Department immediately.

Contractors are not permitted to make connections to site electric, water, wastewater, steam, compressed air or other plant utilities without approval from the OCWD Project Manager.

No water may be used from any fire hydrants, fire standpipes or risers, or hose stations for any purpose other than to fight a fire.

New or modified electrical / plumbing and utility circuits must be identified and tagged. Prints are to be updated as any changes occur.

Electrical power, steam, water (hot, cold, chilled, etc.), natural gas, vacuum, etc. shall not be shut off to any equipment, machinery or other services without approval from the Project Manager.

IX. RISK & SAFETY INSTRUCTIONS

OCWD has developed safety procedures to protect our employees, visitors, contractors, community, facilities and the environment. Upon request, Contractors can be provided with in-house safety procedures applicable to their work. For further clarification on any of these rules or if requirements are not fully understood, contractors must contact the OCWD Project Manager or Risk & Safety Department.

OCWD site will be considered multi-employer site per Cal OSHA §336.10 and all contractors and subcontractors will be held accountable for safety of their own employees as well as OCWD employees. No shortcuts will be tolerated, and we expect full cooperation from our contractors when it comes to safety compliance.

Safety policies and procedures must be followed at all times without exception. Safety concerns shall be reported directly to the OCWD Project Manager who must consult the Risk & Safety Department to resolve potential hazards or outstanding safety concerns and issues.

All work-related injuries, illnesses, accidents and/or incidents must be reported to the OCWD Project Manager and to the Risk & Safety Department immediately.

X. SAFETY EQUIPMENT

Contractor’s employees should use eyewash and safety showers in applicable emergency situations.

Obey all OCWD safety signs and hazard warnings including the use of safety
glasses/goggles in designated areas. Signs are posted for everyone’s safety.

The use of appropriate signs (i.e., danger, wet floor, etc.) is mandatory where hazards exist to communicate and prevent accidents & injuries.

All overhead work must be roped off. Planking and scaffolds must be secured safely.

All open ditches, trenches, excavations, potholes and the like must be marked by barriers and signs.

Contractors must not remove any safety equipment (fire exit signs, fire extinguishers, safety mirrors, railings, chains, etc.) without prior approval from the Risk & Safety Department.

All ladders must meet the applicable regulatory requirements. Metal ladders are not to be use for electrical work or stored near electrical panels. It is prohibited for anyone to stand on the top two steps of any ladder.

XI. CUTTING, WELDING AND HOT WORK

A hot work permit must be obtained and signed daily from the Maintenance Department (or Control Room supervisor for after-hour/weekend work) for burning, welding, cutting, brazing, soldering and other work involving open flame or an electric arc per OCWD Hot Work procedure.

The permitted Hot Work area must be prepared and checked by the contractor prior to any welding and/or burning being performed. Inspection of the area should at a minimum include removing all combustible material from the area.

Proper safety equipment must be worn in the Hot Work process.

Fire watch must be performed by the contractor after the Hot Work and inspected by OCWD Maintenance Department. Hot Work Permits must be returned to the Maintenance Department for fire watch sign-off.
A Class ABC fire extinguisher MUST be nearby when there is Hot Work being performed.

*Cal/OSHA, § 4848. Fire Prevention in Welding and Cutting*
*Cal/OSHA § 6777, Hot Work Permits*
*Cal/OSHA §1537. Welding, Cutting, and Heating of Coated Metals*
*Cal/OSHA § 1536. Ventilation Requirements for Welding, Brazing, and Cutting*

**XII. CONFINED SPACES**

Contractor personnel are not permitted to enter any confined space at OCWD until approved by the OCWD Project Manager. Contractors are required to provide a copy of the following prior to entering Confined Spaces:

- Training documentation for those entering confined spaces
- Copy of completed entry permit

The OCWD Project Manager or designee will inform the contractor about known hazards of the confined space.

Contractor is required to inform the OCWD Project Manager of any hazards confronted or created in the confined space.

Confined Space Entry PERMIT and MONITORING must be completed prior to entry.

Permit-Required Confined Spaces means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or contains any other recognized serious safety or health hazard.
Examples of permit required confined space include but not limited to: tanks, manholes, vaults, pipes, and secondary containment pits.

*Cal/OSHA §5157. Permit-Required Confined Space.*

**XIII. ROOF AND ELEVATED SURFACE WORK**

![Image of a worker on a roof]

No access to the roof is allowed without the OCWD Project Manager or the Maintenance Manager notice. No smoking is allowed on the roof. Communication such as a two-way radio or cell phone is required. Contract employees are not allowed to work near unguarded skylights without fall prevention equipment.

- Article 19. Floor, Roof and Wall Openings (Cal/OSHA Construction Safety Orders 1632 - 1633)
- Article 21. Scaffolds - General Requirements (Cal/OSHA Construction Safety Orders 1635.1 1637)
- Article 22. Scaffolds - Various Types (Cal/OSHA Construction Safety Orders 1640 - 1655)
- Article 24. Fall Protection (Cal/OSHA Construction Safety Orders 1669 - 1672)

**XIV. LOCKOUT / TAGOUT**

Contractor personnel must comply with all requirements of the OCWD Lockout / Tagout procedure when working on any system with potential energy from any source (electric, mechanical, hydraulic, steam, etc.).

OCWD designated Operations personnel, will place their lock first and will be the last person to remove their lock during a lockout process involving contractors. All contractors and personnel working on a locked-out system must have their own locks. All locks must be applied for all workers and the system not restarted until the last lock is removed. It is forbidden for anyone to remove another person’s lock.

*CAL/OSHA §3314. The Control of Hazardous Energy for the Cleaning, Repairing, Servicing, Setting-Up, and Adjusting Operations of Prime Movers, Machinery and Equipment, Including Lockout/Tagout.*
XV. COMPRESSED GASES

Contractor personnel must comply with all requirements for identifying, storing and safely using cylinders of compressed gases (air, oxygen, helium, acetylene, argon, hydrogen, nitrogen, liquid nitrogen, etc.). Free standing gas cylinders (unsecured) are not allowed on site. All gas cylinders must be used, stored and secured properly (i.e. chained, strapped)

Cal/OSHA §4650. Storage, Handling, and Use of Cylinders and Compressed Gases.

XVI. ASBESTOS

Contractors are prohibited from using any materials, supplies, or other objects that contain or may potentially contain asbestos or asbestos fibers.

Contractors who identify materials that are suspected of containing asbestos must immediately stop work and notify the OCWD Project Manager.

CAL/OSHA §1529. Asbestos.

XVII. FIRE PROTECTION

Self-closing safety cans with flame arrestors must be used with all flammable liquid of 5 gallons or more.

Fire protection and emergency equipment (fire extinguishers, pull alarms, exits, hydrants, etc.), must not be blocked with materials and equipment.

The use of portable gasoline-powered equipment within OCWD buildings and on the roofs of OCWD buildings is prohibited.

Approval from the OCWD Risk & Safety Department is required before temporarily obstructing roadways that could block the movement of emergency equipment, plant vehicles or agency (fire trucks, ambulances, police cars, etc.)

CAL/OSHA §3221. Fire Prevention Plan
XVIII. HAZARD COMMUNICATION

Contractors must provide Safety Data Sheets (SDS) of all chemicals that will be brought onsite to the Risk & Safety Department. Contractors must inform the OCWD Project Manager of any hazardous conditions which might arise in the performance of their job.

Safe chemical handling procedures must be used by contractor personnel to ensure exposure levels remain safe for all OCWD employees.

Personal Protective Equipment (PPE) specified and recommended in the SDS should be worn properly at all times the chemical(s) is in use.

CAL/OSHA §5194. Hazard Communication

XIX. PROTECTIVE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

Contractor personnel will use PPE required for the job (e.g. eye protection with side shields, goggles, welding helmet, hearing protection, hard hats, and safety shoes, etc.). PPE will be worn in all posted areas or whenever hazards associated with the task being performed warrant further protection. Eye protection must always be worn when using hand or power tools and when working with chemicals.

Contractors are responsible for supplying their workers with the required PPE while performing work at OCWD.

CAL/OSHA §3380. Personal Protective Devices
## BASIC SAFETY INSPECTION

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<td><strong>Hard Hats</strong> worn in construction areas and where there is a potential for falling objects.</td>
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<td><strong>Tools</strong> are put away and stored properly after usage.</td>
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<td><strong>Safety Data Sheets</strong> provided for hazardous chemicals brought onsite.</td>
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**NOTE:** These are NOT intended to replace Federal, State, Local laws or Ordinances and Regulations regarding Contractor Environmental Health & Safety (EHS) performance.  
All work in areas where there is imminent danger to employees will cease until the dangerous condition is removed.
I have read the information stated in the OCWD’s Contractor Environmental Health & Safety Handbook. I understand that the information provided covers brief highlights of the OCWD’s safety programs. It is my responsibility to review the updated programs and communicate the safety information & requirements to my employees.

I understand that the Contractor’s Environmental Health & Safety Handbook is not intended to replace Federal, State or Local regulations regarding Contractor performance. Contractor shall keep itself fully informed of all existing and future state and federal laws and all county and city ordinances and regulations which in any manner affect the activities of Contractor and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. Contractor (including contractor employees and subcontractors) shall at all times observe and comply with all such existing and future laws, ordinances, regulations, orders and decrees, and shall protect and indemnify OCWD, its officers, directors, employees and agents against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree.

Contractor Company

Contractor Name & Title (Please Print):

Contractor Signature:

Date:

FORWARD A SIGNED COPY OF THE CONTRACTOR’S AGREEMENT PAGE TO RISK & SAFETY DEPARTMENT
EXHIBIT I

NEW RESTRICTIONS ON LOBBYING
SECTION 319 OF PUBLIC LAW 101-121
NEW RESTRICTIONS ON LOBBYING, SECTION 319 OF PUB. L. 101-121

BACKGROUND:
Recipients of federal grants, cooperative agreements, contracts, and loans are prohibited by 31 U.S.C. 1352 (limitation on use of appropriated funds to influence certain federal contracting and financial transactions) from using federal (appropriated) funds to pay any person for influencing or attempting to influence any officer or employee of an agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress with respect to the award, continuation, renewal, amendment, or modification of any of these instruments. These requirements are implemented by EPA in 40 CFR part 34, which also describes types of activities, such as legislative liaison activities and professional and technical services, which are not subject to this prohibition.

Applicants for EPA awards with total costs expected to exceed $100,000 are required to certify that (1) they have not made, and will not make, such a prohibited payment, (2) they will be responsible for reporting the use of non-appropriated funds for such purposes, and (3) they will include these requirements in consortium agreements and contracts under grants that will exceed $100,000 and obtain necessary certifications from those consortium participants and contractors. The signature of the authorized organizational official on the application serves as the required certification of compliance for the applicant organization. EPA appropriated funds may not be used to pay the salary or expenses of an employee of a grantee, consortium participant, or contractor or those of an agent related to any activity designed to influence legislation or appropriations pending before Congress or any state legislature.

RESOURCES:


Disclosure of Lobbying Activities: SF-LLL: https://apply07.grants.gov/apply/forms/sample/SFLLL_1_2-V1.2.pdf

RESPONSIBILITIES:
Borrower Responsibilities:

- Ensure that no WIFIA loan proceeds are used for prohibited payments relating to lobbying
- Sign certification in LOI and Application and understand the responsibilities
- Fill out and sign EPA Form 6600-06 certifying compliance with these requirements
- Fill out and submit SF-LLL to disclose any lobbying activities
- Include language in all contracts requiring compliance with these requirements
TECHNICAL SPECIFICATIONS
DIVISION 1 – General Requirements
1. GENERAL DESCRIPTION OF WORK. The Work to be performed under these Contract Documents involves furnishing all labor, materials, tax, equipment and services in strict compliance with the Contract Documents, for rehabilitation of an existing 66-inch pipeline. The Work consists of cleaning and sliplining of existing 66-inch RC pipeline from approximately the north end of the Orange County Sanitation Districts Plant 2 to approximately Garfield Avenue along the Santa Ana River. The Work also includes installation of manways, vacuum assemblies, and cathodic protection system along the 66-inch pipeline alignment.

2. OTHER CONSTRUCTION CONTRACTS. Work by others will be in progress on the project construction sites (OCSD Plant 1, OCSD Plant 2 and SCE property) under separate contracts including, but are not limited to, the following:

OCSD Plant 1:
- OCWD Contract 1: Groundwater Replenishment System Final Expansion (Plant 1 and SCE Property)
- OCSD P1-105: Headworks Rehabilitation Project
- OCSD P1-133: Primary Clarifiers 6-31 Reliability Improvements at Plant 1

OCSD Plant Site 2:
- OCWD Contract 1: Groundwater Replenishment System Final Expansion (Plant 2)
- OCSD Project J-117B/P2-107: Outfall Low Flow Pump Station and SCADA System & Network Upgrades (Plant 2)
- OCSD Project P2-122: Headworks Modifications at Plant 2
- OCSD Project P2-98A: A-Side Primary Clarifiers Replacement (Plant 2)

SCE Property:
- Maintenance and modifications to existing electrical systems

For all OCSD projects, contact with the contractor shall be coordinated through OCSD. For all OCWD projects, contact with contractor shall be coordinated through OCWD. For all other projects, it shall be the duty of the Contractor of this project to contact the contractors of any other adjacent projects under construction and to coordinate the work to avoid any delays or inconvenience to any project. The Contractor's attention is directed to the fact that other contractors will be working in the areas where work under this Contract is being performed. All planned coordination events shall be coordinated through the Owner and shall include Owner attendance or designated representative of the Owner.
3. **COORDINATION.** Contractor shall plan, schedule, and coordinate its operations in a manner which will facilitate the simultaneous progress of the Work under other OCWD and OCSD contracts outside the scope of these Contract Documents.

4. **WORK BY OWNER.** The activities that are to be performed by the OCWD and/or OCSD are the opening and closing of valves at the Effluent Junction Box for the shutdown of selected pipeline(s) and/or diversion of flows between the interplant pipelines for the Work. If required, temporary shutdown of the interplant gas pipeline and plant/industrial water pipelines. However, Work shall be planned to include continuous operations of these pipelines.

5. **PROCUREMENT CONTRACTS.** Not used.

6. **SALVAGE OF MATERIALS AND EQUIPMENT.** Existing materials and equipment removed and not reused as a part of the Work shall become Contractor's property, unless otherwise stated in the Contract Documents.

Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of Owner. Contractor shall store and protect salvaged items specified or indicated to be reused in the Work.

Salvaged items not to be reused in the Work, but to remain Owner's property shall be delivered by Contractor in good condition to Owner at OCWD.

Any items specified or indicated to be salvaged which are damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items.

Except where specified as no exception, Contractor may furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor’s property. Contractor may only provide new items instead of those specified where it is allowed in the Technical Specifications.

Existing materials and equipment removed by Contractor shall not be reused in the Work, except where so specified or indicated.

7. **LAND FOR CONSTRUCTION PURPOSES.** If available, the Contractor may be permitted to use land belonging to OCWD and OCSD, on or near the Site, in fee or by agreement, for construction purposes and for storage of materials and equipment. The Contractor may also arrange for use land near or adjacent to the pipeline alignment. For these lands the Contractor shall contact property owners directly to determine availability and to negotiate contract terms.
The locations and extent of the areas available for the Contractor’s use shall be as indicated on the Drawings. For work at OCSD Plant 2, see Drawing C-03 for shared work area and Section 01140 Work Restrictions for work contraints. If the designated space is not sufficient for Contractor’s activities, the Contractor shall arrange, at Contractor’s cost, for additional space as required for construction purposes.

Contractor shall immediately move stored materials or equipment if any occasion arises, as determined by OCWD or OCSD, requiring access to the storage area. Materials or equipment shall not be placed on the property of OCWD or OCSD until OCWD or OCSD has agreed to the location to be used for storage.

8. **OPERATION OF EXISTING FACILITIES.** The existing treatment plant facilities (owned and operated by OCWD and OCSD) must be kept in continuous operation throughout the construction period unless shutdown is required for the work. No interruption will be permitted which adversely affects the degree of service provided. Provided permission is obtained from Owner in advance, portions of the existing facilities may be taken out of service for short periods corresponding with periods of minimum service demands.

The utility corridor between OCSD’s Plant 1 and Plant 2 where the 66-inch pipe is located contains various pipelines and utilities as identified in the plans. All pipelines and utilities shall remain in service for the duration of the project. Specific active utilities and pipelines within the work area include: 120-inch RCP, 84-inch RCP, 16”-18” HPDG, two 4” FOCC, and 14”-18” Recycled Water. See Section 01140 Work Restrictions for additional information.

Contractor shall provide temporary facilities and make temporary modifications as necessary to keep the existing facilities in operation during the construction period. All temporary facilities and modifications shall be submitted for review and approval.

9. **USE OF OWNER’S EXISTING EQUIPMENT.** The Contractor is not permitted to use any of the Owner’s or OCSD’s equipment for the execution of the Work.

10. **NOTICES TO OWNERS AND AUTHORITIES.** Contractor shall, as provided in the General Conditions, notify owners of adjacent property and utilities when prosecution of the Work may affect them.

When it is necessary to temporarily deny access to property, or when any utility service connection must be interrupted, Contractor shall give notices sufficiently in advance to enable the affected persons to provide for their needs. Notices shall conform to any applicable local ordinance and, whether delivered orally or in writing, shall include appropriate information concerning the interruption and instructions on how to limit inconvenience caused thereby.
Utilities and other concerned agencies shall be notified at least 24 hours prior to cutting or closing streets or other traffic areas or excavating near underground utilities or pole lines.

11. **LINES AND GRADES.** All Work shall be done to the lines, grades, and elevations indicated on the Drawings.

Basic horizontal and vertical control points will be established or designated by Engineer to be used as datums for the Work. All additional survey, layout, and measurement work shall be performed by Contractor as a part of the Work.

Contractor shall provide an experienced instrument person, competent assistants, and such instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement work. In addition, Contractor shall furnish, without charge, competent persons and such tools, stakes, and other materials as Engineer may require in establishing or designating control points, in establishing construction easement boundaries, or in checking survey, layout, and measurement work performed by Contractor.

Contractor shall keep Engineer informed, a reasonable time in advance, of the times and places at which it wishes to do Work, so that horizontal and vertical control points may be established and any checking deemed necessary by Engineer may be done with minimum inconvenience to Engineer and minimum delay to Contractor.

Contractor shall remove and reconstruct work which is improperly located.

12. **CONNECTIONS TO EXISTING FACILITIES.** Unless otherwise specified or indicated, Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case, Contractor shall receive permission from OCWD, OCSD, or the owning utility prior to undertaking connections. Contractor shall protect facilities against deleterious substances and damage.

Connections to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously (around the clock) if necessary to complete connections in the minimum time. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the owning utility.

13. **UNFAVORABLE CONSTRUCTION CONDITIONS.** During unfavorable weather, wet ground, or other unsuitable construction conditions, Contractor shall confine its operations to work which will not be affected adversely by such conditions. No portion of the Work shall be constructed under conditions which would affect adversely the quality or efficiency thereof, unless special means or
precautions are taken by Contractor to perform the Work in a proper and satisfactory manner.

14. CUTTING AND PATCHING. As provided in General Conditions, Contractor shall perform all cutting and patching required for the Work and as may be necessary in connection with uncovering Work for inspection or for the correction of defective Work.

Contractor shall perform all cutting and patching required for and in connection with the Work, including but not limited to the following:

- Removal of improperly timed Work.
- Removal of samples of installed materials for testing.
- Alteration of existing facilities.
- Installation of new Work in existing facilities.

Contractor shall provide all shoring, bracing, supports, and protective devices necessary to safeguard all Work and existing facilities during cutting and patching operations. Contractor shall not undertake any cutting or demolition which may affect the structural stability of the Work or existing facilities without Engineer's concurrence. Contractor shall abide by all Owner policies regarding Confined Space and OSHA requirements in addition to OCSD Safety Policy.

Materials shall be cut and removed to the extent indicated on the Drawings or as required to complete the Work. Materials shall be removed in a careful manner, with no damage to adjacent facilities or materials. Materials which are not salvable shall be removed from the site by Contractor.

All Work and existing facilities affected by cutting operations shall be restored with new materials, or with salvaged materials acceptable to Engineer, to obtain a finished installation with the strength, appearance, and functional capacity required. If necessary, entire surfaces shall be patched and refinished.

15. CLEANING UP. Requirements for cleaning up are covered in the General and Special Provisions. Adequate clean-up will be a condition for recommendation of progress payment application.

16. APPLICABLE CODES. References in the Contract Documents to local codes mean the following:

- International Building Code with California amendments
  - 2016 California Building Code
  - 2016 California Plumbing Code (Title 24 – Part 5)
  - 2016 California Electrical Code (Title 24 – Part 3)
  - 2016 California Mechanical Code (Title 24 – Part 4)
  - 2016 California Fire Code (Title 24 – Part 9)
• 2016 Title 24 Energy Provisions
• National Electric Code
• State of California Codes
• County of Orange Codes and Standards
• American Water Works Association (AWWA)
• Hydraulic Institute Standards (HIS)
• National Fire Protection Association (NFPA) Recommended Practices and Manuals
• Owners (OCWD and/or OCSD) Confined Space Protocols

For the above Codes, the current Code at the time of Bid is applicable. Other standard codes which apply to the Work are designated in the Specifications.

17. **REFERENCE STANDARDS.** Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or laws or regulations in effect at the time of opening of Bids (or on the effective date of the Contract or Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents. However, no provision of any referenced standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall any such provision or instruction be effective to assign to Owner, Engineer, or any of Engineer's Consultants, agents, or employees, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibly inconsistent with the provisions of the Contract Documents.

18. **SPECIFICATION DATA SHEETS AND SCHEDULES.** Specifications may have data sheets and schedules as part of specific specification sections. Locations for data entries on the data sheets and schedules may be left blank intentionally. When no data is entered in a respective cell, this indicates that no data is required for that cell of the data sheet or schedule. The Contractor shall be responsible for furnishing and installing all equipment, piping, wires, and devices in the Contract Documents whether or not they are shown in the data sheets and schedules.

19. **PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES.** In accordance with the General Provisions and the Special Provisions, the Contractor shall assume full responsibility for the protection of all buildings, structures and utilities, public or private, including poles, signs, services to buildings, utilities in the street, gas pipes, digester gas pipelines, water pipes, hydrants, on-site wells, sewers, drains and electric and telephone cable, whether or not they are shown on the Drawings. The Contractor shall
carefully support and protect all such structures and utilities from damage of any kind. Any damage resulting from the Contractor’s operations shall be immediately repaired by Contractor, at Contractor’s own expense.

20. SITE ADMINISTRATION. Contractor shall be responsible for all areas of the Site and Work area used by it, by other contractors, and by all Subcontractors in the performance of the Work. Contractor shall exert full control over the actions of all employees and other persons with respect to the use and preservation of property and existing facilities, except such controls as may be specifically reserved to Owner or others. Contractor shall have the right to exclude from the Site all persons who have no purpose related to the Work or its inspection, and may require all persons on the Site (except Owner's employees) to observe the same regulations as Contractor requires of its employees.

21. POTHOLING. The Contractor shall pothole at each pit location for all utilities shown within each pit area whether specifically identified to be potholed or not in the drawings. In addition, the Contractor shall include in the Bid potholing at five (5) locations along the pipeline corridor at locations to be determined and identified by the Engineer. The approximate maximum pothole depth is 15 feet. Potholing shall use vacuum non-destructive digging. For the utilities to be potholed within each pit location, the depth of potholing shall be to the top of the utility as shown in the drawing profiles plus 6 feet if the utility is not encountered at the location shown in the profile. Due to the presence and location of the HDPE pipeline along the pipeline alignment, the Contractor shall comply with stringent potholing and excavation requirements. See Section 01140 Work Restrictions and other specification sections.

22. OCSD PLANT 2 PARKING. The Contractor’s parking area identified in the Contract Documents (Drawing No. C-03) is shared by all Plant 2 and other OCSD and OCWD Contractors. The Contractor shall attempt to utilize the Contractor’s staging area for its own parking of vehicles. OCSD will provide a 30 calendar day notification to the Contractor to vacate the shared Contractor’s parking area at any time during the period of performance of the Contract. OCSD may utilize this parking area for other purposes.

End of Section
1. **SCOPE.** This section covers methods of measurement and payment for items of Work under this Contract.

2. **GENERAL.** The Contract Price for each section of the Contract shall cover all Work required by the Contract Documents. All costs in connection with the proper and successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction plant, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of Contractor and all costs in connection therewith shall be included in the prices bid.

3. **ESTIMATED QUANTITIES.** All estimated quantities stipulated in the Bid Form or other Contract Documents are approximate and are to be used only (a) as a basis for estimating the probable cost of the Work and (b) for the purpose of comparing the Bids submitted for the Work. The actual amounts of work done and materials furnished under unit price items may differ from the estimated quantities. The basis of payment for work and materials will be the actual amount of work done and materials furnished. Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise on account of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefor.

4. **UNITS OF MEASUREMENT.** A pound is an avoirdupois pound. A ton is 2,000 pounds avoirdupois. The unit of liquid measure is the U.S. gallon.

5. **CERTIFIED WEIGHTS.** When payment is to be made based on weight, the weighing shall be done on platform scales certified and inspected by applicable California State Weights and Measures Department, or when approved by the Engineer, on a completely automated weighing and recording system. The Contractor shall take all measurements, compute all payment quantities, and furnish the Engineer with duplicate licensed weighmaster's certificates showing the actual net weights. The Engineer shall verify and approve measurements.

6. **METHODS OF MEASUREMENT.** Materials and items of work which are to be paid for based on measurement shall be measured in accordance with the method stipulated in the sections involved or the description of Bid Items found in 2.2 of this Section. In determining quantities, all measurements shall be made in a horizontal plane unless otherwise specified.
Material not used from a transporting vehicle shall be determined by the Engineer and deducted from the certified tag.

When material is to be measured and paid for on a volume basis and it would be impractical to determine the volume, or when requested by the Contractor in writing and approved by the Engineer in writing, the material will be weighed and converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities will be adopted.

Full compensation for all expense involved in conforming to the above requirements for measuring and weighing materials shall be considered as included in the unit prices paid for the materials being measured or weighed and no additional allowances will be made therefore.

Quantities of material wasted or disposed of in a manner not called for under the Contract; or rejected loads of material, including material rejected after it has been placed by reason of failure of the Contractor to conform to the provisions of the Contract; or material placed outside the lines indicated on the plans or given by the Engineer; or material remaining on hand after completion of the Contract, will not be paid for and such quantities will be deducted from the final total quantities. No compensation will be allowed for hauling rejected material.

2. DESCRIPTION OF BID ITEMS.

2-1. Summary.

The Bid Amounts for each Bid Item will be used for comparative bid analysis. The Bid amounts will also form the basis of monthly progress payments. Each Lump Sum bid amount will undergo further breakdown as described later in this section. Unit prices for any unit price bid items will be the basis for monthly progress payment determinations and for any changes related to that Work item. Bid Item No. 2, Worker Protection and Safety/Sheeting, Shoring and Bracing will also demonstrate the Contractor's compliance with the California Labor Code relating to the price for sheeting, shoring, and bracing of excavations. Bid items are not intended to be exclusive descriptions of work categories and the Contractor shall determine and include in its pricing all materials, labor, and equipment necessary to complete each Bid Item as shown and specified.

Each lump sum price shall be full compensation for the preparation, demolition, installation, and/or submittal of the materials, and for all labor, equipment, tools and incidental to complete that Bid Item.
2-2. Description of Base Bid Items.

BID ITEM NO. 1, MOBILIZATION, DEMOBILIZATION, AND CLEANUP. Bid Item No. 1 is a lump sum bid item for mobilization and demobilization. Sixty (60) percent of the total for Bid Item No.1 shall be applied to mobilization. Forty (40) percent of the total for Bid Item No. 1 shall be applied to demobilization.

Mobilization shall include the obtaining of insurance, bonds, and other documents; moving of all equipment onto site and setting up field offices; submittal and approval of the complete shop drawing project construction schedule; obtaining and paying for all permits by other agencies as applicable and as required by the Regulatory Requirements and Permits Section to complete all the Work described herein; contacting and coordinating with Underground Services Alert (USA) and other utility owners; furnishing and erecting temporary construction facilities; making connections to temporary utilities (including, but not limited to, power, toilets, water, and fences); installing construction signs; temporary buildings and field office trailer(s); and other pre-construction efforts as required for the proper performance and completion of the work.

Contractor may apply for mobilization/demobilization as follows:

a. When the contract time line reaches Day 30 (Notice-to-Proceed plus 30 calendar days), 40 percent of the portion of this lump sum bid item associated with mobilization shall be included in the progress payment provided the activities identified for mobilization are completed.

b. For each of the following six progress payments, 10 percent of the portion of this lump sum bid item associated with mobilization shall be included in the progress payment (for a total of 100 percent the portion of this lump sum bid item associated with mobilization) provided the activities identified for mobilization are completed.

Demobilization shall include site cleaning and restoration of surfaces within the job site; moving of all equipment away from site and deconstructing field offices’ post-construction meeting, removal of all temporary facilities and equipment from the work area, disconnection of the temporary construction facilities and turnover of project to the Owner, and off-site disposal, handling, and transporting of demolition material not covered in another bid item. Payment for demobilization will be with the Final Progress Payment.

Demobilization also includes the submission by the Contractor of a final payment letter stating that acceptance of the final payment shall operate as and shall be a release of all claims arising by virtue of the Agreement. The Work will not be complete, and final payment cannot be approved or paid, until this letter is received and is acceptable to the Owner.
Contractor may not apply for payment of demobilization until all demobilization items are completed as specified.

**BID ITEM NO. 2, WORKER PROTECTION AND SAFETY/SHEETING, SHORING, AND BRACING.** Bid Item No. 2 is a lump sum bid item for work associated with worker protection and sheeting, shoring and bracing. This bid item includes:

(A) Sheeting, shoring, and bracing associated with the Project
(B) All other worker protection and safety

Measurement of each of these Bid Items is described below. Contractor may apply for payment for these Bid Items on a percent complete basis of the items covered in Worker Protection and Safety/Sheeting, Shoring, and Bracing Bid Item.

(A) **All Other Sheeting, Shoring, and Bracing.**
This portion of Bid Item No. 2 shall include all costs for providing all sheeting, shoring and bracing or equivalent method for stabilizing excavations and its appurtenances for the completion of other Work as part of the AWTF Final Expansion. Full compensation for all planning; design; engineering fees, submittal preparation, furnishing and constructing, and removal and disposal of sheeting, shoring, and bracing or other means of excavation stabilization as required by, but not limited to, Labor Code Sections 6700-6708 shall be included. This work shall be completed as required under the provisions of any permits, and in accordance with the requirements of OSHA and Construction Safety Orders of the State of California.

(B) **All Other Worker Protection and Safety.**
This portion of Bid Item No. 2 shall include all costs for providing a detailed plan of worker safety and maintaining safety during construction. This plan shall conform to Labor Code Sections 6700-6708 and implement all applicable safety orders and permits.

**BID ITEM NO. 3, BUILDERS ALL RISK INSURANCE.** Bid Item No. 3 is a lump sum bid item for the purchase of Builders All Risk insurance for the Project in compliance with Public Contract Code Section 7105.

**BID ITEM NO. 4 REMOVAL, CLEANING, AND DISPOSAL OF DEBRIS AND CCTV.** Bid item No. 4 is a lump sum bid item for removal, cleaning, and disposal of debris in the 66-inch pipeline. CCTV of the cleaned pipeline. Bid item includes all equipment, manpower, and debris haul off and disposal fees.
BID ITEM NO. 5 STEEL LINER INSTALLATION. Bid item No. 5 is a lump sum bid item for furnishing all equipment, labor, and materials to construct the steel liner portion of the Project. The limits of this work are from approximately STA 70+25 to approximately STA 81+05, complete and in place with steel tee manways.

BID ITEM NO. 6A FRP LINER INSTALLATION. Bid item No. 6 is a lump sum bid item for furnishing all equipment, labor, and materials to construct the FRP liner portion of the Project. The limits of this work are from approximately STA 25+40 to approximately STA 70+25, and from approximately STA 81+05 to STA 181+60, complete and in place with manways.

BID ITEM NO. 7 CATHODIC PROTECTION SYSTEM. Bid item No. 7 is a lump sum bid item for furnishing all equipment, labor, and materials to construct and test the cathodic protection system for the Project.

2-2. Description of Alternative Bid Items.

BID ITEM NOS. 1, 2, 3, 4, 5, and 7. Bid item Nos. 1, 2, 3, 4, 5, and 7 are lump sum bid items matching the descriptions for the Base Bid Items.

BID ITEM NO. 6B HDPE LINER INSTALLATION. Bid item No. 6 is a lump sum bid item for furnishing all equipment, labor, and materials to construct the HDPE liner portion of the Project. The limits of this work are from approximately STA 25+40 to approximately STA 70+25, and from approximately STA 81+05 to STA 181+60, complete and in place with manways.

End of Section
1. **LIST OF ABBREVIATIONS.** Abbreviations for standards and organizations used in the Contract Documents are defined as follows:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AA</td>
<td>Aluminum Association</td>
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<tr>
<td>AAMA</td>
<td>Architectural Aluminum Manufacturers Association</td>
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<tr>
<td>AASHTO</td>
<td>American Association of State Highway and Transportation Officials</td>
</tr>
<tr>
<td>ACI</td>
<td>American Concrete Institute</td>
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<tr>
<td>ACPA</td>
<td>American Concrete Pipe Association</td>
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<tr>
<td>ACOE</td>
<td>Army Corps of Engineering</td>
</tr>
<tr>
<td>AEIC</td>
<td>Association of Edison Illuminating Companies</td>
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<tr>
<td>AFPA</td>
<td>American Forest &amp; Paper Association</td>
</tr>
<tr>
<td>AISC</td>
<td>American Institute of Steel Construction</td>
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<tr>
<td>AISI</td>
<td>American Iron and Steel Institute</td>
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<tr>
<td>AITC</td>
<td>American Institute of Timber Construction</td>
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<tr>
<td>ANSI</td>
<td>American National Standards Institute</td>
</tr>
<tr>
<td>APA</td>
<td>Engineered Wood Association (formerly American Plywood Association)</td>
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<tr>
<td>APWA</td>
<td>American Public Works Association</td>
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<tr>
<td>AREMA</td>
<td>American Railway Engineers and Maintenance-of-Way Association</td>
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<tr>
<td>ASAHC</td>
<td>American Society of Architectural Hardware Consultants</td>
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<tr>
<td>ASCE</td>
<td>American Society of Civil Engineers</td>
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<tr>
<td>ASME</td>
<td>American Society of Mechanical Engineers</td>
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<tr>
<td>ASSE</td>
<td>American Society of Sanitary Engineers</td>
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<tr>
<td>ASTM</td>
<td>ASTM International</td>
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<tr>
<td>AWG</td>
<td>American Wire Gauge</td>
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<tr>
<td>AWI</td>
<td>Architectural Woodwork Institute</td>
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<tr>
<td>AWPA</td>
<td>American Wood-Preservers' Association</td>
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<tr>
<td>AWS</td>
<td>American Welding Society</td>
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<tr>
<td>AWWA</td>
<td>American Water Works Association</td>
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<tr>
<td>BHMA</td>
<td>Builders Hardware Manufacturers Association</td>
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<tr>
<td>BIA</td>
<td>Brick Institute of America (formerly SCPI)</td>
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<tr>
<td>CC</td>
<td>Communication Cable/Conduit</td>
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<tr>
<td>CDA</td>
<td>Copper Development Association</td>
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<tr>
<td>CISPI</td>
<td>Cast Iron Soil Pipe Institute</td>
</tr>
<tr>
<td>CRA</td>
<td>California Redwood Association</td>
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<tr>
<td>CRSI</td>
<td>Concrete Reinforcing Steel Institute</td>
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</tbody>
</table>
CS Commercial Standard (U.S. Department of Commerce)

DIPRA Ductile Iron Pipe Research Association

EEI Edison Electric Institute

EJB Effluent Junction Box

EJCDC Engineers’ Joint Contract Documents Committee

EPA Environmental Protection Agency

FCC Federal Communications Commission

Fed Spec Federal Specification

FIA Factory Insurance Association

FM Factory Mutual

FOCC Fiber Optic Communications

GAP Green Acres Project

HPDG High Pressure Digester Gas

HDPE High Density Polyethylene

HPMA Hardwood Plywood Manufacturers Association

IEEE Institute of Electrical and Electronics Engineers

IBC International Building Code

IPCEA Insulated Power Cable Engineers Association

IRI Industrial Risk Insurers

MHI Materials Handling Institute

MSS Manufacturers Standardization Society of Valve and Fitting Industry

NACE NACE International

NBBPVI National Board of Boiler and Pressure Vessel Inspectors

NBS See NIST

NEBB National Environmental Balancing Bureau

NEC National Electrical Code

NECA National Electrical Contractors Association

NEMA National Electrical Manufacturers Association

NFPA National Fire Protection Association

NG Natural Gas

NIST National Institute of Standards and Technology (formerly NBS)

NPT National Pipe Thread

NRMCA National Ready Mixed Concrete Association

NSC National Safety Council
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>NSF</td>
<td>NSF International (formerly National Sanitation Foundation)</td>
</tr>
<tr>
<td>OCFC</td>
<td>Orange County Flood Control</td>
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<td>OCWD</td>
<td>Orange County Water District</td>
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<tr>
<td>OCSD</td>
<td>Orange County Sanitation District</td>
</tr>
<tr>
<td>OOBS</td>
<td>Ocean Outfall Booster Pump Station</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>P1</td>
<td>Plant 1</td>
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<tr>
<td>P2</td>
<td>Plant 2</td>
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<tr>
<td>PCA</td>
<td>Portland Cement Association</td>
</tr>
<tr>
<td>PCI</td>
<td>Precast/Prestressed Concrete Institute</td>
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<tr>
<td>PPI</td>
<td>Plastic Pipe Institute</td>
</tr>
<tr>
<td>PS</td>
<td>Product Standard</td>
</tr>
<tr>
<td>RIS</td>
<td>Redwood Inspection Service</td>
</tr>
<tr>
<td>SAR</td>
<td>Santa Ana River</td>
</tr>
<tr>
<td>SCE</td>
<td>Southern California Edison</td>
</tr>
<tr>
<td>SEFE</td>
<td>Secondary Effluent Flow Equalization</td>
</tr>
<tr>
<td>SEJB4</td>
<td>Secondary Effluent Junction Box 4</td>
</tr>
<tr>
<td>SFPA</td>
<td>Southern Forest Products Association</td>
</tr>
<tr>
<td>SI</td>
<td>Système International des Unités (International System of Units)</td>
</tr>
<tr>
<td>SMACNA</td>
<td>Sheet Metal and Air Conditioning Contractors National Association</td>
</tr>
<tr>
<td>SPFA</td>
<td>Steel Plate Fabricators Association</td>
</tr>
<tr>
<td>SPI</td>
<td>Society of the Plastics Industry</td>
</tr>
<tr>
<td>SSFI</td>
<td>Scaffolding, Shoring &amp; Forming Institute, Inc</td>
</tr>
<tr>
<td>SSPC</td>
<td>SSPC: The Society for Protective Coatings</td>
</tr>
<tr>
<td>SSPWC</td>
<td>Standard Specification for Public Works Construction</td>
</tr>
<tr>
<td>SWPPP</td>
<td>Storm Water Pollution Prevention Plan</td>
</tr>
<tr>
<td>TABB</td>
<td>Testing, Adjusting, and Balancing Bureau</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters' Laboratories</td>
</tr>
<tr>
<td>USBR</td>
<td>U.S. Bureau of Reclamation</td>
</tr>
<tr>
<td>USGBC</td>
<td>U.S. Green Building Council</td>
</tr>
<tr>
<td>WEF</td>
<td>Water Environment Federation</td>
</tr>
</tbody>
</table>

End of Section
PART 1 – GENERAL

1-1. DESCRIPTION. The Contractor shall provide for each piece of equipment supplied, a 316-stainless steel or non-corrosive asset nameplate firmly attached and permanently engraved with the “asset tag” directed by the Owner. In addition, a separate equipment nameplate with the Owner’s standard equipment number shall be permanently affixed to each piece of equipment. The Owner shall assign a block of equipment numbers to be assigned by the Contractor for each piece of equipment.

The unique equipment number used by the manufacturer shall be consistent with the number used to identify the equipment in parts listings and O&M documentation. Equipment numbers shall be provided and affixed to the equipment by the equipment manufacture prior to delivery to the Contractor.

For all devices where nameplates are supplied, the Contractor shall develop an “Equipment Cross Reference Schedule” that matches the asset tag and equipment number to the appropriate equipment manual and parts list. The equipment schedule shall include the pertinent information associated with the equipment including asset tag and equipment number, description, functional name, location, component equipment model, part number, size, materials, accessories, range, equipment cost, replacement cost, purchase order number, warranty information, expected life, etc. The Equipment Cross-Reference Schedule shall be provided in the form of a Microsoft Excel spreadsheet.

The Contractor shall coordinate the identification of all equipment provided with the Owner’s asset tagging and management system.

1-2. SUBMITTALS. The Contractor shall provide asset tags as part of the Shop Drawing Submittal.

Submit a complete listing of all equipment furnished along with both equipment identification number and asset tag number for approval.

Submit the “Cross Reference Schedule” approved equipment number and asset tag for each piece of equipment furnished in the same electronic format as that provided by the Owner.
PART 2 – PRODUCTS

2-1. EQUIPMENT DESIGN AND FABRICATION. There are two types of tags that are needed for the identification of assets in the field. One is the asset tag and the other is the equipment tag. Asset numbers are already formatted as shown on the P&IDs. Equipment numbers are not going to be available until the assets and the equipment have been entered into Maximo (the CMMS software) and Maximo assigns the equipment its unique identifier. Hence, the submission of tags by the Contractor will be a two-phased activity. First, the Asset Tags will be submitted as set forth below by the Contractor at the same time the assets are delivered and installed by the contractor. Later, at a predetermined time set by the OCWD, and when the equipment numbers are available from the CMMS program, and submitted by OCWD to the Contractor, the Contractor will deliver the equipment tags as set forth below.

Two forms of identification will be used for assets:

Asset Tag – will refer to the identification of the asset in the context of the facility, process, site, etc. The Asset Tag will include Area/location, Train/Block Number, Component ID, and Sequence Number (unique identification) of the asset related to the function. The Asset Tag will remain with the location or function.

Equipment Tag – will refer to the unique identifier of the specific piece of equipment or asset. The Equipment Number will remain with that asset/equipment and “travel” with it as it is put in service, taken out of service, repaired, overhauled, etc. The Equipment Number will be linked to an Asset Tag when the equipment is in service.

2-1.01. Asset Tags. Assets are identified by facility, location / area, process, relative position within a process, and related system using an asset tag. The purpose of having asset tags is for operations and maintenance personnel to be able to identify the asset in the field.

Asset tags are assigned to the placement of the asset and remain if the actual equipment in replaced. The asset tags are mounted adjacent to the equipment on slabs, mounting stands, conduit and similar locations closely associated with the asset.

All process equipment, valves, instruments and controls will be given an asset tag. All process plant assets, non-fixed equipment, and furnishing assets shall be given an asset tag.

Pipe and appurtenances are associated with a process and flow steam/system. Pipes and appurtenances shall receive asset numbers but shall not be tagged in the field.
Asset tags shall match the format and tagging shown on the P&IDs unless noted otherwise.

The asset register contains the complete relationship an asset has within the facility. The asset tag is derived from the information contained in the register. The asset tagging conventions define what elements of the asset register are used for each asset tag type.

The Location/Area for all valves and equipment on Contract 2 shall be 144.

An example of an asset register is shown below:

<table>
<thead>
<tr>
<th>Facility Code</th>
<th>Area/Location Code</th>
<th>Equipment/Component Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE Pipeline</td>
<td>SE 144 A01 SE PV 3310</td>
<td></td>
</tr>
</tbody>
</table>

The asset tag will comprise of the Location/area, Train/Block Number, Component ID, and Sequence Number as shown below:

<table>
<thead>
<tr>
<th>Area/Location Code</th>
<th>Equipment/Component Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location / Area</td>
<td>Train / Block Number</td>
</tr>
<tr>
<td>Component ID</td>
<td>Sequence Number</td>
</tr>
<tr>
<td>144 A01 PV 3310</td>
<td></td>
</tr>
</tbody>
</table>

All component, Sequence Number, and Sub-Process Sequence Number for equipment contained as part of a duplicated process shall be the same component, sequence and sub-process designation. For example, all the Secondary Effluent Pipeline Vacuum Assembly Isolation Valves shall carry the final designation as PV 3310. The designator for the Unit in contained in the Train or Block Number.

Tagging schedules shall be obtained form the PCSS and the ISS.

2-1.02. **Equipment Number.** Unique equipment identification numbers are assigned to a specific equipment item for the life of the item. When the equipment item is moved from the process, the equipment identification number goes with the equipment item.
Each device shall bear a nameplate to identify its equipment identification number both in text and bar code formats. Equipment numbers shall be displayed on the outside of equipment enclosures and panels. Bar codes shall reflect the equipment number using Code 39 and printed in a minimum of 18-point font size. Bar codes shall be printed on adhesive backed labels designed for exterior applications for both adhesion and fading for a minimum of seven years exposure, affixed to the permanent nameplates.

The equipment number will be assigned by Maximo, the CMMS software and will be a random sequential number. This number shall be unique. Contractor shall use this equipment number as part of the equipment cross-reference schedule for each equipment item. Equipment numbers shall be represented with a bar code as part of the equipment identification engraved on the equipment number nameplate. Codes shall be printed with the minimum 18pt font in Code 39 or as specified herein.

Nameplates shall be attached using Type 316 stainless steel self-tapping machine screws where possible or as specified otherwise. If the use of a stainless-steel screw is not possible, provide a 316-stainless steel chain or stainless-steel wire (18-gauge min) and affix to a non-removable part of the device. Where specified, attach the nameplate using permanent Silicon II adhesive as approved by the Engineer.

Equipment number and asset tags shall be provided for all equipment furnished including but not limited to:

1. Mechanical process equipment, pump, blowers, valves, etc.
2. Field instrumentation.
3. Miscellaneous items as required.

2-1.03. Equipment Nameplates. Information to be permanently engraved onto the nameplate shall include the identifying equipment number, asset tag, manufacturer, model number, and manufacturer part number.

The asset tag included on the nameplate shall only include the Location/Area, Train/Block Number, Component ID, and Sequence Number fields.

Nameplate asset tag example:

<table>
<thead>
<tr>
<th>Location/Area</th>
<th>Train/Block Number</th>
<th>Component ID</th>
<th>Sequence Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>144</td>
<td>A01</td>
<td>PV</td>
<td>3310</td>
</tr>
</tbody>
</table>

2-1.04. Control Components Tagging. Not used.
PART 3 – EXECUTION

3-1. **ASSET TAGS.** Asset Tags shall be mounted in close proximity to the asset but not likely to be removed if the asset is removed. Use 316 SS, 0.032-inch wire with 3 full twist (minimum), folded inward to prevent puncture wounds to mount tags to conduit, pipe support stands, or silicone adhesive (preferred) to mount nameplates to flat or large-radius inflexible surfaces such as concrete pad, panels and support stands.

3-2. **EQUIPMENT NUMBERS.** Equipment Numbers shall be mounted directly on the asset so that the equipment number travels with the asset, providing a unique identifier to allow historical asset management of that asset. Use 316 SS #4 screws (preferred) or 0.032-inch wire with 3 full twist minimum folded round to prevent puncture wounds or silicon adhesive.

End of Section
1. **APPLICABLE CODES.** See Technical Specifications for Applicable Codes.

2. **FEES AND PERMITS.**

2-1. **Summary.** Contractor shall comply with all the terms, conditions and requirements attached to all permits, bonds and licenses required by any local, state, or federal agencies to perform work, construct, erect, test and start up of any equipment or facility for this Contract. The Contractor shall give all notices necessary and incidental to the due and lawful prosecution of the Work.

Any permits, bonds, licenses and fees therefore required for the performance of work under this Contract and not specifically mentioned herein as being obtained and paid for by the Owner shall be included in the Contractor’s Bid price. The Contractor shall apply for and obtain all safety permits for excavations, tunneling, trenches, construction (building structure, scaffolding, or falsework) and demolition required by CAL/OSHA.

The Contractor shall post at the site of Work all required permits as stipulated by the respective regulatory agency.

2-2. **Local Agency Fees and Permits.** The Contractor shall be responsible for satisfying all code requirements, calling for inspections, and obtaining final approvals on behalf of the Owner. The Contractor shall notify the Engineer of the need and the readiness of all required inspections. All inspections are to be coordinated with the Engineer. The Contractor shall comply with all construction conditions stipulated in the permits. The Contractor shall be responsible for and the Owner shall not provide reimbursement for any costs required for the reinspection of defective work or additional costs due to the Contractor’s failure to properly schedule the inspections. The Contractor shall comply with the provisions of any and all permits obtained by the Owner and/or contained in these Specifications.

The Owner is not responsible for any local agency or utility permits required for temporary facilities during construction such as field office trailers and temporary electrical service for construction operations. Obtaining all such permits and the costs associated with such permits are the responsibility of the Contractor and shall be included in the Contractor’s Total Base Bid.

2-3. **Environmental Restrictions.** The Owner has prepared an Environmental Impact Report (EIR) and issued subsequent addenda in response to CEQA
comments for the Project in accordance with the California Environmental Quality Act (CEQA) and the CEQA Guidelines. A copy of the EIR is available for review at the Owner’s offices. In addition to the requirements in the summary of permits, environmental protection, protection of sensitive habitats, and other actions are required by mitigation measures adopted by the Owner. Mitigation Monitoring and Reporting Plan is included as an appendix to the EIR.

The Contractor shall be responsible for compliance with the environmental controls listed in the Environmental Controls section. The Contractor shall coordinate its work relating to these requirements with the Engineer.

2-4. Summary of Permits. The Contractor shall be responsible for coordination with the Engineer and complying with all the terms, conditions and requirements on the following requirements.

- **South Coast Air Quality Management District (SCAQMD).** The Contractor shall comply with all applicable District Rules and Regulations, particularly Regulation VIII.

- **Coastal Development Permit, Plant No. 2 GWRS Facilities.** The contractor shall comply with all requirements and conditions of approval stated in OCWD’s Coastal Development Permit No. 18-023 in the implementation of the Project work on the OCSD Plant 2 site. A copy of the Permit is available for review at the Owner’s office.

- **Orange County Sanitation District (OCSD) Dewatering Permit (Sewer Discharge Requirements).** Direct or indirect discharge of water from dewatering operations into the OCSD’s sanitary sewer system first requires a Contractor application for a no-fee permit issued by the OCSD prior to any discharge. For permit application, the Contractor shall obtain and complete required documents from the Engineer to secure an Authorization to Discharge Letter from the OCSD’s Source Control staff. The Contractor shall allocate a minimum of 10 working days for this process. Additionally, the Contractor must implement the following requirements:

  1. As a part of the permit application process, the Contractor shall analyze a representative sample of the dewatering wastewater, as required, for Total Toxic Organics (TTO’s), Selenium, and other Pollutants of Concern and provide the analytical results and the completed permit application to the Engineer. Pollutants shall mean any constituent, compound, or characteristic of wastewaters on which a discharge limit may be imposed either by the OCSD or the regulatory bodies empowered to regulate the OCSD and as defined in the OCSD’s Wastewater Discharge Regulations (Ordinance).
2. The permit issued by the OCSD’s Source Control staff may require the Contractor to monitor its discharge for Total Toxic Organics (TTO’s), Selenium, and other Pollutants of Concern and provide the analytical results to the OCSD’s Source Control staff. Typical monitoring frequency is after the commencement of discharge and before the end of discharge. Monitoring frequency shall be specified by the OCSD’s Source Control staff.

3. Monitoring of Dewatering Effluent Discharge Into OCSD’s Collection System: Any discharge of on-site dewatering to OCSD’s collection system shall be monitored by the Contractor, as required, for Heavy Metals, Selenium, Total Toxic Organics (TTO’s), Indicator Bacteria and other Pollutants of Concern to ensure compliance with the OCSD’s NPDES permit ensure compliance with the OCSD’s NPDES permit. In case where chlorine addition is used for disinfection or biological control, the Contractor shall monitor for Chlorine.

4. Any discharge of on-site dewatering directly to OCSD’s ocean outfall (bypassing treatment processes) shall be monitored by the Contractor, as required, for TSS, VSS, BOD, Ammonia, Heavy Metals, Selenium, Toxicity, Total Toxic Organics (TTO’s), and Indicator Bacteria and other Pollutants of Concern to ensure compliance with the OCSD’s NPDES permit effluent requirements. In cases where chlorine addition is used for disinfection or biological control, the Contractor shall monitor for Chlorine.

5. All dewatering operations require the use of a desilting tank with a stainless-steel sampling port and a drip container so that the Engineer may collect periodic dewatering samples. Additionally, the desilting tanks shall be covered with sturdy and air-tight covers so no odors can escape, and no illegal dumping is possible. The air-tight covers shall be maintained throughout the dewatering period, and only removed when necessary for silt removal or other maintenance activities. The desilting tank shall be located in a safe and easily accessible location. The system used for desilting the water shall be a baffled structure and shall provide not less than 5 minutes detention time and have a “flow-through” velocity not exceeding 0.2 feet per second at the anticipated peak flow. The desilting box shall be cleaned as required to maintain the detention time and flow-through limitations specified above. The intent is to avoid any addition of soil materials from dewatering operations into the receiving sewer or storm drain systems. The method of desilting and point of disposal of water shall be subject to the Engineer’s approval.

6. For all dewatering operations, each disposal point must have a calibrated, non-resettable totalizing effluent flow meter with a flow accuracy of ± 5% to track the discharges into the Owner’s facility. The
Contractor shall submit weekly reports showing total amount of discharge at each point with meter readings and other data necessary to support the quantity reported. Also, an accessible sample collection point shall be provided immediately upstream of the tie-in point to the sewer or OCSD’s sewerage facilities. The Contractor shall provide OCSD’s SOURCE CONTROL staff and Engineer unrestricted access to the facility and site to inspect, monitor, or verify compliance with OCSD’s Permit and Ordinance requirements. Contractor shall make provisions to allow entry to the site for the purposes outlined herein at all times.

7. The Contractor is responsible for development and implementation of a detailed contingency plan in the event that it becomes necessary to reduce or cease dewatering flows into the OCSD’s sanitary sewer system.

8. All dewatering operations with detectable levels of pollutants shall be pretreated to reduce the amount of pollutants, eliminate the pollutants, or alter the nature of the pollutant properties in the dewatering water to a level authorized by OCSD prior to, or in lieu of, discharge of the dewatering water into OCSD’s system. The reduction or alteration can be obtained by physical, chemical or biological processes, or process changes, or by other means. The method of pretreatment and point of disposal of water shall be subject to the OCSD’s Source Control staff and Engineer’s acceptance.

9. All dewatering operations with detectable levels of TTO’s, or evidence of TTO’s in the extraction zone, or significant amounts of volatile organics, may require the use of granular activated carbon (GAC) filters in lead-lag arrangement or other suitable technology to mitigate a Lower Explosion Limit (LEL) event. Note that additional particle filtration is typically provided upstream of the GAC filters to prevent fouling and to extend the life of the carbon. The GAC filters shall be equipped with a stainless-steel sampling port and a drip container on the final stage discharge outlet so that the Engineer may collect periodic dewatering samples. Additionally, the GAC filters shall be air-tight so no odors can escape, and no illegal dumping is possible. The air-tight covers shall be maintained throughout the dewatering period, and only removed when necessary for carbon changeout or other maintenance activities. The GAC filters shall be located in a safe and easily accessible location. Each GAC filter shall provide enough detention time to meet OCSD’s discharge standards. The carbon shall be changed in the lead GAC filter as required. The GAC filters and additional particle filtration equipment upstream of the GAC filters shall be cleaned as required to maintain the detention time and flow-through limitations specified above. The intent is to avoid any addition of soil materials from dewatering operations into the receiving sewer system.
or fouling of the GAC filter carbon media. The method of pretreatment and point of disposal of water shall be subject to the Engineer’s acceptance.

10. Pretreatment of Chlorinated Dewatering Effluent: All dewatering operations that discharge significant levels of chlorine directly to the OCSD’s ocean outfall (bypassing treatment processes), or in areas where fugitive odor emissions may impact local residences, or where chlorine levels may cause a safety concern as a result of disinfection or biological control, require the use of dechlorination dosing and on-stream monitoring to ensure compliance with the OCSD’s NPDES permit effluent requirements. The method of pretreatment and point of disposal of water shall be subject to the Engineer’s approval.

11. Discontinuation of Dewatering Discharge into OCSD’s Sewer System: The Contractor is responsible for development and implementation of a contingency plan in the event that it becomes necessary to reduce or cease dewatering flows into OCSD’s sanitary sewer system for reasons other than a storm event.

12. Discharge During Storm Event: Water may not be discharged into the OCSD’s sanitary sewer during a significant wet-weather storm event without the acceptance of the Engineer. Wet season period is defined in the Work Restrictions section. The disposal system must be equipped with an instant shut off mechanism to protect the OCSD’s facilities in a high flow situation. All costs associated with temporary shut-off of the dewatering system, including protection of the Contractor’s Work, shall be the responsibility of the Contractor. The Contractor will be notified by the Engineer when such a situation is at hand. Failure to provide notification in advance of a high flow situation will not relieve the Contractor of its responsibility to stop discharging all dewatering flows once the high-flow situation is present, and its responsibility to absorb all costs associated with the temporary shut-off of dewatering. When continued discharge into the OCSD’s sanitary sewer system has been disapproved during a wet weather/high flow event, but continued dewatering is desired, the Contractor may elect to discharge into the storm drain system, but must have a pre-approved NPDES permit issued by the RWQCB to discharge and must comply with all provisions of these specifications. Switching of discharge points shall be at no cost to OCSD or the Owner.

13. Dewatering flow shall be discharged as indicated in these Contract Documents and subject to the OCSD’s Source Control staff and Engineer’s acceptance. The Contractor shall notify the Owner when discharge occurs so that sampling of the groundwater can be performed to verify that it complies with the treatment requirements identified herein.
14. See Section 01140 Work Restrictions for other dewatering information.

- **Southern California Edison (SCE).** SCE owns and operates underground electrical transmission, distribution facilities, and overhead power lines that are at and near the site. The Contractor shall assume, in preparing its Bid, that conditions will include:
  
a. The Contractor shall contact Underground Services Alert (USA) at least two (2) working days prior to construction within the vicinity of the underground electric conduits.
  
b. SCE requires that all construction activities within the vicinity of facilities are in accordance with appropriate OSHA and California Public Utilities Commission regulations.
  
c. SCE policy requires that all relocation and repair be performed by their own forces. The Contractor shall immediately contact SCE should any damage occur to utilities and appurtenances.
  
d. All construction activities must be limited to the right-of-way or limits of construction, as designated on the design drawings, unless specifically authorized by the Owner.
  
e. Any access into, work within, and use of SCE property shall be coordinated with SCE. The Contractor shall coordinate all required permits, temporary construction easements, and documents necessary for completion of the Work. All fees required shall be paid for by the Contractor.

- **Southern California Gas Company (SCGC).** SCGC owns and operates underground gas transmission and distribution facilities that are near the site. The Contractor shall assume, in preparing its Bid, that conditions will include:
  
a. The Contractor shall contact Underground Services Alert (USA) at least two (2) working days prior to construction within the vicinity of the underground gas conduits.
  
b. SCGC requires that all construction activities within the vicinity of facilities are in accordance with appropriate OSHA and California Public Utilities Commission regulations.
  
c. SCGC policy requires that all relocation and repair be performed by their own forces. The Contractor shall immediately contact SCGC should any damage occur to gas pipelines and appurtenances.
  
d. All construction activities must be limited to the right-of-way or limits of construction, as designated on the design drawings, unless specifically authorized by the Owner.
State of California Department of Industrial Relations Occupational Safety and Health Administration (Cal/OSHA) – Construction Activities Permit. The Contractor shall obtain a Construction Activity Permit from Cal/OSHA for excavations and pipeline trenches greater than five (5) feet deep into which construction personnel will enter. This permit will include any confined space entry requirements. To obtain the permit, the Contractor shall schedule and attend a safety permit conference with the nearest Cal/OSHA District office. At the conference, the Contractor shall provide enough project details that Cal/OSHA can make a determination that the work will be performed safely.

The Contractor shall provide the following to Cal/OSHA:

a. Permit Application Form
b. Activity Notification Form
c. Copy of Contractor’s IIP Program
d. Copy of Contractor’s Code of Safe Practices

State of California Department of Industrial Relations Occupational Safety and Health Administration (Cal/OSHA) – Lead Abatement. Cal/OSHA Consultation Service/California Department of Industrial Relations is the regulatory agency for Lead. Specifically, Section 1532.1 in Title 8 of California Code of Regulations makes construction employers responsible for basic steps in recognizing lead in construction; and Section 36100 Title 17 of CA Code of Regulations covers lead abatement as part of demolition. The fact sheet, found at the website [http://www.dir.ca.gov/dosh/dosh_publications/lead-fct-sheet-rev.pdf](http://www.dir.ca.gov/dosh/dosh_publications/lead-fct-sheet-rev.pdf), summarizes the answers to most questions.

The Owner has conducted a Lead Survey. This survey is available for review at the District or for purchase from OCB Reprographics for a nominal fee per the location and contact details listed in the Notice Inviting Bids.

Verizon Wireless. Verizon Wireless (Verizon) owns and operates overhead and underground telecommunications facilities near the site. The Contractor shall assume in preparing its Bid, the following conditions:

a. The Contractor shall contact Underground Services Alert (USA) at least two (2) working days prior to construction within the vicinity of any underground telecommunications lines. The Contractor shall also notify Verizon at least five (5) working days prior to construction in the vicinity of underground or overhead utilities that require support, as defined by Verizon or the Owner.

b. Verizon requires that all construction activities within the vicinity of overhead electrical facilities be conducted in accordance with
appropriate Cal/OSHA and California Public Utilities Commission regulations.

c. Verizon policy requires that all relocation and repair be performed by their own forces. The Contractor shall immediately contact Verizon should any damage occur to cables, appurtenances, or overhead lines.

- **California Division of Drinking Water (DDW).** DDW has the primary responsibility for establishing criteria to protect the public health with regard to recycled water use. DDW requirement for water recycling are contained in the California Code of Regulations, Title 22, Division 4, Chapter 3, Wastewater Reclamation Criteria. The Owner will be preparing an updated Title 22 Engineers Report and Operations Plan for the Project.

- **Orange County Flood Control District (OCFCD).** The Contractor shall coordinate with OCWD and OCFCD prior to the start of construction to obtain an Encroachment Permit. OCFCD shall be notified of all work within its property. Under no circumstances shall any excavation be performed within OCFCD property unless that portion is within OCSD easement. See Specification 01140 3-2.

- **City of Huntington Beach.** The Contractor shall coordinate with OCWD and the City of Huntington Beach, including the Huntington Beach Fire Department, to obtain a Permit to Construct.

- **City of Fountain Valley.** The Contractor shall coordinate with OCWD and the City of Fountain Valley, including the Fountain Valley Fire Department, to obtain a Permit to Construct.

3. **STORM WATER QUALITY CONTROLS.**

Requirements presented in this section cover stormwater quality controls for the entire project including work on both OCWD and OCSD property. No stormwater within the OCSD property construction area shall leave the site nor shall stormwater be tracked off site. The Contractor shall make all necessary provisions for the capture of stormwater within the OCSD property construction area. For bidding purposes, the Contractor shall assume a Risk Level 2 for determining BMP requirements. The Contractor shall be responsible for retaining a person certified in performing the Risk calculation as required in the permit.

Contractor shall file a Notice of Intent (NOI) to apply for coverage under the General Construction Activities Storm Water Permit (State Water Resources Control Board WQ Order No. 99-08) prior to commencement of construction activity.
3-1. **General.** The 1972 amendments to the Federal Water Pollution Control Act established the National Pollutant Discharge Elimination System (NPDES) permit program to control discharges of pollutants from point sources. The 1987 amendments to the Clean Water Act (CWA) created a new section of the CWA devoted to storm water permitting (Section 402(p)). The EPA has delegated permitting authority to the State Water Resources Control Board (SWRCB). The SWRCB issues both general and individual permits. Construction activities including all construction discharges are regulated under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity (General Permit). The appropriate Regional Water Quality Control Board (RWQCB) enforces the General Permit. Coverage under a General Permit requires the submission of a Notice of Intent (NOI) with the appropriate fee, annual compliance reports, a Notice of Termination (NOT) and preparation of a storm water pollution prevention plan (SWPPP).

Construction activity includes, but is not limited to: clearing, grading, demolition, excavation, construction of new structures, pipelines and reconstruction of existing facilities involving removal and replacement that results in soil disturbance. This includes construction access roads, staging areas, storage areas, stockpiles, and any off-site areas, which receive run-off from the construction project such as discharge points into a receiving water.

The Owner has permits from the RWQCB: Recycled Water Order No. R8-2004-0002 and Amending Order Nos. R8-2008-0058 R8-2014-054, R8-2016-0051, and R8-2019-0007, and SAR discharge permit Order No. R8-2014-0069 and NPDES Number CA8000408. While the Owner will continue to be responsible to the RWQCB for causing the preparation of and compliance with the various management plans called for in the permits, the Owner will require the Contractor to provide the detail planning and compliance activities required insofar as they would potentially affect the Contractor's methods and means of performing the Work.

If a violation of the permits is due to the Contractor's actions or inactions and a fine is assessed, the Contractor shall be responsible for the fine.


3-2. **Contractor’s Responsibilities.** The Contractor shall comply with the SWRCB, RWQCB, County, City, and other local agency requirements regarding stormwater management, inspection, and monitoring.
The Contractor shall be responsible for meeting the requirements of the General Permit except as specifically noted below. The Contractor shall prepare the following documents in accordance with Section C, STANDARD PROVISIONS FOR CONSTRUCTION ACTIVITY, of the General Permit and submit them to the Owner as follows:

- Prepare NOI and provide to Owner for signature, then file NOI.
- Prepare and submit the SWPPP for Owner review at least 30 days prior to any soil disturbing construction in accordance with Section A: STORM WATER POLLUTION PREVENTION PLAN of the General Permit. The Plan shall follow the format presented in the California Storm Water Best Management Practices (BMP) Handbook - Construction Activity volume, available for order from www.cabmphandbook.com. The plan must address all areas outside of the Project site that are disturbed by Contractor for the prosecution of the Work.
- Install, construct, implement, monitor, maintain and remove upon completion all of the BMPs and other pollution prevention measures in accordance with Section A: STORM WATER POLLUTION PREVENTION PLAN of the General Permit.
- Prepare the annual compliance report and submit to the Owner prior to review as required by Section B, Item 4. – Compliance Certification of the General Permit.
- Prepare all inspection and monitoring reports in accordance with Section B, items 3 through 6 of the General Permit and submitting them to the Owner for review.
- Prepare NOT for Engineer and Owner review. The Owner will file the NOT, however, the Contractor shall certify the NOT.
- Provide evidence to the Engineer that the individual responsible for the SWPPP preparation, implementation, and permit compliance has been appropriately trained and has attended training and/or workshops offered by the SWRCB, RWQCB, or other locally recognized agencies or professional organizations in accordance with Section A, Item 12. – Training of the General Permit. All workers on-site shall, at a minimum, have received training from the responsible individual.
- Contractor shall provide the Engineer the names and 24-hour phone numbers for parties responsible for implementing, monitoring, inspecting and maintaining the SWPPP.

With the exception of the NOI, all documents prepared by the Contractor shall be routed through the Owner, via the Engineer, for submission to the RWQCB.
Contractor shall be bound to the conditions on the Notice of Intent (NOI) that will be filed by Contractor and will be responsible for all costs associated with the implementation of the Plan including all fines, damages and job delays incurred due to failure to implement the requirements of the Permit.

Contractor shall maintain a copy of the NOI, Plan and Permit at the Project Site at all times, and shall make the Plan available to Owner, Engineer, Engineer, and the State Water Quality Control Board during construction activities. Contractor shall allow authorized agents of the Water Quality Control Board, State Water Resources Control Board, U.S. Environmental Protection Agency, and local storm water management personnel upon the presentation of credentials and other documents as may be required by Laws and Regulations to accomplish the following.

a. Enter, at reasonable times, upon the construction site and Contractor's facilities pertinent to the Work.

b. Have access to and copy, at reasonable times, any records that must be kept as specified in the permit.

c. Inspect, at reasonable times, the construction site and related erosion and sediment control measures.

d. Sample or monitor, at reasonable times, for the purpose of ensuring compliance with the Permit.

e. Contractor shall notify the Engineer immediately following a request from any regulatory agency to enter, inspect, sample, monitor or otherwise access the Project Site or its records.

The Contractor shall be responsible for taking the proper actions to prevent stormwater coming into contact with contaminants and sediments from migrating offsite or entering storm sewer drainage systems. The Contractor shall take immediate action if directed by the Engineer or if the Contractor observes contaminants and/or sediments entering the storm drainage system, to prevent further stormwater from entering the system.

The Contractor shall update the SWPPP whenever there is a change in construction or operations which may affect the discharge of pollutants to storm water.

The Contractor's attention is directed to the following requirements:

- The Contractor shall clean and maintain the construction sites free from excess construction materials, spoils, and dust daily during construction operations. The Contractor shall also prevent spillage of soil on haul routes and immediately remove any spilled materials. Near creeks or
drainage ways, the Contractor will be required to keep all equipment and materials out of the drainage path during construction.

- Excavated material not acceptable for use as backfill shall be removed and disposed of by the Contractor.

- Water used for hydrostatic testing may be discharged provided that the water has been tested and determined to be free of contamination, in accordance with the SWPPP, the General Permit, and in accordance with NPDES.

- The Contractor shall use sediment barriers near rivers, creeks, and drainage swales to prevent sediment, construction materials, or fluid spills from construction equipment from entering the rivers, creeks, drainage swales, or drainage canals. If the pollutants or sediments from the construction site enter the rivers, creeks, drainage swales, or drainage canals, the pollutants and sediments shall be removed immediately.

- Mechanical and electrical equipment, pipe, valves, and embankment materials may be loaded, unloaded, and stored at the site with enclosures or flow barriers, which shall be erected by the Contractor. The barriers shall surround the temporary storage areas to prevent storm water flows from entering the areas and to control sediments and other pollutants discharge in storm water flows from leaving the temporary storage areas.

- If storm water flows enter the temporary storage areas and contact the construction material, the Owner shall determine if the storm water has become contaminated or may be allowed to be discharged to the storm drains or steam channels. For the purposes of this paragraph, contamination is defined as any degradation of the storm water quality due to contact with construction materials including but not limited to excavated materials and petroleum products. If the storm water flows have become contaminated due to contact with the construction materials, the Contractor shall provide for disposal of the storm water flows at no additional costs to the Owner in a manner acceptable to the Owner and the Regional Water Quality Control Board.

- If spills occur in the temporary storage areas or at the site, the Contractor shall immediately notify the Owner and, at the Contractor’s expense, contain and clean up the spill to prevent spilled material from entering storm drains, creeks, stream channels, drainage canals, or groundwater, or from being absorbed by the underlying pavement or soil.

- The Contractor shall immediately clean up spills of fuel, hydraulic fluid, or oil from construction equipment or vehicles, including spills on the construction site, and at the Contractor’s yard. The Contractor shall include containment areas for these materials, and provide for disposal of these materials, their containers, and pavement or soil that may be
contaminated with fuel, hydraulic fluid, or oil in accordance with all applicable laws and regulations.

- Backfill material stored at the construction site shall be protected from storm water flows with solid barriers. If a potential for erosion due to storm water exists, covers shall be provided. The purpose of these barriers and covers shall be to prevent the backfill material from flowing into water courses.

- Water from equipment washing shall not be discharged to creeks, drainage swales, or drainage canals or allowed to percolate into the ground. The Contractor shall not sweep, grade, or flush surplus materials, rubbish or debris into creeks, drainage swales, or drainage canals.

- Fueling, maintenance, and parking of vehicles and vehicle maintenance equipment are prohibited within 0.20 mile of any river, creek, drainage canal, drainage swale, or stream.

3-3. Owner Responsibilities. The Owner shall be responsible for the following:

- Review and sign Notice of Intent (NOI) for Contractor to file.

- Furnish the Contractor with base maps of a suitable scale in order to satisfy the requirements of Section A, items 5 through 10 of the General Permit.

- The Owner will submit to the RWQCB an annual summary report and pay the associated fee. This annual summary report will require the submission of the annual certification and update as required in Contractor’s responsibilities above.


- Signatory responsibility as defined in Section C, Item 9. a. – Signatory Requirements of the General Permit.

4. DEWATERING.

Construction dewatering is regulated by the California Regional Water Quality Control Board- Santa Ana Region and is governed by the National Pollutant Discharge Elimination System (NPDES) Permit No. CAG998001 adopted by the Regional Water Quality Control Board (RWQCB) to regulate construction dewatering. Should the Contractor need to control groundwater by dewatering and/or depressurization of water bearing soil and rock formations, or other low threat discharges, the Contractor must comply with this NPDES Permit, or any updated NPDES Permit, and all other laws and regulations having jurisdiction over construction dewatering. The Contractor is responsible for obtaining all
permits from agencies with control over all dewatering matters including well installation/abandonment, water discharge, use of existing storm drains and natural water sources. Contractor can refer to copy included herein as an appendix. The Contractor will be held responsible for any fines or penalties from regulatory agencies resulting from its dewatering system.

Before dewatering is commenced, the Contractor shall obtain acceptance of OCSD and Engineer for the method, installation, monitoring, testing, removal, discharge point(s) and other system details of the Contractor’s proposed dewatering system. To that end, the Contractor is to submit to the Engineer all the requirements specified in the Dewatering Specification.

Water may not be discharged into OCSD’s sanitary sewer during a wet-weather storm event.

End of Section
Section 01140

WORK RESTRICTIONS

1. GENERAL SEQUENCING AND CONSTRAINTS. The Advanced Water Treatment Facility (AWTF), operated by the Orange County Water District (Owner/District), is a component of the Groundwater Replenishment System (GWRS) and it is a critical source for supplementing existing water supplies by providing reliable, high-quality source of water to recharge the Orange County Groundwater Basin and protects the Basin from further degradation due to seawater intrusion. The Secondary Effluent Flow Equalization Facilities at OCSD Plant 2 support GWRS by providing more total flow and allowing operation at a more constant flow rate into the AWTF. In order to convey flow from Plant 2 to the AWTF, the existing 66-inch RCP interplant pipeline will be rehabilitated as part this project for use as pressure pipe.

The facility operates under the terms of the District’s Producer/User Water Recycling Requirements from the California Regional Water Quality Control Board – Santa Ana Region. The Owner maintains a rigorous testing and monitoring schedule to assure compliance. A copy of the permit is on file available for review at the Owner’s offices. Except where outages or bypasses have been approved by the Owner, the Contractor is to conduct the Work such that the Owner’s ability to produce water shall not be impaired or reduced. The Contractor’s work must never prevent the OCWD facilities from complying with the water requirements established by State and Federal regulations.

The Orange County Sanitation District (OCSD) owns and operates Plant No. 1 and 2. Plant No. 1 and 2 are critical means of treating wastewater for reclamation purposes, including feed to the AWTF, and for conveying treated wastewater to the ocean for safe disposal. Impairing the operational capabilities of this treatment plant will result in serious environmental damage and monetary fines. Bypassing of untreated or partially treated wastewater to surface waters or drainage courses is prohibited. When accidental bypassing occurs, the Owner is entitled to take appropriate action and costs incurred will be deducted from progress payments, if deemed appropriate by the Owner.

The Contractor shall conduct work in a manner that will not impair the operational capabilities of the OCWD AWTF and Orange County Sanitation District's Plant Nos. 1 and 2 or reduce the capacity of the AWTF or treatment plants, except as provided in Section 01140 Work Restrictions.

The Contractor is to employ personnel knowledgeable and experienced in treatment plant construction including knowledge of treatment processes, facility operations and chemical systems. Examples of required knowledge include, but
are not limited to, treatment terminology, functions of treatment plant facilities, and actions that would adversely impact water treatment and water quality.

Work Sequence and Constraints described hereinafter are critical events in work sequence, which are presented to underscore the importance of proper sequencing, scheduling and coordination so that it is integrated with the required OCWD and OCSD (Plant 1 and Plant 2) facility production. The work sequence and constraints presented do not describe all items affecting the completion of the Work, but are intended to describe important events necessary to minimize disruption of the existing facilities and to ensure compliance with water quality permit requirements.

The existing facility where Contractor’s work is to be done will be occupied by the Owner throughout the construction period. The existing facility where Contractor’s work is to be done within OCSD’s Plant No. 1 and 2 sites will be occupied by OCSD staff throughout the construction period. Coordination with OCSD and OCWD will be required to maintain Plant No. 1 and GWRS in operation. The Contractor shall provide all necessary access to the Owner’s and OCSD’s personnel as required to safely and efficiently operate/maintain the facilities. At all times during the Contract duration, the Contractor is to provide the Owner’s and OCSD’s personnel and representatives safe and immediate access to all process control equipment. Additionally, the Contractor is to provide for unimpeded access for all delivery vehicles transporting materials, chemicals and equipment to the facility for the Owner’s and OCSD’s operations.

The Work required within the OCSD property and easement along the Santa Ana River will require Contractor coordination with the City of Huntington Beach, City of Fountain Valley, SCE, nurseries, and other adjacent property owners and home owner’s association. Contractor shall inform OCWD’s Public Information Officer (PIO) of construction activities impacting residents, businesses, schools, and general public a minimum of two (2) weeks prior to performing any Work. OCWD to inform OCSD’s PIO. These requirements are in addition to already included in the Contract Documents.

The tie-ins and outages discussed in this section do not represent all required tie-ins or outages for the Work. It shall be the contractor’s responsibility to identify additional tie-ins and outages and provide required planning documents and coordination.

2. INTERRUPTION OF FACILITY OPERATIONS.

2-1. General Requirements. The Work shall be bid, scheduled and constructed in such a manner as to result in the least possible disruption to the operations and staff of the existing facility. Modifications that affect or may affect the operation of the facility shall not be made without first obtaining written permission from the Engineer. Disruptions or interference to one portion of the facility will likely affect
other facility processes since they are interrelated and dependent on one another. The Contractor must fully understand any and all possible reductions on facility production and/or water quality as they plan the Work.

The Contractor shall note that not all valves and gates that may be used to isolate lines and facilities will completely seal. The Contractor shall allow for leakage of 60 gpm from the EJB valve and 60 gpm from each of the OOBS sluice gates in planning its work and may, with the Owner's concurrence, test certain valves and gates before work involving isolation has begun. The Contractor shall provide adequate temporary pumping and piping facilities to properly clear the work areas as necessary of water, chemicals, sludge and/or sewage. The Contractor shall clean the work areas as required to perform the work. Shutdown and isolation of existing facilities by closing existing valves/gates and operating electrical control panels, or as specifically provided for in the Contract Documents, will be performed by Owner personnel in conjunction with Contractor's staff upon preapproval by Engineer or according to approved schedule.

Prior to any shutdown or flow diversion all materials, fittings, supports, equipment and tools shall be on the site and all necessary skilled labor scheduled prior to starting any connection work. The Contractor shall provide staff following shutdowns to monitor and ensure the proper operation of systems.

The Contractor is advised that any shutdown of facilities will place a considerable burden on the Owner's staff before, during and after the shutdown. If through inadequate planning, lack of preparedness, faulty or inefficient workmanship or other causes controllable by the Contractor, delays, excessive time, or additional shutdowns are required that cause the Owner to incur extra cost, said extra cost will be assessed against the Contractor. To minimize impact on plant staff, all outages shall be limited to the periods specified herein unless a different shutdown time is otherwise required in the Contract Documents.

Planned utility service shutdowns to any service area or process unit of the project shall be accomplished during periods of minimum use. In some cases, this will require night or weekend work, which shall be at no additional cost to the Owner. The Contractor shall program work so that service will be restored in the minimum possible time and shall cooperate with the Owner in reducing shutdowns of the utility to a minimum. No utility shall be disconnected without prior written approval from the utility owner and Engineer. When it is necessary to disconnect a utility, the Contractor shall give at least two (2) weeks' notice to the utility owner and to the Engineer for approval of the proposed schedule. When outages require electrical switching procedures, Contractor shall schedule a final work plan review meeting a minimum of 48 hours prior to the outage. Downtime for piping, power interruptions, and other utility services requiring taps or connections will require prior written acceptance seven (7) days in advance, starting on a Thursday, of the requested downtime.
The Contractor shall note that only certain structures, tie-ins and constraints are addressed in this section. All work, whether or not addressed here, shall be governed by applicable parts of this section, and schedules and procedures further submitted for approval.

When construction includes temporary or permanent modifications to systems conveying or potentially conveying hazardous materials such as chemical systems, valves shall not be considered a sufficient means of isolation during construction. A positive isolation and sealing method such as caps, plugs, blind flanges, pancake flanges and/or spectacle flanges shall be used in addition to isolation valves.

2-1.01. High Pressure Digester Gas Pipeline (HPDG).

Construction is in close proximity to an Orange County Sanitation District Department of Transportation regulated 18-inch High Pressure Gas Pipeline (HPDG). The requirements for the HPDG before construction begins is to have an Operator Qualified inspector (OCSD to provide inspector) line locate the pipeline at 25 foot intervals along where the construction will take place.

During construction the Contractor shall make sure heavy equipment does not sit on top of the HPDG or dig too close to the pipeline. It is recommended that an Operator Qualified inspector be on site for construction watch (when excavating the insertion pits). If HPDG pipeline is exposed Contractor shall stop work immediately and contact OCSD. If at any time the HPDG pipeline is exposed photos and an inspection record must be completed and provided to OCSD.

Two weeks prior to any excavation or potholing work, the Contractor shall notify in writing the Owner and OCSD of the work. The HPDG pipeline is an active pipeline owned and operated by OCSD with restrictions and regulations imposed by regulatory and utility agencies. During excavation or potholing work, a representative of OCSD or the regulatory/utility agency must be present. Excavation or potholing without the presence of OCSD or the regulatory/utility agency staff may result in fines and project delays which if incurred as a result of the Contractor's activities shall be borne by the Contractor.

2-1.02. Removal of Liquids from 66-inch Pipeline.

Liquids defined for this section include: 1) the flow entering the pipeline from either OCSD Plant 1 or Plant 2, 2) the flow resulting from water used in the 66-inch pipeline cleaning operation, and 3) the flow use in pressure testing of the pipeline provided the test water is any of the aforementioned type flows, plant, recycle, or potable water. These flows may be discharge to the OCSD outfall system via the existing 66-inch and/or 84-inch pipeline. Flow from any insertion pit groundwater dewatering operation may not be discharged to OOBS.
The existing 66-inch bulkhead at OOBS has an 8-inch flange connection. The Contractor may use this flange for connection and removal of flow from the 66-inch pipeline. The Contractor shall provide the pump and pipelines for connection to the flange and discharge into the OOBS wetwell at a location to be identified by OCSD. For initial dewatering of the 66-inch pipeline the Contractor shall assume the pipeline to be full up to Elevation 7 and the existing siphon full.

During the execution of the work, the 84-inch pipeline may be used for conveyance of liquids to OOBS. Similar to the 66-inch bulkhead, the 84-inch bulkhead has an 8-inch flange.

Use of the 66-inch and/or 84-inch pipeline shall be coordinated with OCWD/OCSD and shall be conditional as describe in these Contract Documents.

The 66-inch and 84-inch are critical pipelines used for conveyance of treated flow from Plant 1 to Plant 2. Although OCSD permits temporary shutdown of the pipeline from its normal use for execution of other work, OCSD may request return of the pipeline for its use. If requested by OCSD, the Contractor shall have X days to return the 66/84-inch pipelines back to OCSD for use. Required Contractor work may include, but not limited to, removal of bulkheads, closure of any removed manway blind flanges, and installation of temporary spool pieces where removed for completion of the work. Events which may require return of the pipelines to OCSD include, but are limited to, large storm events, planned OCSD or OCWD operational or maintenance events, and unforeseen emergency events. OCSD will make every effort to accommodate use of the 66/84-inch pipelines however reserves the right to request return of operation to OCSD at any time and for any reason.

For discharge of flow from the 66-inch pipeline into the 84-inch pipeline along the alignment, the point of connection shall be at the manway(s) and shall be a closed connection (no free discharge into an open pipe).

2-1.03. Certification of 66-inch and 84-inch Pipeline Bulkheads at OOBS.

As describe in other section of these Contract Documents, the 66-inch and 84-inch pipelines may be taken out of service for completion of the Work. The Contractor shall be responsible and shall include in the Bid all costs associated for installation and removal of the bulkheads. Prior to use of the bulkheads, the Contractor shall certify that the bulkheads are structurally safe for use. The certification effort shall include condition assessment / inspection of the bulkhead, and structural analysis of the bulkhead by a Licensed Structural Engineer. Certification for use of the bulkhead shall include stamping and sealing by a Licensed California Structural Engineer. The existing bulkheads are located at Plant 2 at the Ocean Outfall Booster Pump Station. Installation and removal of the bulkheads shall be coordinated with OCSD/OCWD.
2-1.04. **Disposal of Groundwater Dewatering Flow.**

Groundwater levels vary seasonally and at each insertion pit location. Section 02200B Earthwork – OCSD and Section 01090 Regulatory Requirements and Permits dewatering sections apply with the more restrictive requirement being enforced.

The Contractor may use the 84-inch pipeline to convey groundwater dewatering flow from the interplant pipeline corridor area to Plant 2. The conditions for use, including but not limited to, return of pipelines for OCSD use apply. However, the pipeline flow shall not be discharged to OOBS but must be treated (desilted) and discharged to a sewer/storm drain for further treatment at Plant 2.

2-2. **Outage or Bypass Submittal Requirements.**

An outage is defined as a complete shutdown of facilities that eliminates the ability to convey flow through the existing 66 inch interplant pipeline, or 84 inch interplant pipeline, or HPDG interplant pipeline.

The Contractor shall submit to the Engineer, for review and acceptance, a detailed outage or bypass plan and time schedule for operations not less than sixty (60) days in advance of each scheduled outage or bypass. The detailed plan shall meet the restrictions and conditions found in the Contract Documents. A System Outage Request (SOR) form shall accompany each outage or bypass plan. The outage plans shall be coordinated with the construction schedule and shall meet the Contractor's planned method; describe the proposed points of isolation; the length of time required to complete said operation; any necessary temporary power, controls, instrumentation or alarms required to maintain control, monitoring and alarms; and the manpower and equipment which the Contractor shall provide in order to ensure proper operation of affected facilities. In addition, the outage plan shall describe the Contractor's contingency plan that shall be initiated in the event that its temporary facilities fail or it becomes apparent that the time constraints described in the approved SOR cannot be met. The contingency plan shall conform to all specified outage requirements. All costs for preparing and implementing both the outage and contingency plans shall be borne by the Contractor.

The Contractor shall attend a meeting with the Engineer, OCSD, and the Owner two (2) weeks before the scheduled outage to review the SOR. Any changes to the SOR must be approved by the Engineer and the Owner prior to the outage.

Contractor shall demonstrate readiness to begin outage at a Go/No-Go meeting no less than forty-eight (48) hours prior to outage. Contractor shall demonstrate that all required equipment, materials, and personnel will be on-site and operational for the outage.
2-3. Work Constraints, Sequencing and Planned System Outages Specific to This Project.

The Contractor shall note that during the construction of the Project, the existing OCWD and OCSD facilities will remain in service except where outages or bypasses have been approved by the Owner. The Contractor is responsible for sequencing the Work so that the Work is completed on or prior to the Substantial Completion dates. The Work shall be sequenced in stages and scheduled to accommodate the Owner’s operational requirements during the construction period. The Contractor is responsible for coordinating the construction schedule and operations with the Owner to allow the plant operations to function properly during the Work.

2-3.01. Sequence of Work.

A suggested sequence of work is specified below for project construction. The list below does not relieve the Contractor of responsibility of providing a complete outage sequence including all components of the work. The work sequence shall include but not be limited to:

1. Early submittal of pipeline, valves, and means and method.
2. Clearing and grubbing, trailer set-up, staging area construction, traffic control features.
3. Existing utility verification / potholing at each insertion pit location, and verify groundwater level. Caution! Overhead power lines and HPDG pipeline are located near each insertion pit.
4. Shutdown/lockout existing 66-inch at EJB and OOBS.
5. Remove debris and liquid from pipeline and clean as required for sliplining.
6. CCTV of pipeline.
7. Install and complete work of slip liner from STA 149+25 to 181+50 and from STA 25+50 to STA 50+00 including temporary connections (DWG C-36) by July 1, 2021. Completion includes backfill and restoration of insertion pit areas to grade and removal of all equipment and materials. Contractor for Contract 1 (Shimmick) work is schedule to begin work near STA 25+50 and STA 181+50 on July 1, 2021. Prior to this work stake location as described in step 8.a below.
8. For an insertion pit location:
   a. Licensed surveyor to stake location of West Santa Ana River ROW, East OCSD Easement, and/or West OC Flood ROW whichever is furthest east. No excavation, shoring, or clearing and grubbing is to occur east of the staked line.
   b. If required install traffic access control signage.
c. Clear and grub existing vegetation and rip rap.
d. If required, install dewatering facilities.
e. Temporarily or permanently relocated existing interfering utilities.
f. Excavate and shore insertion pit, and if required temporarily support existing utilities.
g. Demolish 66-inch pipe and manways as required for installation of slipliner.
h. Install slipliner.
i. Install new manway and if shown, vacuum assembly.
j. Test installed section
k. Backfill insertion pit and remove shoring.
l. Installed at grade required vacuum assemblies.
m. Remove dewatering facilities.
n. Restore site including rip rap and remove temporary access road, if required.
o. If no longer required for site remove traffic control signage.

9. Repeat step 5 for each insertion pit location.

Any deviations from the specified work sequence must be reviewed and approved by the Engineer prior to commencement of the Work.

2-3.02. Time Constraints.

The following time constraints will affect the Contractor’s work sequence, site access and construction schedule. The listing of time constraints in this section and elsewhere in the Contract Documents shall not mean that all time constraints or special conditions have been identified. The list does not substitute for the Contractor’s coordination and planning for completion of Work within the specified Contract time.

The following requirements shall be incorporated into Contractor’s CPM Construction Schedule.

- Preconstruction surveys shall be performed to address any required mitigation measures as required in the Contract Documents.

- The wet season is from October 15 through April 15. As such, the Construction Schedule shall be developed based on work between April 15 and October 15 with additional required time being shared near the beginning and end of the wet period. During the wet season, shutdowns shall not be allowed unless authorized by the Owner to do so.
• Install and complete work of slip liner from STA 149+25 to 181+50 and from STA 25+50 to STA 50+00 including temporary connections (DWG C-36) by July 1, 2021. Contractor for Contract 1 (Shimmick) work is schedule to begin work near STA 25+50 and STA 181+50 on July 1, 2021.

• The Contractor shall maintain the access road(s) as a condition of their use. The Contractor shall minimize any interruptions to all access gates including OCSD accesses via Garfield Avenue at Plant 1 and Brookhurst Avenue at Plant 2.

• The Contractor shall maintain safe public access points to the Santa Ana River Trail as well as travel by the public along the Santa Ana River Trail.

• Project construction involves earthwork activities that include making excavations and placing and compacting engineered fills. Because of the nature of the onsite soils, such earthwork activities will expose slopes and other surfaces that are susceptible to the effects of erosion. Slopes and other surfaces that are exposed shall be protected from the effects of erosion, and shall receive permanent protection as soon after the earthwork activities are completed. Refer to additional requirements specified herein and in the technical specifications.

• The existing 120-inch and 84-inch RCP pipelines are used to convey effluent from Plant 1 to Plant 2 and cannot be placed out of service. Use of the 84-inch for conveyance of cleaning and debris water from within the 66 inch, and groundwater dewatering flow may be permissible with OCSD approval. Further, protection of these pipelines during the Work is paramount.

• The existing facilities within Plant No. 2 cannot be out of service for more than the limits indicated without jeopardizing the OCSD’s ability to provide continuous service to Owner.

• If multiple plant shutdowns are determined to be needed to complete the outages, the shutdowns shall be separated by at least 14 calendar days, unless otherwise approved by the Owner and/or OCSD.

• Shutdowns requiring the use of OCSDs outfall shall be coordinated with OCSD at all times.

2-3.03. Owner Facilities Out of Service.

The Work under this Contract requires the Contractor to connect to or to permanently or temporarily modify, the existing Owner’s facilities as well as OCSD’s facilities listed below. Such facilities may be taken out of service only when the proposed outage plan has been reviewed and accepted (after being submitted for review not less than sixty (60) days prior to the outage), requested by the Contractor with fifteen (15) days advance notice, and approved in writing by the Owner.
The time limits presented above begin when the Owner's crew begins to close in-line valves, and ends when the Owner's crews have completed all procedures for putting a facility back in service. Work by the Contractor within the time limits include; but are not limited to; draining, installing, testing, refilling, and acceptance by Engineer of the installation completed within the outage period.

The Owner has the option of requiring Contractor to terminate its work and restore the facility back to full service at the end of the specified time period, or may allow Contractor to continue to work beyond the time limits specified, subject to the liquidated damages provisions stated in the Bid From.

The outage description below represents major outages that the Owner has identified in advance for the Contractor. The Contractor shall coordinate outages with all trades to achieve the maximum work. The table does not include all outages that are necessary for completion of the Work. Additional outages may be required as determined by Contractor for performing the work associated with demolition and utility relocation as specified in the Contract Documents.

The Contractor shall employ sufficient labor, superintendence, and equipment continuously during the outage to complete the designated work within the specified periods. The Contractor shall have available and provide as required temporary pumps, piping, valves, tanks, lighting, controls, instrumentation, and safety devices. Once initiated, the work during the outage may proceed on an extra shift or around-the-clock basis as necessary and approval from the Owner. Contractor shall note that to complete the required tie-ins during the specified outage periods, all required and related submittals shall have been submitted and accepted early in the construction phase.

The following outages include a suggested sequence of construction and work that should be completed and shall be taken into consideration when preparing the proposed schedule of construction. The suggested sequences and work contained herein are not inclusive and may require additional steps to provide a complete facility or system.

Major Outages (not listed in chronological order):

The following is a list of the project outages with constraints. For all outages the Contractor shall plan to group as many outage as practical to minimize disruption to the OCWD and OCSD.

The following outages shall be scheduled:

**Outage A**

Name of Facility: 66-inch RCP Interplant Pipeline
Nature or Type of Work:
For sliplining and installation of manways and vacuum assemblies on and within the 66-inch RCP, the 66-inch RCP shall be taken out of service.

Points of Isolation and Considerations:
- Shutdown and lockout of valve at Effluent Junction Box near Plant 1.
- Installation of stop plate/bulkhead at Ocean Outfall Booster Pump Station at Plant 2.

Maximum Time Facility Shall Be Taken Out of Service
See Section 2-3.02 Time Constraints.

The 66-inch pipeline is a critical facility and may be required to be placed in-service during the work due to a storm event or emergency condition. If directed by the Owner to return the 66-inch pipeline to service, the Contractor shall have 2 days to return the 66-inch pipeline to service.

Proposed Sequencing
See Section 2-3.01 Sequence of Construction.

Outage B
Name of Facility: 84-inch RCP Interplant Pipeline
Nature or Type of Work:
Temporary use of the 84 inch pipeline for conveyance of existing liquid contents, cleaning and debris water, and insertion pit dewatering flow from the interplant pipeline corridor to Plant 2 for either discharge into OOBS or discharge into a plant sewer depending on the type of source flow.

Points of Isolation and Considerations:
- Shutdown and lockout of valve at Effluent Junction Box near Plant 1.
- Installation of stop plate/bulkhead at Ocean Outfall Booster Pump Station at Plant 2.

Maximum Time Facility Shall Be Taken Out of Service
See Section 2-3.02 Time Constraints.

The 84-inch pipeline is a critical facility and may be required to be placed in-service during the work due to a storm event or emergency condition. If directed by the Owner to return the 84-inch pipeline to service, the Contractor shall have 2 days to return the 84-inch pipeline to service.
Proposed Sequencing
See Section 2-3.01 Sequence of Construction.

3. OTHER WORK RESTRICTIONS AND COORDINATION REQUIREMENTS.

3-1. Work Hours. See the General Provisions “Working Hours” section for restrictions.

3-2. West OC Flood Property Line / West R.O.W. Santa Ana River / East OCSD Easement. Under NO circumstances shall the Contractor excavate or shore on or east of the Property Line, Right of Way, or Easement shown in the table below. Prior to any excavation or shoring work, the Contractor’s license surveyor shall stake the location of the Property Line, Right of Way, or Easement identified herein. The staking is required only in the areas where excavation and shoring are to occur and not along the entire alignment. The stakes shall remain in place for the duration of the work within that area.

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<td>24+00 – 34+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-05</td>
<td>34+00 – 44+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-06</td>
<td>44+00 – 52+47</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-06</td>
<td>52+47 – 52+54</td>
<td>West OC Flood Property Line</td>
</tr>
<tr>
<td>C-06</td>
<td>52+54 – 54+00</td>
<td>East OCSD Easement</td>
</tr>
<tr>
<td>C-07</td>
<td>54+00 – 64+00</td>
<td>East OCSD Easement</td>
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<tr>
<td>C-08</td>
<td>64+00 – 74+00</td>
<td>East OCSD Easement</td>
</tr>
<tr>
<td>C-09</td>
<td>74+00 – 78+29</td>
<td>East OCSD Easement</td>
</tr>
<tr>
<td>C-09</td>
<td>78+29 – 84+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-10</td>
<td>84+00 – 94+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-11</td>
<td>94+00 – 104+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-12</td>
<td>104+00 – 114+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-13</td>
<td>114+00 – 124+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-14</td>
<td>124+00 – 134+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-15</td>
<td>134+00 – 144+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-16</td>
<td>144+00 – 154+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-17</td>
<td>154+00 – 164+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-18</td>
<td>164+00 – 174+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
<tr>
<td>C-19</td>
<td>174+00 – 184+00</td>
<td>West ROW Santa Ana River / East OCSD Property Line</td>
</tr>
</tbody>
</table>

* Stationing is approximate

3-3. Rights of Way. The Owner will acquire all grants for easements shown on the Drawings to allow the Contractor to perform the Work. Within the terms of the easement, the Contractor may use the easement only for accessing the Site, performing survey staking, storing equipment, materials and supplies for this Project only, and performing the required Work. Once work is completed the Contractor is to leave the easement area in a neat and clean condition. The
Contractor is not allowed to use the easement for any other purposes without written approval of the Owner.

3-4. **Existing Utilities.** A minimum of forty-eight (48) hours in advance of excavation activities, the Contractor shall contact the following parties to ascertain and verify the existence and location of utility lines and facilities and shall coordinate all work in accordance with the information obtained from such inquiries in order to prevent damage to such lines and facilities.

**Underground Service Alert (USA) (811)**

Prior to conducting any excavation, the Contractor shall contact the appropriate regional notification center as required by Government Code Section 4216. In accordance with Government Code Section 4215, the Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating existing main or trunkline utility facilities not indicated in the Contract Plans and Specifications with reasonable accuracy, and for the equipment on the project necessarily idled during such work; provided that the Contractor shall first notify the Agency before commencing work on locating, repairing damage to, removing or relocating such utilities.

All sewer crossings shall conform to the State Health Department regulations for water/sewer separation and materials. Cost for special pipeline materials to meet Health Department regulations, and repair of services damaged shall be included in the cost of the bid items to which the work is appurtenant. No separate payment will be made.

The Engineer or his representative has endeavored to determine the existence of utilities at the work site from the records of the owners of known utilities in the vicinity of the work. The positions of these utilities, as derived from such records, are shown on the Plans. The service connections to these utilities may not be shown on the Plans.

The Contractor shall make his own investigations, including exploratory excavations, to determine the locations and type of existing service laterals or appurtenances when their presence can be inferred from the presence of other visible facilities, such as buildings, meters and junction boxes, on or adjacent to the work site.

3-5. **Hand Excavation.** Contractor’s attention is directed to the work at each insertion pit and areas. Existing utilities have been shown in these areas which have been identified from other records. As indicated above, Contractor shall identify all existing utilities prior to beginning work and obtain approval from Engineer that Contractor has conducted all its investigations. Contractor shall
hand excavate to depth shown on the Drawings prior to installation of shoring support system.

3-6. **Trench Excavation.** No trench in shall be left open during periods when the Contractor is not at the site of work. Trenches in roadways shall be backfilled and temporarily paved, where applicable, or if trench shall be left open, covered with steel trench plates as specified in the technical specifications.

3-7. **Curtailment in Power Usage.** The Owner has entered into a three-year agreement with Enelx whereby Enelx may curtail power usage with 30-minutes notice. The plant is subject to a 14-megawatt curtailment in power usage during times when the SCE electric grid is in jeopardy (usually on hot summer days). The Owner must curtail power usage to reach a firm service level (FSL) of 5-megawatts. During these shutdowns, it might be possible to continue with construction activities, but the various energy-intensive water treatment processes and pumps will be shut down in accordance with the AWTF’s Demand Response (DR) plan requirements. The following table lists the curtailment in power requirements as part of the DR. The Contractor shall incorporate this concept into the planning of the project and shall not receive any change orders or extra time for these events.

<table>
<thead>
<tr>
<th>Demand Response Program Parameters</th>
<th>D.R. Vendor, North American Power Partners (A-4 Program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Load Curtailment</td>
<td>14 Megawatts (5 Megawatts FSL)</td>
</tr>
<tr>
<td>Maximum interruption hours per day</td>
<td>6 -hrs / day</td>
</tr>
<tr>
<td>Contract Term</td>
<td>2019, 2020, and 2021</td>
</tr>
</tbody>
</table>

3-8. **Contractor’s Use of Premises.** Owner and OCSD’s operating personnel will be responsible for operating the existing facilities throughout the execution of this contract. Equipment presently installed in the facility must be available to Owner and OCSD personnel at all times for use, maintenance, and repair. If it is necessary in the course of operating the facility, for the Contractor to move his equipment, materials, or any material included in the work, he shall do so promptly and place that equipment or material in an area which does not interfere with the facility operation. The Contractor shall not adjust or operate serviceable or functioning equipment or systems.

All of the existing facilities at Plant No. 1 and 2 will remain in operation throughout this Contract except as specifically identified for temporary shutdowns and bypasses. The Contractor shall schedule and conduct his work to minimize necessary shutdowns and interference with operations and maintenance.
The Contractor shall notify the Engineer whenever it is necessary to take out of service any pump, pipeline, wet well, channel, electrical circuit, equipment, or structure. The Contractor shall be responsible for providing whatever temporary piping, pumping, power, and control facilities as are required to maintain continuous facility operation except as otherwise specified. The Contractor shall maintain the integrity of the existing facility utilities at all times.

End of Section
**SYSTEM OUTAGE REQUEST FORM**

System to be Shutdown: ________________________________________________
______________________________________________________________
______________________________________________________________
Date of Shutdown: __________ Beginning at __________ a.m. p.m.
Duration of Shutdown: _________  Critical Path Activity? (   ) yes  (   ) no

Owner: Orange County Water District

Project: GROUNDWATER REPLENISHMENT SYSTEM
FINAL EXPANSION
CONTRACT NO. GWRS-2019-01

Contractor: CM/OCWD Operations
Regulatory Agency Notification Required? ( ) yes ( ) no
Is a Dry Run Required? ( ) yes ( ) no
Confined Space Entry? ( ) yes ( ) no
Combustible/Hazardous Gases Present? ( ) yes ( ) no

Describe work to be performed including detailed sequence of events, safety plan, protection of existing facilities, equipment to be used, and contingency plan. Use additional sheets as necessary.

Will you require assistance from OCWD Operations? Note that all existing valves and controls shall be operated by OCWD staff only.

**Outage Contact Information**

<table>
<thead>
<tr>
<th>Name of Person on Call/Duty</th>
<th>Home Phone</th>
<th>Cell Phone and/or Pager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCWD Operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Contractor Comments:

Certified by: ________________________________  Date: __________
(Contractor’s Signature)  (Construction Manager’s Signature)

**CM / OCWD / Engineer Review Action**

(   ) SOR Acceptable with comments noted on attached.
(   ) SOR Not Acceptable with reasons noted on attached. Re-Submittal is required.

Submittal No.

(   ) 1st Submission  (   ) Re-Submittal
Spec Section
Dwg/Detail No.
Section 01150

SITE SECURITY

1. **GENERAL.**

1-1. **Security Program.**

A. The Contractor shall:

1. Protect the area associated with completion of the Work including all field office trailers and their contents from theft, vandalism, and unauthorized entry. The Contractor is not responsible for monitoring actions or procedures of staff, deliveries, or other visitors associated with the existing facility or other work occurring at the site.

2. The Contractor shall maintain a secure project site 24 hours per day, every day beginning on the first day of construction and ending at Final Completion. The Contractor shall make adequate provisions for protection of the Work against fire, theft, vandalism and for the protection of public against exposure to injury. If in the opinion of the Owner, the Contractor is not taking adequate steps to secure the site, the Owner will require that additional protective measures are immediately taken. The Owner shall not have any liability for loss of, and damage to, materials, tools, and equipment of the Contractor or of those employed by him, by contract or otherwise.

3. The Contractor shall initiate a site security system and program, at the time of mobilization onto the work-site, which provides adequate security for site stored and installed material, product, and equipment. The Engineer will review the security system proposed by the Contractor and provide comments. Considerations for the security program shall include, but not be limited to, the following:

   - The Contractor shall attempt to use, if available, the existing security entrance on Garfield Avenue for all Contractor and Subcontractor construction traffic to OCSD Plant 1 site. This entrance shall be coordinated with the other entrance on Garfield Avenue for 1) Orange County Sanitation District staff, and 2) Contractors and subcontractors associated with the Orange County Sanitation District. If the gate is not available, the Owner shall provide a location for an alternate entrance and the Contractor shall provide security as noted in this Section.
The Contractor shall use, if available, the existing security entrance on Brookhurst Street and Banning Avenue for all Contractor and Subcontractor construction traffic to OCSD’s Plant 2 site. This entrance shall be coordinated with the other entrance on Brookhurst Street for 1) Orange County Sanitation District staff, and 2) Contractors and subcontractors associated with the Orange County Sanitation District. If the gate is not available, the Owner shall provide a location for an alternate entrance and the Contractor shall provide security as noted in this Section.

The Contractor shall provide in advance of starting construction, a list of all employees and vehicles that need access to the site. This list would include employees of subcontractors at all tier levels. The Contractor shall provide periodic updates to this list as needed or required by the Engineer.

The Contractor should be aware that the site may not have adequate space to allow all employee vehicles to be parked on the Project site. All costs associated with off-site employee parking and shuttle to site shall be included in the Contractor’s bid.

The Contractor shall be responsible for furnishing to each employee engaged on the Work, and for requiring each employee engaged on the Work to display, such identification as may be approved and directed by the Engineer. All prescribed identification shall immediately be delivered to the Engineer for cancellation upon the release of any employee.

The Contractor shall ensure that no alcohol, firearm, weapon or controlled substance enters or is used during the completion of the Work. The Contractor shall immediately remove from the site and terminate the employment at this site of any employee found in violation of this provision.

The Contractor’s employees, agents and subcontractors shall be restricted from entry to existing buildings and structures except as may be required by the Work.

All property owned by the Owner is fenced. While it may be necessary for the Contractor to remove some of the existing fencing for construction of the new improvements, the Contractor’s operations shall not reduce the present protection and security. If the present fences are removed, an equivalent temporary continuous perimeter protection shall be provided and new fence, which matches the existing fence, shall be installed to replace the existing fence prior to the completion of the work.
In the event all or a part of the site is to be permanently fenced, this permanent fence or a portion thereof may be built to serve for protection of the Work site, provided however, that any portions damaged or defaced shall be replaced prior to final acceptance. Temporary openings in existing fences shall be protected to prevent intrusion by unauthorized persons. During night hours, weekends, holidays, and other times when no work is performed at the site, the Contractor shall provide temporary closures during the working hours defined in Work Restrictions Section.

- Provide high security locked box containers in the fenced area for material storage, or off-site approved, bonded storage area required for the Work.

- Ensure that structures associated with the improvements designed with security locks must be capable of being secured with temporary or permanent high security locks prior to installation.

4. The Work within the pipeline alignment area from Garfield Avenue to OCSD Plant 2 has high public exposure and as such Work along the alignment shall be secured each day by the Contractor at the completion of the work day. The Contractor shall provide an onsite security guard at each active insertion pit location during off work hours. “Active” is defined as any insertion pit location where equipment or materials are being stored and/or excavation of the pit has started. The Contractor shall provide a lockable portable toilet at each location where the security guard is located.

5. Maintain the security program throughout the Contract duration.

6. Be responsible at all times for security of the storage compound and lay-down areas, and for all Contractor plant, material, equipment, and tools, as well as, for those belonging to subcontractors.

7. Provide OCWD, OCSD, and the Engineer with a list of 24-hour emergency phone numbers.

8. Submit to the Engineer an up-dated progressive inventory of materials, equipment, and tools when received on-site.

1-2. Entry Control.

A. The Contractor shall:

1. Be assigned one point of entry and exit at the AWTF project site on Garfield Avenue. This access gate is to remain closed and locked at all times that traffic is not using the gate. If the requirement for a
closed and locked manual gate is not deemed practical by the Contractor, the Contractor can employ a full-time guard at the gate as a suitable alternative.

2. Be assigned one point of entry and exit to OCSD’s Plant 2 on Brookhurst Street. This access gate is to remain closed and locked at all times that traffic is not using the gate. If the requirement for a closed and locked manual gate is not deemed practical by the Contractor, the Contractor can employ a full-time guard at the gate as a suitable alternative.

3. Restrict entry through that entrance to only authorized personnel and vehicles with proper identification associated with the Work.

4. Maintain copies of vehicle insurance cards or other proof of insurance on-site for vehicles permitted on-site from that entrance.

5. Require vehicle passes when vehicles are on-site.

6. Maintain an Employee/Visitor Log, and make the log available to the Engineer on request. The log shall be submitted to the Engineer every two weeks or as necessary.

7. Give jobsite security orientation training to all affected employees including subcontractor employees in accordance with Orange County Water District requirements and Orange County Sanitation District as the case may be. Employee participation in the security orientation shall be acknowledged by their respective individual signatures affixed to an orientation roster.

8. Implement security badge system approved for the Site by the Engineer.

9. The Contractor shall be responsible for gate repairs. If repairs are not made within four hours and the gate remains open, OCSD reserves the right to close and barricade the gate at the Contractor’s expense.

10. Where entry/exit access to the alignment area work sites is through a secured gate owned/controlled by others (SCE, Nursery, City of Huntington Beach, OC Flood Control, etc), it is the Contractor’s responsibility to coordinate security measures with the owning/impacted agency.

B. The Engineer has the right to refuse access to the site or request that a person or vehicle be removed from the site if found violating any project security rules.
1-3. **Restrictions.**

A. The Contractor shall not allow cameras on site, or photographs to be taken except with prior approval of the Owner or Engineer.

1-4. **Project Site Security Services.**

A. Specific Requirements:

1. Security guard(s) shall be neat in appearance and dressed in company uniform at all times. Guard personnel shall be provided by a licensed security company. Each guard shall receive security orientation training from the Engineer and Owner prior to start of work on this project. New guards shall not commence duties on site before receiving this orientation. All guards must be trained vehicle flaggers.

B. Other Duties:

At the request of the Engineer, the security guard shall perform additional duties as follows:

1. Monitor security for equipment and/or material temporarily stored along the access road or in the parking area.

2. Upon approval by the Owner, the guard shall assist the Engineer to remove personnel denied access to the site for violation of site regulations.

3. Enforce construction related parking area regulations and site speed limit, and obtain the name/vehicle license number of violators and report violators to the Engineer.

4. Inspect area lighting in construction areas on a daily basis and report deficiencies to the Engineer.

5. Call the Engineer to report a fire, hazardous material spill, or medical emergency. Report the emergency to the fire department as directed by the Engineer.

6. Notify the Engineer of all unusual activities/occurrences.

C. Contractor – Provided Facilities/Equipment:

1. A potable toilet with external hand washing station shall be provided at each active insertion pit location where a security guard is located.
2. CONTRACTOR SECURITY PLAN.

A. Prior to the performance of any work the Contractor shall submit to OCSD, Owner, and the Engineer for review and comment two copies of the security plan commensurate with the needs of the project, and signed by an officer of the Contractor. Adequacy of the security plan is the responsibility of the Contractor.

OCSD, Owner, and the Engineer will not review the Contractor security plan for adequacy.

The security plan shall:

1. Include employee site security orientation program.
2. Include security measures to protect Contractor employees and other persons from injury, prevent material damages, or avoid financial losses.
3. Cover security procedures related to Contractor tools and equipment that shall be mobilized for the Work.

End of Section
1. **DATUM.** Vertical and horizontal datum are based on the coordinates and benchmarks shown on the Drawing G-03. The Contractor is to locate and protect control points prior to starting the Work and preserve control points during construction. The Contractor shall re-establish all control points disturbed by its operations at no cost to Owner.

The Contractor shall establish other vertical and horizontal control from these Owner and OCSD furnished reference points as required to properly layout and construct the Work. All connections shall be installed based on actual elevations of existing structures to which connections are made.

The Contractor's layout shall be based upon existing structures and the vertical and horizontal datum established by the Owner and OCSD. Contractor shall note that OCWD and OCSD have different coordinate systems and survey control points as discussed in Paragraph 3 of this Specification.

The Contractor shall be responsible for the preservation of all existing survey monuments or permanent benchmark. Any monuments or benchmark disturbed or destroyed by Contractor shall be referenced and replaced by a licensed land surveyor. A corner record or record of survey, as appropriate, shall be filed by the licensed land surveyor as required by the Land Surveyor’s Act with the appropriate local government agencies.

2. **QUALITY ASSURANCE.**

The Contractor's Surveyor shall be a land surveyor registered in the State of California with at least five (5) years surveying experience for similar sized projects.

Dimensions for existing structures, piping, paving, and other nonstructural items are taken from the available information during the Owner’s planning and design. The Contractor shall field verify all dimensions and conditions in advance of construction in the area. Any discrepancy between the field survey by the Contractor and the information indicated in the Contract Documents shall be immediately brought to Construction Manager's attention by written notification. In all questions arising as to proper location of lines and grades, the Engineer's decision will be final.

Accuracy of the Contractor's stakes, alignments and grades may be periodically and randomly checked by the Engineer. If requested by Engineer, the Contractor shall supply field labor as required, at no extra charge to Owner, to aid and assist
the Engineer in checking location and grades of the work as set by the Contractor. The Contractor shall postpone portions of the Work affected by the Engineer’s survey check, and shall also move materials and equipment that interfere with a clear line of sight between horizontal control points and the construction work. The Engineer’s field checks are to confirm compliance of the work with the drawings and specifications, and do not substitute for or complement the Contractor’s required field quality control procedures.

The Contractor’s registered land surveyor shall check the line and grade of the slab or footing concrete forms prior to the placement of the first slab or footing at each structure and building.

3. PROJECT SURVEY REQUIREMENTS.

As part of the bid price for the construction of the improvements the Contractor shall provide and be responsible for the layout of all work specified in the contract. The Contractor shall provide all necessary surveys, field staking, and positioning for the construction of all components at the proper alignment, elevations, grades, and positions, as indicated on the Drawings and as required for the proper operation and function.

Basis of Bearing and Benchmark for Contractor’s use for work shall be as shown in the Drawings.

The Contractor shall stake the work limits and right-of-way lines prior to the start of sitework.

The Contractor shall lay out all work, including structures and pipelines, and shall be solely responsible for executing the Work in accordance with the lines and grades indicated.

A preconstruction survey shall be performed prior to the start of Work. Survey shall indicate limits of existing features, including, but not limited to, buildings, piping, and utilities within the limits of the Work. Survey shall indicate any areas of potential future mitigation of lead paint, asbestos, or other hazardous items within the limits of the Work.

3-1. Submittals.

Contractor to furnish Engineer one copy of all land surveyor notes, calculations, sketches and drawings within 48 hours after completion of each survey task. Calculations shall be signed and sealed by a land surveyor registered in the State of California.
4. **RECORD DOCUMENTS.**

The Contractor shall prepare, maintain and submit Record Documents as specified in the Closeout Procedures section. The Contractor’s land surveyor shall affix his signature and registration number to applicable record drawings certifying the accuracy of lines and grades shown.

End of Section
Section 01300

SUBMITTALS

1. GENERAL.

Shop Drawings and engineering data (submittals) covering all equipment and all fabricated components and building materials which will become a permanent part of the Work under this Contract shall be submitted to Engineer for review, as required. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and the operation of component materials and devices; the external connections, anchorages, and supports required; the performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

Each submittal shall cover items from only one section of the specification unless the item consists of components from several sources. Contractor shall submit a complete initial submittal including all components. When an item consists of components from several sources, Contractor's initial submittal shall be complete including all components.

Submittal review shall be only for general conformance with the design concept and general compliance with the information given in the contract documents. It shall not include review of quantities, dimensions, weights or gages, fabrication processes, construction safety precautions, all of which are the sole responsibility of the Contractor. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Engineer shall not be required to review and shall not be responsible for any deviations from the contract documents not clearly noted by the Contractor, nor shall the Engineer be required to review partial submissions or those for which submissions for correlated items have not been received.

2. CONTRACTOR RESPONSIBILITIES.

All submittals, regardless of origin, shall be approved by Contractor and clearly identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each copy of all submittals, regardless of origin, shall be stamped or affixed with an approval statement of Contractor. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.
Contractor shall be solely responsible for the completeness of each submittal. Contractor's stamp or affixed approval statement of a submittal, per Transmittal Form, is a representation to Owner and Engineer that Contractor accepts sole responsibility for determining and verifying all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto, and that Contractor has reviewed and coordinated each submittal with other Shop Drawings and with the requirements of the Work and the Contract Documents.

All deviations from the requirements of the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal using the Transmittal Form. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

The Contractor shall coordinate submittals with the work so that work will not be delayed. Contractor shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete.

The Contractor shall certify on each submittal document that it has reviewed the submittal, verified field conditions, and complied with the contract documents.

All shop drawings submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission at the proper time so as to prevent delays in delivery of materials.

The Contractor shall check all subcontractors’ shop drawings regarding measurements, size of members, materials, and details to verify that they conform to the intent of the Drawings and Specifications. Shop drawings found to be inaccurate or otherwise in error shall be returned to the Contractor and subcontractors for correction before submission thereof.

Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor:

“Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements”.
Shop drawings and product data sheet 11-in x 17-in and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package.

3. SUBMITTAL AND MATERIAL LIST.

The Contractor shall identify long lead items for consideration and incorporation into the schedule. A list of long lead items shall be submitted within 3 days after the Notice to Proceed. Submittals for the long lead items shall be provided within fifteen (15) days after the Notice to Proceed.

Within fifteen (15) days after the Notice to Proceed, the Contractor shall submit a draft Master Submittal List of all required submittals to the Engineer for favorable review. The Master Submittal List shall include a description of each item, Specification or Drawing reference and the anticipated submittal date. The List shall include all items of equipment and materials for architectural, structural, mechanical, piping, electrical, heating and ventilating, equipment piping, and plumbing work; and the names of manufacturers with whom purchase orders have been placed. Items on the List shall be arranged in the same order as in these Specifications, and shall contain sufficient data to identify precisely the items of material and equipment the Contractor proposes to furnish. After the submission is favorably reviewed and returned to the Contractor by the Engineer, it shall become the basis for the submission of detailed manufacturer's drawings, catalog cuts, curves, diagrams, schematics, data, and information on each separate item for review. No work shall proceed on any item until it has been submitted and favorably reviewed. An incomplete submittal list is not a basis for avoiding a submittal required by the specifications.

4. DEFINITIONS.

A. Manufacturer's Instructions: Instructions, stipulations, directions, and recommendations issued in printed form by the manufacturer of a product addressing handling, installation, erection, and application of the product; Manufacturer’s Instructions are not prepared especially for the Work.

B. Shop Drawings: As defined in the General Provisions, shop drawings include, but are not necessarily be limited to:

1) Custom-prepared data such as fabrication or erection/installation (working) drawings.

2) Scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and
test reports including performance curves and certifications, as applicable to the Work.

C. Product Data: Illustrations, standard schedules, performance charts, brochures, diagrams and other information to illustrate materials or equipment for some portion of the Work.

1) Product data as specified in individual Sections, and as applicable to the Work shall include, but not necessarily be limited to:
   a. Standard prepared data for manufactured products (sometimes referred to as catalog data or "cuts").
   b. Manufacturer's product specifications.
   c. Installation instructions.
   d. Availability of colors and patterns.
   e. Manufacturer's printed statements of compliance and applicability.
   f. Roughing-in diagrams and templates.
   g. Product photographs.
   h. Standard wiring diagrams.
   i. Performance curves and operational-range diagrams.
   j. Production or quality control inspection and test reports and certifications, and mill reports.
   k. Operating and maintenance instructions and recommended spare parts listing and printed product warranties.

D. Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged. Samples specified in individual Sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens of coordination of visual effect, graphic symbols and units of work to be used by the Engineer or others for independent inspection and testing, as applicable to the Work.

5. **PROCEDURES.**

In addition to the requirements in the General Provisions:

A. The Contractor is encouraged to mark the submittal “high”, “normal” or “low” priority to assist the reviewer in prioritizing the submittal reviews during periods of high volume of submissions.
B. Transmittal Form - Unless otherwise specified, submittals regarding material and equipment shall be accompanied by the Shop Drawing Transmittal Form found at the end of this section. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers. The specification section and subsection or paragraph to which the submittal is related shall be indicated on the transmittal form.

C. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted. The Contractor shall utilize a 9-character submittal identification numbering system in the following manner:

1) The first five digits shall be the applicable Specification Section Number.

2) The next three digits shall be the numbers 001-999 to sequentially number each initial separate item or drawing submitted under each specific Section number.

3) The last character shall be a letter, A-Z, indicating the submission, or resubmission of the same drawing, i.e., “A=1st submission, B=2nd submission, C=3rd submission, etc. A typical submittal number would be as follows:

   a. 03300-008-B-P/E
   b. 03300 = Specification Section for Concrete.
   c. 008 = The eighth initial submittal under this specification section.
   d. B = The second submission (first resubmission) of that particular shop drawing.
   e. P = Paper based submittals
   f. E = Electronic submittals

D. The Contractor shall provide four (4) hard copies and two (2) electronic copies of each submittal. Should the Contractor require more returned copies of any particular submittal, the Contractor shall furnish a greater number of copies to the Engineer than is specified.

E. Provide or furnish products and execute the Work in accordance with accepted submittals, unless in conflict with Contract Documents.

F. All deviations from submittals shall be listed in the Bid Form or List of Substitutions as defined in the General and Special Provisions.
G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention in writing on the Shop Drawing Transmittal Form and on resubmitted shop drawings by use of revision triangle s or other similar methods, to revisions other than the corrections requested by the Engineer on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Engineer are provided on the resubmittal. Resubmittals shall be in an organized and consistent format.

H. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered “REJECTED” until resubmitted. The Engineer may at his/her option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

I. Contractor shall include an overall equipment schedule for submittals containing multiple items. Schedule shall include equipment type and model number.

6. SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

A. The Contractor shall stamp, sign and date submittals indicating review and approval; and submit to Engineer.

1) Stamp and signature indicates Contractor has satisfied shop drawing review responsibilities and constitutes Contractor's written approval of shop drawing.

2) Shop drawings without Contractor's written approval will be returned for resubmission.

B. Paper based submittals shall be provided in:

1) Binders: Commercial quality, 8-1/2 inch by 11 inch (size A4), three D side ring binders with durable plastic covers; 2 inch (50 millimeter) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

2) Cover: Identify each binder with typed project number and name and subject matter of the contents. Titles shall be placed both on the front and binder edge of the binder.
3) Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

4) Text: Manufacturer’s printed data or type written data on 20-pound, minimum, white punched paper. Computer generated data shall be printed by letter quality 150 dpi resolution printers unless approved otherwise.

C. For electronic submittals, drawings and the necessary data shall be submitted electronically to Engineer as specified below. Submittal documents shall be in color to facilitate use of red line markups. All electronic files shall be in Portable Document Format (PDF) as generated by Adobe Acrobat Professional Version 7.0 or higher. The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated. PDF images must be at a readable resolution. For most documents, they should be scanned or generated at 300 dots per inch (dpi). Use of higher resolution is acceptable with Owner and Engineer approval. Optical Character Recognition (OCR) capture must be performed on these images so that text can be searched, selected and copied from the generated PDF file. The PDF documents shall have a bookmark created in the navigation frame for each major entry (“Section” or “Chapter”) in the Table of Contents. Thumbnails shall be generated for each page or graphic in the PDF file.

The opening view for each PDF document shall be as follows:

   Initial View: Bookmarks and Page
   Magnification: Fit in Window
   The file shall open to Contractor’s transmittal letter, with bookmarks to the left. The first bookmark shall be linked to the Table of Contents.

PDF document properties shall include the submittal number for the document title and Contractor’s name for the author.

The Contractor shall provide an "equipment cross reference schedule" for multiple items covered by the same submittal identifying the ordering information associated with the submittal item.

Electronic submittal file sizes shall be limited to 10 MB. When multiple files are required for a submittal the least number of files possible shall be created.
Facsimiles (fax) will not be acceptable. Submittals will not be accepted from anyone but Contractor. Submittals shall be consecutively numbered in direct sequence of submittal and without division by subcontracts or trades.

D. Product Data and Manufacturer's Instructions: Excise or cross out non-applicable information and clearly mark applicable information with citations to and terminology consistent with Contract Documents.

E. Samples: Label will be returned with reviewer's selection when appropriate, comments and stamp. Samples will not be returned unless return is requested in writing and additional sample is submitted. More details on sample requirements are included in the General Provisions.

F. Electronic Copies of Approved Submittals: All approved submittals shall be provided in electronic format per the requirements set forth in the Operation and Maintenance Data and Manuals section of this Specification for Electronic Approved Submittals and Operation and Maintenance Manuals. Additional requirements are provided in the Closeout Procedures section.

7. MANUFACTURER'S INSTRUCTIONS.

Submit manufacturer's instructions whenever made available by manufacturers and when installation, erection, or application in accordance with manufacturer's instructions is required by the Specifications. Submit manufacturer's instructions prior to installation, erection, or application of equipment and other project components. Submit manufacturer's instructions in accordance with requirements for Product Data.

8. ENGINEER'S REVIEW.

The Engineer's review of submittals shall not release Contractor from Contractor's responsibility for performance of requirements of Contract Documents. Neither shall the Engineer's review release Contractor from fulfilling purpose of installation nor from Contractor's liability to replace defective work. The Contractor shall not consider submittals as Contract Documents. The purpose of submittals is to demonstrate how Contractor intends to conform to the Contract documents and design concepts. The Engineer will be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.

The Engineer's review does not extend to:

1. Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
2. Contractor’s means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings or required by the Contract Documents.

3. Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.

4. As permitting any departure from the Contract requirements.

5. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.

6. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

9. REVIEW NOTATIONS.

A. REVIEW NOTATIONS. The returned submittal shall indicate one of the following actions:

If the review indicates that the material, equipment or work method complies with the project manual, submittal copies will be marked "NO EXCEPTIONS TAKEN". In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

If the review indicates limited corrections are required, copies will be marked "MAKE CORRECTIONS NOTED". The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided. Engineer reserves the right to request a complete corrected copy of all submittals.

If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked "AMEND AND RESUBMIT". Except at its own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

If the review indicates that the material, equipment, or work method does not comply with the project manual, copies of the submittal will be marked "REJECTED - SEE REMARKS". Submittals with deviations that have not been identified clearly may be rejected. Except at its own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
If the submittal information does not require a review by the Engineer and/or is submitted for information only, copies of the submittal will be marked "Review not Required" and will be returned as “RECORD COPY”.

B. FABRICATION. Fabrication of an item shall not be commenced before the Engineer has reviewed the pertinent shop drawings and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN", or "MAKE CORRECTIONS NOTED". Revisions indicated on shop drawings shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from the Contractor's having to make the required revisions to shop drawings unless review by the Engineer of said drawings is delayed beyond a reasonable period of time and unless the Contractor can establish that the Engineer's delay in review actually resulted in a delay to the critical path of the Contractor's construction schedule. The review of such drawings by the Engineer will be limited to checking for general conformance with the requirements of the Contract Documents, and shall in no way relieve the Contractor of responsibility for errors or omissions contained therein, nor shall such review operate to waive or modify any provision contained in the Contract Documents. Fabricating dimensions, quantities of material, applicable code requirements, and other contract requirements shall be the Contractor's responsibility.

10. REVIEW COSTS.

The Owner's cost for review of submittals for the same proposed materials, equipment or work shall be apportioned as follows:

1. The cost of review of the initial submittal and the first revised submittal will be borne by the Owner.

2. The cost to review all additional revised submittals after the first revised submittal will be charged to the Contractor. The cost of review shall include, without limitation, administrative, design and engineering activities directly related to review of submittals.

3. If a submittal is approved and the Contractor elects to submit an alternate item for review for the same application, the Contractor shall be responsible for the review costs for the alternate submittal. The cost of review shall include, without limitation, administrative, design and engineering activities directly related to review of submittals.

11. OPERATION AND MAINTENANCE DATA AND MANUALS.

Adequate operation and maintenance information shall be supplied for all equipment requiring maintenance or other attention. The equipment Supplier shall
prepare a Project specific operation and maintenance manual for each type of equipment indicated in the individual equipment sections or the equipment schedule.

Unless otherwise agreed by Engineer, the operation and maintenance manual for each type of equipment shall only be submitted for review following completion of review of all shop drawings and engineering data pertaining to that equipment.

Parts lists and operating and maintenance instructions shall be furnished for other equipment not listed in the individual equipment sections or the equipment schedule.

Operation and maintenance manuals shall include the following:

A. Table of contents and index (to be included in each volume of multi-volume manuals)

B. Part 1: Equipment record:
   a. Summary: Provide Equipment Record Form indicating the equipment name, equipment number, and process area in which the equipment is installed.
   b. Form: Complete the Equipment Record Form for each item of mechanical, electrical and instrumentation equipment in the Work (provided at end of this Specification).
   c. Include any performance curves, tests or engineering data not specifically listed on the forms.

C. Part 2: Operational procedures:
   a. Equipment function, normal operating characteristics, and limiting conditions
   b. Assembly, installation, alignment, adjustment, disassembly, and checking instructions.
   c. Operating instructions for startup, routine and normal operation, regulation and control, shutdown, and emergency conditions.
   d. Lubrication and maintenance instructions.
   e. Guide to troubleshooting.
   f. Parts lists and predicted life of parts subject to wear.
   g. Outline, cross section, and assembly drawings; engineering data; and wiring diagrams.
h. Factory test reports, test data and performance curves, where applicable.

i. Testing to determine performance efficiency.

j. Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices.

k. List of all electrical relay settings including alarm and contact settings.

l. Safety considerations relating to installation, operation, and maintenance procedures.

m. Calibration procedures

n. Wiring diagrams

o. Operational log sheets and maintenance schedules

p. Material Safety Data Sheets (MSDS) for any applicable item (chemicals, oils, lubricants, etc.)

q. Warranty Information, Bond(s), and Service Contract(s)

D. Part 3: Preventive maintenance procedures:

a. Identify all manufacturer-recommended procedures to be performed on a periodic basis.

b. Provide recommended frequency of preventive maintenance procedures. Include lubrication schedules, lubricant SAE grade, type, and temperature ranges.

E. Part 4: Parts list:

a. Provide a complete parts list, including a generic description and manufacturer’s identification number for each part. Include addresses and telephone numbers of the nearest supplier and parts warehouse.

b. Provide cross-sectional or exploded view drawings with parts list.

F. Part 5: Wiring diagrams:

a. Provide complete, color-coded, internal and connection wiring diagrams for electrical equipment.

b. Provide as-installed control diagrams by controls manufacturer.
G. Part 6: Shop Drawings:

a. Provide approved Shop Drawings for the piece of equipment included. Shop Drawing marked approved as noted: Indicate all changes necessary.

b. Mark each sheet to clearly identify specific products and component parts and data applicable to installation.

c. Delete inapplicable information.

d. Include only those sheets, which are pertinent to the specific product.

H. Part 7: Safety:

a. Include all safety precautions to be taken when operating and maintaining equipment.

I. Part 8: Documentation:

a. Provide all equipment warranties, affidavits, and certifications required by the Technical Specifications.

b. Provide proper procedures in event of failure.

c. Provide instances which might affect validity of warranties.

d. Provide expiration date of all warranties.

e. Provide contact information.

J. Part 9: Materials and Finishes:

1. Content for Products, Applied Materials and Finishes:
   
a. Manufacturer's data, giving full information on products.
      1) Catalog number, size composition.
      2) Color and texture designations.
      3) Information required for re-ordering special manufactured products.

b. Instructions for care and maintenance.
   
   1) Manufacturer's recommendations for types of cleaning agents and methods.
   2) Cautions against cleaning agents and methods which are detrimental to product.
   3) Recommended schedule for cleaning and maintenance.
2. Content for Moisture-Protection and Weather-Exposed Products:
   a. Manufacturer's data, giving full information on products.
      1) Applicable standards.
      2) Chemical Composition.
      3) Details of installation.
   b. Instructions for inspection, maintenance and repair.

3. Additional Requirements for Maintenance Data: Respective sections of the Specifications.

The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered, or which may be required by Contractor.

Preliminary copies of operation and maintenance manuals shall be submitted to Engineer for review before shipment of the equipment. Preliminary copies shall be in hardcopy format. The quantity of preliminary copies shall be as required in the Shop Drawings section of the General Provisions.

After review by Engineer, final copies of operation and maintenance manuals shall be delivered to Engineer no later than thirty (30) days prior to placing the equipment in operation and no later than thirty (30) days after approval of the preliminary operation and maintenance manuals. If electronic and hard copies of final operation and maintenance manuals are not submitted within the timeframes specified, progress payments will be withheld until the required information is submitted. The Contractor shall provide four (4) final hard copies and two (2) final electronic copies of all operation and maintenance manuals. All final hard and electronic copies of operation and maintenance manuals shall be reviewed by Engineer for conformance with the specifications of this section and shall be returned for corrections if required.

Shipment of equipment will not be considered complete until all required manuals and data have been received.

- Hard Copy Operation and Maintenance Manuals. Hard copies for preliminary and final manuals shall be temporarily bound in heavy paper covers bearing suitable identification. All manuals and other data shall be printed on heavy, first quality 8-1/2 x 11 inch paper, with standard three-hole punching. Drawings and diagrams shall be reduced to 8-1/2 x 11 inches or 11 x 17 inches. Where reduction is not practicable, larger drawings shall be folded separately and placed in envelopes, which are bound into the manuals. Each envelope shall be suitably identified on the outside. Each volume containing data for three or more items of equipment shall include a table of contents and index tabs. The final hard copy of
Each manual shall be prepared and delivered in substantial, permanent, three-ring or three-post binders with a table of contents and suitable index tabs. Provide indexed, tabbed flyleaf for each separate product and system, with typed description of product and major component parts of equipment.

- Electronic Approved Submittals and Operation and Maintenance Manuals. Each electronic copy shall be delivered on a unique CD-ROM in Adobe Acrobat’s Portable Document Format (PDF). The PDF file(s) shall be fully indexed using the Table of Contents, searchable with thumbnails generated.

File names shall use the “eight dot three” convention (XXXXX_YY.pdf), where X is the five digit number corresponding to the specification section, and YY is a two digit number set in sequential order when there are more than one PDF document (more than one O&M manual) per specification section. The initial filename for the O&M submittal will be provided with the request for final O&M manuals.

Scanned images must be at a readable resolution. For most documents, resolution for scanned documents shall be between 300 dots and 600 dots per inch (dpi). Optical Character Recognition (OCR) capture must be performed on these images. OCR settings shall be performed with the “original image with hidden text” option in Adobe Acrobat Exchange.

One PDF document (PDF file) shall be created for each equipment service manual. The entire manual shall be converted to a single PDF file via scanning or other method of conversion. Drawings or other graphics shall also be converted to PDF format and included into the single PDF document. Pages that must be viewed in landscape format shall be rotated to the appropriate position for easy reading on screen.

The PDF documents shall have a bookmark created in the navigation frame for each major entry (“Section” or “Chapter”) in the Table of Contents. Thumbnails shall be generated for each page or graphic in the PDF file.

The opening view for each PDF document shall be as follows:

Initial View: Bookmarks and Page

Magnification: Fit In Window

The file shall open to the cover page of the manual, with bookmarks to the left, and the first bookmark shall be linked to the Table of Contents.
• Labeling. As a minimum, the following information shall be included on all final O&M manual materials, including CD-ROM disks, jewel cases, and hard copy manuals:

  Manufacturer's name.

  Equipment name and/or O&M title spelled out in complete words.

    Example:  “Operations and Maintenance Manual”

    “Vertical Diffusion Vane Pumps”

  Specification Section Number. Example: “Section 11140”

  Project Name. “Final Expansion of the Groundwater Replenishment System”

  File Name and Date. Example: “11140_01.pdf”, “5-05-10”

• Drawings. All drawings shall be in PDF format in PDF Searchable Image format. The Optical Character Recognition of the image shall be at a 95-percent confidence level. The drawings shall be linked as follows:

  o External links from the Drawing Index

  o External links from the references within drawings to other drawings

  Drawings available in native format (i.e. AutoCAD) shall be provided in electronic format in a native format supported by available viewers.

12. ELECTRONIC RED-LINE DRAWINGS.

Electronic red-line drawing updates shall be submitted with each pay request for the duration of the Contract on a date agreed to by the Owner, Engineer, and Contractor. If electronic red-line drawing updates are not submitted by the due date, progress payments will be withheld until the required information is submitted. Contractor shall refer to the Project Record Documents part of the Closeout Procedures section for requirements on information to be included on red-line drawings. Electronic format and requirements are as follows:

A. Upon Notice to Proceed, a DVD containing Conformed Drawings in electronic PDF format will be provided to the Contractor.

B. Contractor shall use Adobe Acrobat Professional or Revu Bluebeam to red-line PDF drawings to reflect as-built installation of facilities. Line color requirements provided in the Closeout Procedures section shall be used.
C. For each change made to the electronic drawings, the Contractor shall create a link to the document in which the change was approved (RFI, Change Order, etc.).

D. Electronic “RED-LINE” updates shall only include drawings revised during that period, but shall include all changes to date for those drawings submitted.

E. A complete electronic “AS-BUILT” set of drawings shall be provided with the hard copy set of Project Record Documents required in the Closeout Procedures section.
**SHOP DRAWING TRANSMITTAL FORM**

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<tr>
<th>Date:</th>
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<tr>
<th>From:</th>
<th>To: Orange County Water District</th>
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<th>Project Name:</th>
<th>Owner: Orange County Water District</th>
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<tr>
<th>Subject of Submittal:</th>
<th>Equipment</th>
<th>Specification</th>
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**Complete either (a) or (b) following:**

**(a)** We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown (NO EXCEPTIONS).

**(b)** We have verified that the material or equipment contained in this submittal meets all the requirements specified or shown, except for the following deviations (ATTACH LIST OF DEVIATIONS:)

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<th>Contractor's or Supplier's Authorized Signature:</th>
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# OCWD Equipment Record

## EQUIPMENT MAINTENANCE DATA SUMMARY

<table>
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<tr>
<th>Project Name</th>
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<tr>
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<td>Equip. Location</td>
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<td>Manufacturers Address</td>
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## Local Vendor

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### BREAK-IN MAINTENANCE REQUIREMENTS

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### PREVENTIVE MAINTENANCE REQUIREMENTS

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## RECOMMENDED SPARE PARTS

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## ELECTRICAL NAMEPLATE DATA

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## MECHANICAL NAMEPLATE DATA

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### SAFETY HAZARDS

Special instructions or warnings associated with this equipment

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End of Section
PART 1 - GENERAL

1-1. THE REQUIREMENT.

A. It is expressly understood and agreed that the rate of progress and the time of completion of the Work are of the essence for this Contract. The Work shall be executed with such progress as required to prevent any delay to this Contract and to other Contractors working on other contracts at the site. This includes Contract Milestone dates and constraints, time requirements, and the general completion of the Work as defined in the Contract Documents.

B. The Work specified in this Specification section includes preparation, submittal, and use of a Construction Schedule as a portion of the Contractor’s mobilization. Its subsequent updates and revisions, as reviewed and allowed by the Engineer, shall be a required part of each Progress Payment Application submitted by the Contractor as provided in the Contract Documents.

C. The Contractor shall prepare and submit all required Construction Schedules in accordance with the requirements of this Specification section. By preparing and submitting the schedules and progress period updates, the Contractor represents that it can, and intends to, safely execute the contracted Work and all portions thereof including all activities of SubContractors, equipment vendors, and suppliers including submittals and re-submittals within the specified times and constraints and that its Bid Price includes all costs associated with execution of the Work described in the Contract Documents and as represented in the Construction Schedules.

1-2. RELATED WORK SPECIFIED ELSEWHERE.

A. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Section 01140, Work Restrictions.

2. Section 01090, Regulatory Requirements and Permits.
B. Comply with the requirements of the General Provisions, Special Provisions, and General Requirements.

1-3. REFERENCE SPECIFICATIONS, CODES AND STANDARDS.

A. The Contractor shall comply with the reference specifications of the General Requirements.

B. The following publications are cited as references for the Critical Path Method (CPM) scheduling technique described in this Contract:


2. Association for the Advancement of Cost Engineering International (AACE), latest editions of Recommended Practices as applicable for Engineering, Procurement and Construction.

1-4. PURPOSE OF THE SCHEDULE.

A. This Specification section specifies requirements and procedures for the Contractor to use in preparation of construction schedules, cost-loaded schedules, resource-loaded schedules, cash flow projections, manpower projections, and cost and schedule reports. The purpose of the schedules and reports shall be to:

1. Ensure adequate planning and timely execution of the Work by the Contractor;

2. Facilitate coordination and interfacing of the Contractor’s work with others as needed;

3. Establish a baseline Construction Schedule to which subsequent periodic schedule updates will be compared to determine overall progress and performance toward satisfactory completion of the Contract;

4. Periodically record the “As-Built” condition of the Contract;

5. Assist the Engineer in monitoring progress;

6. Establish the amount of the progress period payment to be made to the Contractor;

7. Establish the amount of daily manpower required to complete the Contract within the Contract Duration;

8. Evaluate proposed changes to the Contract and resultant impacts to the construction schedule;

1-5. MOBILIZATION AND PROGRESS PAYMENTS.

A. OCWD’s administration of the Contract, its construction program, internal resource coordination, and operations planning may be severely impeded if adoption of the schedule is delayed. Consequently ten percent of the Contractor’s mobilization payment, as allowed pursuant to the Contract Documents, shall be retained and allocated for payment as follows:

1. The Contractor may request and be paid twenty percent of the retained mobilization in its payment application that follows submittal and acceptance of the Interim Construction Schedule.

2. The Contractor may request and be paid the balance of the retained mobilization in its payment application that follows submittal and acceptance of the Baseline Construction Schedule.

B. The Contractor’s progress payment applications may be deemed improper and may not be accepted and processed for payment by OCWD without periodic Construction Schedule updates submitted in the time and manner required by this Specification section and subsequently accepted by the Engineer.

1-6. CONTRACTOR SUBMITTALS.

A. Certifications and other submittal documentation in compliance with Article entitled “Contractor Qualifications” of this Specification.

B. The Contractor shall submit all items as required by Appendix G of this Specification section in the time, quantities, and manner stipulated therein and in accordance with the Contract Documents for submittals unless noted otherwise herein.

1-7. QUALITY ASSURANCE.

A. Contractor Qualifications:

1. The Contractor shall provide a qualified construction scheduler to meet on site with the Engineer during an eight-hour day shift one day per week (minimum) and maintain the progress schedule. The scheduler shall have verifiable experience in construction work sequencing, productivity, preparation and maintenance of detailed construction schedules for individual contracts of $5 Million and larger in constructed value. The scheduler shall be proficient in the use of Primavera® Project Management software and shall have a minimum of ten years experience.

a. Within seven days after Notice to Proceed, the Contractor shall submit the construction scheduler’s resume to the Engineer, including personal references from at least two owner-
representatives familiar with the construction scheduler’s work on previous similar contracts. The Engineer reserves the right to reject the proposed scheduler based on poor references, lack of qualifications as defined in this Specification section, and/or poor performance history on previous OCWD contracts including late schedule submittals, lack of responsiveness to requested clarifications, corrections, re-submittals and/or time impact analysis.

b. The Contractor’s scheduler shall attend all meetings, including progress and special meetings pertaining to scheduling of the Work. The scheduler, along with the Contractor’s management team shall work closely with the Engineer to comply with and deliver the requirements of this Specification section.

c. It is the specific intent of this Specification section that the Contractor and its scheduler shall be wholly responsible for developing, maintaining, updating, checking and providing an accurate and comprehensive representation of the Contractor’s work plan in the required software, related databases and reports to achieve the purposes set forth in the Contract Documents.

1-8. ENGINEER’S REVIEW.

A. The Engineer shall review schedule submittals in accordance with this Specification section and the other Contract Documents for the administrative purposes described herein. However the Engineer’s review, comments or consent to use the Contractor’s schedule shall not be construed as validation or endorsement of the Contractor’s work plan and approach nor shall it relieve the Contractor of any and all responsibility, liability or risk related to its work plan, its work plan as represented by the schedule, or requirements of the Contract.

1-9. GENERAL SCHEDULE REQUIREMENTS.

A. The Contractor shall have sole responsibility for development, maintenance, update, revision, checking and presentation of its work plan in the form of a Critical Path Method (CPM) Construction Schedule for use by the Engineer in meeting the purposes described in the Contract Documents. The Contractor shall provide all information concerning methods, means, sequencing, logic, and duration of all activities as well as providing all CPM logic network diagram and tabular report data.

B. The Contractor shall use Primavera® Project Management, latest version, and a hardware system commensurate with the size of the contract. The system shall be capable of handling, processing, printing, and plotting all data required to satisfy the requirements of this Specification section. Electronic files submitted to OCWD shall be compatible with Primavera® Project Management, latest version.
C. Within fourteen days following Notice to Proceed, the Engineer shall schedule and conduct a Pre-Construction Scheduling Conference to commence development of the required construction schedules. At the meeting, the requirements of this and related Specification sections will be reviewed with the Contractor and the Contractor shall present its proposed:

1. Methodology for the CPM Construction Schedule, illustrating sequence of operations, cost, resource and quantity loading.

2. Work Breakdown Structure (WBS), Activity Coding Structure and Activity Identification numbering system for labeling all Work Activities, correlated with the Contract Agreement Schedule of Prices. At a minimum the Contractor shall provide the data detailed in Appendices B and C of this Specification section.

D. The Engineer shall review the WBS, the coding structure, and activity identification system presented by the Contractor within ten days following the Pre-Construction Scheduling Conference. The Contractor shall make all modifications requested by the Engineer and, following concurrence by the Engineer, shall employ the agreed to coding, structure, and system in its Construction Schedule. In addition the Contractor may be required to develop additional activity codes and values to comply with reporting requirements listed in the Contract Documents, and/or as directed by the Engineer.

E. The Work activities comprising the Construction Schedule shall be of sufficient detail to assure adequate planning and execution of the Work such that, in the judgment of the Engineer, it provides an appropriate basis for predicting, monitoring, evaluating and recording the progress of the Work. Work Activities shall conform to the following requirements:

1. Describe Work Activities using consistent terminology such that the Work is readily identifiable for assessment of progress and completion.

2. Subdivide the Work into activities of duration no longer than fifteen uninterrupted work days each, except as to non-construction activities, such as procurement and delivery of materials and equipment, and any other activities for which the Engineer may accept a longer duration in writing.

3. The construction time, as determined by the schedule, from early start to late finish for any sub-phase, phase, or the entire contract shall not exceed the Contract Duration specified or shown in the Contract Documents. One day shall be the smallest time unit shown unless otherwise directed in writing by the Engineer.
4. Except as provided for in Appendix B for milestones, activities labeled "start", "continue", or "completion" shall not be allowed. Logic relationships between activities shall be limited to finish-to-start (FS) type relationships and the use of lags or durations between activities shall not be permitted unless accepted in writing by the Engineer.

5. The Contractor shall not constrain the schedule with artificial logic ties and/or constraint dates and/or use any other scheduling techniques that may distort the activity float and total float associated with the critical path activities and the schedule in general. The only allowable constraint shall be for Contract Milestone dates using a “Finish On or Before” constraint, unless accepted in writing by the Engineer.

6. Each Work Activity shall contain the following information as elaborated in Appendix B of this Specification section:
   a. WBS coding, activity coding and a unique activity identification number consistent with the structure and system agreed to by the Engineer.
   b. Performance responsibility; General Contractor or SubContractor trade code; GEN, MECH, ELEC, CARP, PLAST, etc.
   c. Work location code and description of the physical plant area involved.
   d. Duration in work days based on the appropriate Activity Calendar.
   e. Cost Data as mandated herein.
   f. Resource Data as mandated herein.

F. The Engineer may require the Contractor, at any time during the Contract, to develop a more detailed schedule and/or fragnet than depicted in the Construction Schedule to clearly illustrate the effort needed to complete a specific area or task.

G. The Construction Schedule shall contain the following standard milestones; Notice to Proceed; Mobilization; Construction Start; Specified Contract Milestones for each phase of Work as identified in Contract Documents; Beneficial Occupancy; Substantial Completion and Final Completion

H. Activity Cost Loading:

1. The schedule shall incorporate cost-loaded activities equal to the Contract Total Price and Sub-Totals set forth in Contract Agreement ‘Exhibit “A” Schedule of Prices’ and as further detailed in the General Conditions section entitled ‘PAYMENT – ITEMIZED BREAKDOWN OF CONTRACT LUMP SUM PRICES’.
2. The Contractor shall further divide its prices to determine and substantiate a fair allocation of costs to each activity of Work in the schedule that is physically incorporated into the facility.

3. The Contractor shall not unbalance the activity cost loading and, except for mobilization costs, shall prorate overhead and profit on all activities for the entire contract term. The Contractor shall furnish the minimum data required in Appendix G of this Specification section to the Engineer for review and agreement prior to integrating cost data into the schedule:

4. Procurement, submittal preparation and submittal review activities shall not be cost-loaded. Payment for material and equipment shall be made in accordance with the Contract Documents.

5. The Payment Application and all periodic payment requests shall be based upon, but may not be limited to, the cost-loaded Construction Schedule update; the Contract Agreement ‘Exhibit “A” Schedule of Prices’; and the General Conditions section entitled ‘PAYMENT – ITEMIZED BREAKDOWN OF CONTRACT LUMP SUM PRICES’.

6. Proposed changes to the authorized Cost-loaded Construction Schedule may only be made with the written acceptance by the Engineer.

I. Activity Resource Loading:

1. The activities contained in the Construction Schedule shall be resource-loaded to show the number of work force employees needed on a work day basis to complete the Work within the Contract Duration.

2. Resource activity loading shall include, at a minimum, the composite crew, the classification (e.g., foreman, journeyman, etc.) of the individuals comprising the crew, materials, and equipment associated with each activity shown on the schedule, plus any other information required by Engineer.

3. Labor resources shall be listed in the Resource Library of the Primavera® Software and the Contractor shall assign labor resource loading by trade for each Work Activity of the schedule.

4. The Contractor may use the Primavera® Resource Leveling function for its own internal analysis and planning, but shall not use it in the contract record or submittal schedule databases to avoid potential distortions resulting from the retained logic function.

5. Proposed changes to the authorized Resource-loaded Schedule may only be made with the written acceptance by the Engineer.
J. The Construction Schedule shall begin with the date of issuance of the Notice to Proceed and not exceed the maximum Contract Duration provided in the Contract. It shall include, but not be limited to, the following items as appropriate to this Contract:

1. All administrative tasks.
2. Type of work to be performed, sequences, and labor trades involved, including performance responsibility and trade code.
3. Quantity loading of activities showing, at a minimum, unit price bid items, estimated quantities to be installed or removed as indicated in the Contract Documents or as determined by the Contractor in preparation of its Bid, and any additional information required by the Engineer.
4. All manufacturer factory tests, material and equipment deliveries, field tests, readiness tests, and installation activities that the Contractor intends to seek payment for, including stored materials.
5. All submittal preparation and reviews including Engineer reviews, and acceptance of shop drawings and material samples shall provide a 25 day minimum duration as specified for the Engineer’s review of submittals, unless the submittal is of the type requiring a longer period of time as specified in the Contract Documents for Shop Drawing Submittals.
6. Delivery, installation, check-out/testing, and startup of OCWD-furnished equipment and/or materials in accordance with the schedule dates set forth in the Specifications or as furnished by the Engineer.
7. Approvals required by regulatory agencies or other third parties, including Contractor obtained permits.
8. Identification of all subcontract Work and assignments of responsibility for performing specific activities.
9. All temporary utilities and construction required by the Contractor to perform the Contract Work.
10. Access to and availability of work areas including all anticipated plant shutdowns, pump station shutdowns, flow diversions, or bypass pumping.
11. All interruptions, shut downs and connections to existing plant systems and equipment.
12. All start up, testing, training, and assistance required under the Contract Documents.
13. Timing of the phased or total takeover of the Work by OCWD as may be required by the Contract.
14. Identification of any work force, material, or equipment restrictions, as well as any activity requiring unusual shift work, such as two shifts, six day weeks, overtime, or work at times other than regular days or hours, shall be clearly identified in the Construction Schedule. Normal work hours are eight hours per day, five days a week, unless specified otherwise in the Contract Documents.

15. Contractor activities that will be coordinated with OCWD and OCSD on-going activities.

16. Material and Equipment Installation including installation, check-out, vendor equipment manuals submittal and acceptance, training lesson plan(s) submittal and acceptance, and OCWD staff training.

17. Contractor-prepared drawings and diagrams such as shoring diagrams.

18. Clearly identify all non-work days such as holidays, or other non-work periods in the schedule.

19. Specific Work activities, including but not limited to, site work, underground piping and electrical ductbanks, structural excavation, soil testing, backfill, placement of sheeting, pile driving, formwork erection, rebar placement, placing of concrete, stripping forms, concrete curing, installation of process piping, electrical conduits and wiring, instrumentation and controls conduits and wiring, terminations, other materials and plant equipment, and cleanup.

20. The Contractor shall provide an activity for Inclement Weather with a duration that reflects the number of inclement weather days provided for in the Contract Documents as follows:
   a. The Inclement Weather predecessor activity shall be the last construction activity that occurs before Substantial Completion.
   b. The Inclement Weather successor activity shall be the Substantial Completion milestone.
   c. The Contractor shall notify the Engineer in writing within seven days when a lost work day has occurred due to inclement weather. The Contractor shall correspondingly reduce the inclement weather activity duration as weather days occur, are recognized and accepted by the Engineer.
   d. The Contractor shall notify the Engineer in writing to request a non-compensable extension of time if the number of actual inclement weather delay days exceeds the number of inclement weather delay days identified in the Contract Documents. Such delays shall not entitle the Contractor to additional compensation.
22. Final cleanup.
23. Specific information required by the Engineer.
24. Required inspections by the Engineer.
25. Progress period updating of Contract Record Drawings and final submittal of As-Built Drawings at contract completion, or as directed by the Engineer.

1-10. INTERIM CONSTRUCTION SCHEDULE REQUIREMENTS.

A. Within 30 days following Notice to Proceed the Contractor shall submit its detailed written work plan for the first 150 days of operation and its general approach to the remainder of the Work. The work plan and approach to the remainder of the Work shall also be submitted in the form of an Interim Construction Schedule that incorporates all applicable elements of this Specification section and the other Contract Documents sufficient to meet its purpose.

B. The Engineer shall meet with the Contractor within ten days of the submittal to review and agree on any necessary adjustments and revisions. When revised and accepted by the Engineer the Interim Construction Schedule shall illustrate the Contractor’s methods, means, logic, sequencing and durations of the Work represented by cost-loaded and resource-loaded activities for the first 60 days of the contract. It shall also include cost loading and resource loading for the balance of all contract Work to a summary level through the Final Completion milestone as forecast by the Contractor.

C. The Interim Construction Schedule shall be updated as provided in this Specification section and used to monitor job progress during the first 90 days of the contract or until acceptance of the Baseline Construction Schedule by the Engineer.

1-11. BASELINE CONSTRUCTION SCHEDULE REQUIREMENTS.

A. Within 60 days following Notice to Proceed the Contractor shall submit its detailed written plan for the Work. The work plan shall also be submitted in the form of a Baseline Construction Schedule that incorporates all applicable elements of this Specification section and the other Contract Documents sufficient to meet its purposes as described therein. It shall demonstrate the final level of detail for each activity, all required relationships completely identified, and the duration of each activity correctly depicted. It shall be developed as follows:
1. The activities shown in the interim schedule shall be integrated into the Baseline Construction Schedule without change to form a comprehensive representation of the Contractor’s execution of the Work from start to finish.

2. The Baseline Construction Schedule submitted for review and acceptance by the Engineer shall be un-statused and the data date shall be the Contract Notice to Proceed date.

3. The Baseline Construction Schedule shall clearly indicate the Longest Critical Path of activities from Notice to Proceed to the Contract Completion date.

4. The Baseline Construction Schedule shall contain all cost information assigned to each discrete activity at the final level of detail. Each activity shall be cost-loaded to permit generation of cash flow curves.

5. The Baseline Construction Schedule shall contain all resource information assigned to each discrete activity at the final level of detail. Each activity shall be resource-loaded to permit generation of resource curves.

6. The Contractor shall collect data and information from subContractors, suppliers, and equipment manufacturers for incorporation into the Baseline Construction Schedule. The baseline schedule submittal shall include signed certification letters from subContractors, suppliers and vendors that they have reviewed, discussed and agreed to the schedule as it relates to their work.

7. The Baseline Construction Schedule shall contain no Contract changes or delays which may have been incurred during the schedule development period. These changes will be entered at the first update after the Baseline Construction Schedule has been accepted by the Engineer and a change to the Contract Duration made as part of an approved Change Order in accordance with the Contract Documents.

8. Once the Baseline Construction Schedule is agreed to and accepted by the Engineer it shall become the schedule of record and shall be the basis for future schedule updates.

9. After adoption of the Baseline Construction Schedule, no changes shall be made therein, including changes to logic, sequence and/or duration, without the agreement of the Engineer.

B. The Engineer will have up to 25 days to evaluate and prepare its comments to the Baseline Construction Schedule submittal before scheduling a meeting with the Contractor to discuss it.

C. Within ten days of returning its submittal response, the Engineer will schedule a meeting with the Contractor to review and discuss any
adjustments and revisions to the Baseline Construction Schedule required to make it acceptable to the Engineer.

D. After acceptance by the Engineer, the Baseline Construction Schedule shall represent the Contractor’s methods, means, logic, sequencing and durations of the Work and include the Contractor’s estimated costs and resources for each discrete activity as required to meet the purposes of this Specification section and the other Contract Documents.

1-12. PROGRESS OF THE WORK.

A. Once the Baseline Construction Schedule is adopted the Contractor shall be responsible for preparing and submitting periodic progress update information in the form of a progress report concurrent with the Progress Payment Application cycle established for the contract. At a minimum the progress report and schedule update shall include:

2. Updated Construction Schedule.
3. Reports, tables and diagrams ad described in Appendix G of this Specification section.

B. On a date determined by the Engineer, the Contractor shall meet with the Engineer to review the Contractor’s Progress Payment Application and its required supporting documents, including its Narrative Progress Report and its Construction Schedule Update.

1. Appendix E of this Specification section outlines the update preparation and review sequence to be used for preparation, submittal and review of the Narrative Progress Report and Construction Schedule update.

2. The Contractor and the Engineer will review the Draft submittal, discuss its content and the Engineer will authorize modifications, as appropriate, to facilitate approval of the Payment Application.

3. Following the review meeting, only those revisions authorization by the Engineer shall be incorporated into the electronic file entitled “Update” which shall then be submitted as the record schedule for the progress period update.

4. The Engineer shall be allowed seven days after the meeting to review and determine the acceptability of the Narrative Progress Report and Construction Schedule update. This variance from the typical submittal review period is made specifically to facilitate timely processing of the Contractor’s Progress Payment Application.
5. Narrative Progress Report and Construction Schedule updates returned to the Contractor marked “Revise & Resubmit” or “Not Acceptable” shall constitute a deficient payment application that will not be processed for payment until the schedule report is acceptable to the Engineer.

6. Narrative Progress Report and Construction Schedule updates returned to the Contractor marked “Revise & Resubmit” or “Not Acceptable” shall be resubmitted to the Engineer within seven days, at which time a new seven day review period will begin for the Engineer.

C. The Narrative Progress Report shall summarize the schedule status and be organized as follows:

1. The Contractor's transmittal letter, containing the submittal number.

2. Contents Sheet.

3. Identification of the Update including the Data Date, Update Period and the Schedule File Names as defined in Appendix D to this Specification section.

4. Update Summary including the variance between Contract Milestone dates and their predicted completion dates; Contract Completion variance for the reporting period; the number of days ahead or behind schedule; weather days taken and remaining from the Contract allowance and tables summarizing the status of Contract finances and time. At a minimum the Contractor shall provide the data required by the example in Appendix G of this Specification section.

5. Analysis of Critical Path and each negative Float Path describing the nature of the Critical Path, its impact and the impact of any negative float path on other activities, milestones and completion dates.

6. All current and anticipated time impacts describing the origin of each event; corrective action and schedule adjustments to correct it; recommendations to recover from it and the effect that it may have on other activities, milestones and completion dates.

7. Pending status of outstanding issues such as permits, if any; Contract modifications, RFC’s and or RFP's containing requests for time adjustment; long-lead procurement items; safety reports and any code violations or warnings.

8. Narrative discussion of contract status including highlights of work by area, progress, completion, impediments, changes to the Work plan, issues and concerns accompanied by OCWD Activities and Schedule Change Tables. At a minimum the Contractor shall provide the data required in Appendix G of this Specification section.
D. Progress Period Schedule Updates:

1. The Contractor shall be responsible for preparing and submitting updated schedules, related reports and diagrams, as part of its periodic update Report.

2. The Construction Schedule update shall measure and record only those facts that have occurred to the Work including physical percent complete type, actual start and finish dates, and duration changes. Modifications to logic, durations of activities not started or to actual dates already recorded in previous updates shall not be allowed unless authorized in writing by the Engineer. An electronic file shall be created and entitled “Pure Progress” and included with the update.

3. With each update the Contractor shall identify any changes to the schedule, such as Field Change Orders, accepted time adjustment requests, new activities, constraint changes, deleted activities, activity duration changes, activity description changes, and changes in logic relationships between activities in a Schedule Change Table as detailed in Appendix G of this Specification section. Logic changes shall be described with an explanation of the rationale for the change provided in the report. Such revisions may be incorporated into an electronic file entitled “Draft Update” for target comparison with the “Pure Progress” update. The Contractor shall provide printed diagrams of the target comparisons as part of its presentation to the review meeting.

4. All progress period schedule updates shall be compared to the Baseline Construction Schedule. In addition, each current progress period update shall be compared to the previous period update. Each update shall be labeled with the OCWD project number, data date and title abbreviation identified on the hard copy and electronic file as described in Appendix G of this Specification section.

5. The schedule shall be updated with actual start and finish dates for every in-progress or completed activity, as documented by the Contractor’s Daily Reports and Three Week Look Ahead schedules. No other basis, including automated software calculations or default mechanisms shall be allowed. Failure of the Contractor to ensure that documented dates as specified herein are incorporated into the schedule update shall constitute cause for disapproval of the update and the inability of the Engineer to accurately evaluate the Contractor’s progress for payment purposes.

6. Activities that have reported progress without predecessor activities being completed such as Finish to Start (FS) Relationships with out of sequence progress will not be allowed except on a case-by-case basis with the written acceptance by the Engineer. A written explanation of each such activity shall be included with each update in the Schedule
Change Table as detailed in Appendix G of this Specification section. The Engineer may direct that changes in schedule logic be made to correct any or all out-of-sequence Work.

7. Change order work shall be identified in the schedule as a new activity inserted into the affected schedule logic. The schedule activity shall only be added after the Change Order is approved for payment by OCWD.

1-13. CONSTRUCTION SCHEDULE REVISION.

A. If the Contractor decides to make major changes to the sequencing and logic of the accepted work plan it shall prepare a schedule reflecting its proposed changes for submittal to, and review by, the Engineer separate and apart from the periodic schedule updates.

B. The Contractor’s submittal shall be made in accordance with the requirements of the Contract Documents and the Engineer will have a maximum 25 day period for review before scheduling a meeting with the Contractor.

C. A Revised Schedule that results in a predicted completion date later than the Contract Completion date shall be rejected unless the delay is deemed to be excusable or caused by OCWD or OCSD and a time extension is authorized in writing by the Engineer.

D. The Engineer will then arrange a meeting with the Contractor to review the submittal, discuss its content, and authorize modifications required to allow its integration into the Construction Schedule.

1-14. AS-BUILT CONSTRUCTION SCHEDULE.

A. As a condition precedent to release of any retention, the Contractor shall submit its As-Built Construction Schedule. The As-Built Construction Schedule shall reflect the manner in which the contract was actually constructed including start and completion dates, and all activities, sequences, and logic ties.

B. This schedule submission shall be accompanied by a certification, signed by an officer of the Contractor’s company, the Contractor’s Project Manager and Construction Scheduler, stating “To the best of our knowledge, the accompanying As-Built Construction Schedule accurately reflects the actual start and completion dates and logical relationships of all activities contained herein and represents an accurate depiction of the way in which the contract was constructed”.

1-15. **WEEKLY THREE WEEK LOOK AHEAD.**

A. The Contractor shall submit an electronic copy of the Three Week Look Ahead schedule to the Engineer no later than 48 hours prior to the weekly construction progress meeting. The Three Week Look Ahead schedule shall be developed maintained and provided using MS Excel® software, shall be in the form shown in Appendix G and include at a minimum actual performance for the previous week compared to the planned work for the previous week, planned work for the current week and planned work for the two weeks following the current week.

B. Each weekly Three Week Look Ahead schedule shall be based on the current Construction Schedule update Four Week Look Ahead Report and fully correlated to the activities planned in its Primavera® counterpart, including submittal reviews, procurement, fabrication and delivery of contract deliverables.

C. The Contractor shall use the Three Week Look Ahead schedule actual performance record in preparing its Construction Schedule update.

1-16. **FLOAT OWNERSHIP AND EARLY COMPLETION.**

A. Total float, free float, independent float, near-critical float, critical path float, slack time, or contingency within the overall Construction Schedule is not for the exclusive use of either OCWD or the Contractor but is jointly owned by both and is an expiring resource available to and shared by both as needed to meet Contract Milestones and the Contract Completion date.

B. Pursuant to the float sharing requirements of the Contract, use of float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity times, or imposed dates shall be cause for rejection of the Construction Schedule and any revisions or updates thereto.

C. Within fifteen days of Contract award, the Contractor shall formally notify OCWD in writing of its intent to finish the Work earlier than the Contract Completion date. Agreement between the Engineer and the Contractor to adopt an early completion Baseline Construction Schedule shall include agreement by both parties to amend the Contract Milestones, completion dates, and associated liquidated damages, by Change Order, to those completion dates contained in the agreed to schedule.

1-17. **TIME ADJUSTMENT REQUESTS.**

A. Requests for time adjustments shall be submitted in the time and manner specified in the Contract Documents, as described herein and further elaborated in Appendix F of this Specification section.
B. OCWD initiated changes that extend or shorten the Contract Duration shall be the sole basis to adjust the Contract Completion date. Delays in the critical path not associated with proper requests for time extensions in accordance with the Contract Documents shall be deemed to be the responsibility of the Contractor.

1-18. REMEDIAL MEASURES AND RECOVERY SCHEDULE.

A. The Contractor shall mitigate any potential delay to the Work as efficiently and economically as possible regardless of cause. Where practical the Contractor shall do so without added cost or adverse time impact. Prior to initiating any action for which it expects OCWD to be liable, the Contractor shall notify the Engineer in writing and receive written authorization to proceed.

B. If the Contractor believes the delay may result in a predicted completion date later than the Contract Completion date, it shall review all uncompleted activities on the critical and near critical paths to assess mitigation options and, within seven days of discovering the potential delay it shall submit a written statement to the Engineer describing its plan to recover, including a statement that it has verified the accuracy of all critical and near critical paths. Following acceptance by the Engineer the Contractor shall incorporate its recovery plan into the next schedule update.

C. Whenever it becomes apparent to the Engineer that the current schedule update shows a delay to the critical path, that these delays are through no fault of OCWD and hence, the Contract completion date will not be met, or when so directed by the Engineer, the Contractor shall submit to the Engineer for review a written statement of the steps it intends to take to remove or arrest the delay to the schedule and the Contractor shall promptly provide the requisite level of effort to bring the Work back on schedule. The Contractor shall then incorporate its recovery plan into the next Construction Schedule update.

D. A Recovery Schedule that results in a predicted completion date later than the Contract Completion date shall be rejected unless the Engineer determines that the delay is the responsibility of OCWD, is excusable or that it cannot be mitigated, and authorizes a time extension in writing.

E. The Engineer may require the Contractor to provide reasonable additional resources to recover from any schedule delay, however under no circumstances will the addition of equipment or construction forces, increasing the working hours or any other method, manner, or procedure to recover from delays to the Schedule be considered justification for contract modification for extra Work.
F. The holidays observed by the Owner are as follows:

- New Year's Day
- Presidents' Day
- Lincoln's Birthday (Observed by OCSD only)
- Memorial Day
- Independence Day
- Labor Day
- Veteran's Day
- Thanksgiving Day (Thursday and Friday)
- Christmas Eve
- Christmas Day

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3-1. SUPPLEMENTS.

A. The supplements listed below are attached to and form a part of this Specification section:

- Appendix A - Definitions
- Appendix B - Work Breakdown and Activity Coding Structure
- Appendix C - Activity ID System
- Appendix D - Electronic File Naming
- Appendix E - Update Preparation Sequence
- Appendix F - Time Adjustment Request
- Appendix G - Contractor Deliverables

End of Section
APPENDIX A TO SECTION 01310
Definitions

A. Baseline Construction Schedule: the CONTRACTOR’s as bid Work plan for the Contract, prepared using the Critical Path Method, which shows all planned activities, costs, resources and durations, as accepted to by the ENGINEER.

B. Cash Flow: The CONTRACTOR’s estimate of time-phased construction gross billings, before retention, generated from its scheduled cost-loaded activities.

C. Construction Schedule: the CONTRACTOR’s accepted Baseline Construction Schedule, as it evolves through periodic updates that record actual progress of the Work to completion when it shall show the “as-built” record of the CONTRACTOR’s Work plan as executed.

D. Contemporaneous Period Analysis: a methodology, used in conjunction with a CPM schedule, to model the effects of a time impact event in near real time for a ‘forward-looking’ estimate of contract completion. Also referred to as Time Impact Analysis by the AACE.

E. Contract Completion: the final completion milestone date established by adding the duration in calendar days stipulated in the Contract agreement to the Notice to Proceed date, and as amended via change orders.

F. Contract Duration: the performance period provided for in the contract.

G. Contract Milestone: significant performance points in the Work, as provided for in the Contract

H. Cost-Loaded Schedule: the CONTRACTOR’s allocation of bid estimate costs to each schedule activity which forms the basis for anticipated CONTRACTOR gross billings before retention is withheld.

I. Critical Path: a continuous sequence of schedule network activities with the least amount of total float ending at a Contract Milestone.

J. Critical Path Method (CPM): schedule development that starts with a proper plan sequenced from beginning to end, followed by time driven forward and backward passes to establish the Critical Path and the Float for all other paths.

K. Early Finish: the earliest a schedule activity is expected to finish, based on its relationship (logic) to other activities in the contract.

L. Early Start: the earliest a schedule activity is expected to start, based on its relationship (logic) to other activities in the contract.

M. Float: the flexibility that an activity has against the critical path

N. Fragnet: a fragment of the schedule network that typically illustrates a particular sequence for thorough analysis.

O. Free Float: the amount of time the start of an activity can be delayed without delaying the start of a successor activity.

P. Independent Float: the amount of time that an activity may be delayed without affecting the early start or early finish of any succeeding activities.

Q. Interim Construction Schedule: the CONTRACTOR’s as bid Work plan for that portion of the Contract that precedes adoption of the Baseline Construction Schedule prepared using the Critical Path Method and showing in detail all planned activities, logic, sequencing, costs, resources and durations planned for the interim period cited in this Specification section. It shall also include cost and resource
loading to a summary level for the balance of all Contract Work through the Final Completion milestone as forecast by the CONTRACTOR.

R. Late Finish: the latest a schedule activity can finish, based on its relationship (logic) to other activities on the contract, and still permit the contract to be completed on time.

S. Late Start: the latest a schedule activity can start, based on its relationship (logic) to other activities on the contract, and still permit the contract to be completed on time.

T. Longest Critical Path: a continuous sequence of schedule network activities that begins with the notice to proceed milestone and ends at the contract completion milestone.

U. Milestone: a significant schedule event identified in the Contract as a “milestone”.

V. Narrative Progress Report: a written report that summarizes the status of the Contract and narrates in detail progress of the Work during the report period, anticipated for the next reporting period and the outlook for completion of the Contract

W. Near-Critical Float: is typically defined as float values within a set range just above the critical path float.

X. Original Duration: the amount of time, in calendar days, an activity is expected to take to complete at the beginning of a contract.

Y. Planned Completion: the construction completion milestone date established by the agreed to baseline construction schedule.

Z. Pre-Construction Scheduling Conference: the first meeting between the ENGINEER and the CONTRACTOR to review the requirements of this and related Specification sections, the CONTRACTOR’s proposed methodologies for its work breakdown structure, activity coding, identification, sequencing, cost, resource and quantity loading.

AA. Predicted Completion: a variable date predicted for completion of the Work in each periodic progress update.

BB. Primavera® Project Management, latest version: the latest version of Primavera® scheduling software currently in use by OCWD.

CC. Progress Period: the 28 day progress payment period established by the ENGINEER for the contract.

DD. Project Float: the amount of time between the CONTRACTOR’s planned early completion date and the contract completion date.

EE. Recovery Schedule: the CONTRACTOR’s plan to mitigate its predicted delay to the Contract completion date and conclude the Work as Contracted.

FF. Resource-loaded Schedule: the CONTRACTOR’s allocation of all labor and equipment necessary to complete the Work for each activity as entered into the schedule software database.

GG. Total Float: the amount of time that the actual start and finish of an activity can be delayed along a given network path without delaying the contract completion date

HH. Work Activity: an activity that requires time and resources to complete and must be performed before the Contract is considered complete.
APPENDIX B TO SECTION 01310

Work Breakdown Structure

The CONTRACTOR shall code the Work Breakdown Structure (WBS) Code Value with the OCWD Contract Number and the WBS Name with the OCWD Project Title at the EPS Root level (Level 1) to facilitate integration into the OCWD database. The Activity Coding Structure shall be used to organize all subordinate levels of the Work.

OCWD Contract No: GWRS-2019-01
OCWD Project Title: Final Expansion of the Groundwater Replenishment System Project

Activity Coding

At a minimum, the CONTRACTOR shall assign codes to each activity in the Construction Schedule, using the activity code names, values and corresponding descriptions outlined in the Activity Codes Dictionary below to give OCWD the ability to sort and select schedule information based on the following categories:

1. Type of Work: Construction and non-construction
2. Performance Responsibility: General and SubContractors
3. CSI Division:
4. Milestone:
5. Tie-In
6. Location

ACTIVITY CODES DICTIONARY

<table>
<thead>
<tr>
<th>Code Name</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE</td>
<td>1-6</td>
<td>TYPE OF WORK</td>
</tr>
<tr>
<td>CONT</td>
<td>4</td>
<td>CONSTRUCTOR / SUB-CONSTRUCTOR</td>
</tr>
<tr>
<td>CSI</td>
<td>4</td>
<td>CSI DIVISION</td>
</tr>
<tr>
<td>MS</td>
<td>4</td>
<td>MILESTONE</td>
</tr>
<tr>
<td>TIE</td>
<td>4</td>
<td>SHUTDOWN / TIE-IN</td>
</tr>
<tr>
<td>LOC</td>
<td>4</td>
<td>WORK LOCATION</td>
</tr>
</tbody>
</table>
Code Name: TYPE
Description: Type of Work
Field Length: 6

At a minimum, the CONTRACTOR shall assign a Code Value to each activity corresponding to one of the following Code Descriptions:

Examples:

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration / Submittals</td>
<td></td>
</tr>
<tr>
<td>Submit / Review</td>
<td></td>
</tr>
<tr>
<td>Resubmit / Review</td>
<td></td>
</tr>
<tr>
<td>Procurement / Fabrication / Delivery</td>
<td></td>
</tr>
<tr>
<td>Procure</td>
<td></td>
</tr>
<tr>
<td>Fabricate</td>
<td></td>
</tr>
<tr>
<td>Deliver</td>
<td></td>
</tr>
<tr>
<td>Bid Item 1 – Mobilization/Demobilization</td>
<td></td>
</tr>
<tr>
<td>Mobilization</td>
<td></td>
</tr>
<tr>
<td>Demobilization</td>
<td></td>
</tr>
<tr>
<td>Bid Item 2 – Worker Protection and Safety/Sheeting, Shoring and Bracing</td>
<td></td>
</tr>
<tr>
<td>Bid Item 3 – Builder’s All Risk Insurance</td>
<td></td>
</tr>
<tr>
<td>Bid Item 4 – Prestressed Concrete Equalization Storage Tanks</td>
<td></td>
</tr>
<tr>
<td>Ground Improvements</td>
<td></td>
</tr>
<tr>
<td>Prestressed Storage Tank</td>
<td></td>
</tr>
<tr>
<td>Ladders and Walkways</td>
<td></td>
</tr>
<tr>
<td>Bid Item 5 – Plant 2 Pump Station &amp; Associated Facilities</td>
<td></td>
</tr>
<tr>
<td>Ground Improvements</td>
<td></td>
</tr>
<tr>
<td>Sheet Piling</td>
<td></td>
</tr>
<tr>
<td>Yard Piping</td>
<td></td>
</tr>
<tr>
<td>Yard Structures</td>
<td></td>
</tr>
<tr>
<td>Footings</td>
<td></td>
</tr>
<tr>
<td>Slab on Grade</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td></td>
</tr>
<tr>
<td>Masonry</td>
<td></td>
</tr>
<tr>
<td>Metal Decking</td>
<td></td>
</tr>
<tr>
<td>Metal Framing</td>
<td></td>
</tr>
<tr>
<td>Equipment Pads</td>
<td></td>
</tr>
<tr>
<td>Handrail / Stairs</td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous Metal Work</td>
<td></td>
</tr>
<tr>
<td>Doors and Windows</td>
<td></td>
</tr>
<tr>
<td>Finish Hardware</td>
<td></td>
</tr>
<tr>
<td>Fabricated Grating</td>
<td></td>
</tr>
<tr>
<td>Roof Materials</td>
<td></td>
</tr>
</tbody>
</table>
Flashing Sheet Metal
Joint Sealants
Mechanical
Plumbing
Painting and Coatings
HVAC
Electrical
Instrumentation

Bid Item 6 – Microfiltration System Equipment

Bid Item 7 – Microfiltration System Equipment Installation

Bid Item 8 – Trojan Ultraviolet Light System Equipment

Bid Item 9 – RO Elements

Bid Item 10 – Process Control Integration

Bid Item 11 – Allowance - Witness Factory Testing
   Equipment Identified in Contact Documents

Bid Item 12 – Area 100 Yard Piping
   54/66-inch SE

Bid Item 12 – Area 200 - Microfiltration
   Sheet Piling
   Footings
   Slab on Grade
   Walls
   Elevated Slab
   Equipment Pads
   Canopy
   Screen Wall
   Handrail
   Tanks
   Equipment
   Miscellaneous Metal Work
   Mechanical
   Plumbing
   Painting and Coatings
   HVAC
   Electrical
   Instrumentation

Bid Item 12 – Area 400 – Bulk Chemical Storage / Cartridge Filter Facility
   Tanks
   Equipment
   Mechanical
   Electrical
   Instrumentation

Bid Item 12 – Area 510 – RO Building
   Prefabricated Electrical Building
Bid Item 12 – Area 600 – UV Facility

- Equipment
- Miscellaneous Metal Work
- Fabricated Grating
- Mechanical
- Electrical
- Instrumentation

Bid Item 12 – Area 700 – Polymer / Post Treatment

- Equipment Pads
- Equipment
- Tank
- Miscellaneous Metal Work
- Mechanical
- Painting and Coatings
- Electrical
- Instrumentation

Bid Item 12 – Area 800 – Product and Barrier Pump Station

- Equipment
- Tanks
- Platform and Ladders
- Mechanical
- Electrical
- Instrumentation
**Code Name:** CONT

Description: CONTRACTOR / SubContractor

Field Length: 4

At a minimum, the CONTRACTOR shall assign a unique code for each SubContractor. Following are examples of code values and descriptions to illustrate the expected level of detail.

Examples:

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEC</td>
<td>Electrical SubContractor</td>
</tr>
<tr>
<td>GENL</td>
<td>General Contractor</td>
</tr>
<tr>
<td>MECH</td>
<td>Mechanical SubContractor</td>
</tr>
</tbody>
</table>

**Code Name:** CSI

Description: CSI Division

Field Length: 4

At a minimum, the CONTRACTOR shall assign one of the following values that best describe the division for the Work involved to complete the activity.

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0100</td>
<td>General Requirements</td>
</tr>
<tr>
<td>0200</td>
<td>Sitework</td>
</tr>
<tr>
<td>0300</td>
<td>Concrete</td>
</tr>
<tr>
<td>0400</td>
<td>Masonry</td>
</tr>
<tr>
<td>0500</td>
<td>Metals</td>
</tr>
<tr>
<td>0600</td>
<td>Wood and Plastics</td>
</tr>
<tr>
<td>0700</td>
<td>Thermal and Moisture Protection</td>
</tr>
<tr>
<td>0800</td>
<td>Doors and Windows</td>
</tr>
<tr>
<td>0900</td>
<td>Finishes</td>
</tr>
<tr>
<td>1000</td>
<td>Specialties</td>
</tr>
<tr>
<td>1100</td>
<td>Equipment</td>
</tr>
<tr>
<td>1200</td>
<td>Furnishings</td>
</tr>
<tr>
<td>1300</td>
<td>Special Construction</td>
</tr>
<tr>
<td>1400</td>
<td>Conveying Systems</td>
</tr>
<tr>
<td>1500</td>
<td>Mechanical</td>
</tr>
<tr>
<td>1600</td>
<td>Electrical</td>
</tr>
<tr>
<td>1700</td>
<td>Instrumentation</td>
</tr>
</tbody>
</table>
### MS

**Description:** Milestone Activity  
**Field Length:** 4

At a minimum, the CONTRACTOR shall assign a unique code for each Milestone required by the Contract Documents.

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project Award</td>
</tr>
<tr>
<td></td>
<td>Notice to Proceed</td>
</tr>
<tr>
<td></td>
<td>Mobilization</td>
</tr>
<tr>
<td></td>
<td>Construction Trailers Completion</td>
</tr>
<tr>
<td></td>
<td>Process Control System Completion</td>
</tr>
<tr>
<td></td>
<td>54”/66” Secondary Effluent Pipeline Completion</td>
</tr>
<tr>
<td></td>
<td>Plant 2 Secondary Effluent Pump Station and Flow Equalization Facilities Completion</td>
</tr>
<tr>
<td></td>
<td>Beneficial Occupancy</td>
</tr>
<tr>
<td></td>
<td>Substantial Completion as Established in Bid Form</td>
</tr>
<tr>
<td></td>
<td>Final Completion as Established in Bid Form</td>
</tr>
<tr>
<td></td>
<td>Permit Constraints</td>
</tr>
<tr>
<td></td>
<td>Facility shutdown or outage milestone requirements</td>
</tr>
</tbody>
</table>

### TIE

**Description:** Shutdown / Tie-In  
**Field Length:** 4

At a minimum, the CONTRACTOR shall assign a unique code for each Shutdown or Tie-In required to complete the Work.

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outages A through V identified individually per Section 01140</td>
</tr>
</tbody>
</table>
At a minimum, the CONTRACTOR shall assign a unique code for each significant area of the Work required by the Contract Documents.

<table>
<thead>
<tr>
<th>Code Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area 100 - Yard Piping</td>
</tr>
<tr>
<td></td>
<td>Area 144 – P2 Secondary Effluent Flow Equalization</td>
</tr>
<tr>
<td></td>
<td>Area 200 - Microfiltration</td>
</tr>
<tr>
<td></td>
<td>Area 300 – Green Acres Plant</td>
</tr>
<tr>
<td></td>
<td>Area 400 – Bulk Chemical Storage / Cartridge Filter Facility</td>
</tr>
<tr>
<td></td>
<td>Area 500 – RO Building</td>
</tr>
<tr>
<td></td>
<td>Area 600 – UV Facility</td>
</tr>
<tr>
<td></td>
<td>Area 700 – Decarbonation / Post Treatment</td>
</tr>
<tr>
<td></td>
<td>Area 800 – Product and Barrier Pump Station</td>
</tr>
<tr>
<td></td>
<td>Area 900 – Substation and Switchgear Building</td>
</tr>
</tbody>
</table>
APPENDIX C TO SECTION 01310
Activity ID System

The CONTRACTOR shall assign a unique identification number to each activity in the schedule to facilitate ease of reference and integration into the OCWD database. The CONTRACTOR shall prepare an Activity Identification Dictionary to provide a common key to the structure it employs following the examples provided below.

EXAMPLE ACTIVITY ID STRUCTURE

The 7th, 8th and 9th digits provide a unique designator
The 5th and 6th digit describes location / type detail
The 3rd and 4th digit refers to work type
The 1st and 2nd digit refers to primary work locations

The combination of symbols creates a unique reference ID that allows the same symbol to be used in more than one application.

EXAMPLE ACTIVITY IDENTIFICATION DICTIONARY
Scheduler shall coordinate with OCWD for more concise dictionary

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>Product / Barrier Pump Station</td>
<td>HV</td>
<td>HVAC</td>
</tr>
<tr>
<td>DP</td>
<td>Decarbonation / Post Treatment</td>
<td>JB</td>
<td>Junction Box</td>
</tr>
<tr>
<td>AD</td>
<td>Administration</td>
<td>MC</td>
<td>Mechanical</td>
</tr>
<tr>
<td>AR</td>
<td>Architectural</td>
<td>ME</td>
<td>Mechanical Equipment</td>
</tr>
<tr>
<td>GA</td>
<td>Green Acres Plant</td>
<td>MP</td>
<td>Mechanical Piping</td>
</tr>
<tr>
<td>MF</td>
<td>Microfiltration Facility</td>
<td>MS</td>
<td>Milestones</td>
</tr>
<tr>
<td>SU</td>
<td>Substation / Switchgear Building</td>
<td>PE</td>
<td>Primary Effluent</td>
</tr>
<tr>
<td>BW</td>
<td>Baffle Walls / Basement Walls</td>
<td>RC</td>
<td>RAS Chlorination</td>
</tr>
<tr>
<td>CB</td>
<td>Catch Basin</td>
<td>RO</td>
<td>RO Building</td>
</tr>
<tr>
<td>CD</td>
<td>Conduits</td>
<td>RW</td>
<td>Retaining Walls / Raw Water</td>
</tr>
<tr>
<td>CS</td>
<td>Bulk Chemical Storage / Cartridge Filter Facility</td>
<td>SB</td>
<td>CONTRACTOR Submittal</td>
</tr>
<tr>
<td>UV</td>
<td>UV Facility</td>
<td>SP</td>
<td>Site Prep</td>
</tr>
<tr>
<td>CM</td>
<td>Commissioning</td>
<td>ST</td>
<td>Structure</td>
</tr>
<tr>
<td>DB</td>
<td>Duct Bank / Diversion Box</td>
<td>SX</td>
<td>Site Excavation</td>
</tr>
<tr>
<td>DL</td>
<td>Drain Line</td>
<td>TI</td>
<td>Tie-In</td>
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<tr>
<td>DR</td>
<td>Demo / Removal</td>
<td>TL</td>
<td>Trunk Line</td>
</tr>
<tr>
<td>EL</td>
<td>Electrical</td>
<td>TN</td>
<td>Tunnel</td>
</tr>
<tr>
<td>FN</td>
<td>Foundation</td>
<td>XX</td>
<td>No further description</td>
</tr>
<tr>
<td>FD</td>
<td>Fabricate &amp; Deliver</td>
<td>YP</td>
<td>Yard Piping</td>
</tr>
<tr>
<td>SP</td>
<td>SEFE Pump Station</td>
<td>ST</td>
<td>SEFE Tanks</td>
</tr>
</tbody>
</table>
APPENDIX D TO SECTION 01310
Electronic File Naming

ELECTRONIC FILE NAMING

The CONTRACTOR shall assign a unique identification number to each electronic file submittal that will be compatible with the OCWD database. Each file shall be labeled with the OCWD project number, data date, submittal type abbreviation and file name as described below:

EXAMPLE FILE ID STRUCTURE (Primavera®)

The 17th and 18th digits record the revision, 00, 01, etc.
The 16th digit is left blank
The 15th digit records the submittal type P, D, F or T
The 14th digit is left blank
The 8th through 13th digits express the data date with 2 digits for the year, followed by 2 digits for the month followed by 2 digits for the day
The 7th digit is left blank
The 1st through 6th digits record the OCWD project number.

Submittal types are: Pure Progress: P, Draft Update: D, Final Update: F and TIA: T. The combination of symbols creates a unique ID for each file that can be integrated and managed within the OCWD database. An example would be P1-000 100608 F 00, which identifies Plant 1 project 000, data date June 08, 2010, Final Update, Revision 00.

EXAMPLE FILE NAMING STRUCTURE (Primavera®)

The file name shall be structured to reflect the file content in words as exemplified by the following illustration:

Project ID   Project Name
P1-000 100608 F 00   June 08, 2010 Update - FINAL Rev 00.xer

EXAMPLE FILE NAMING STRUCTURE

Non-Primavera® native files that comprise the balance of the submittal shall be named to reflect the file content in words as exemplified by the following illustrations:

June 08, 2010 Progress Update Narrative Report - FINAL Rev 00.docx
June 08, 2010 Progress Update Tables - FINAL Rev 00.xlsx (all MS Excel® report attachments shall be submitted in one workbook).
APPENDIX E TO SECTION 01310
Construction Schedule Update Preparation and Review

STEP 1 - INFORMAL UPDATE SUBMITTAL:
A. Electronic files:
   1. Unimpeded pure progress update of all work actually occurred during the update period saved in an electronic file entitled “Pure Progress”;
   2. Continuation of the update to include each proposed revision saved in an electronic file entitled “Draft Update”.
B. Printed Informal Update Submittal Report:
   1. Narrative Report including a Schedule Change Table describing each revision that actually took place during the update period, and each proposed revision for discussion and acceptance of by the ENGINEER. This shall also include the following:
      • Target Analysis Schedules comparing the Pure Progress file to the previous months authorized update file and comparing the Draft Update file to the Pure Progress Update file.

STEP 2 - REVIEW MEETING:
A. Review and comment on CONTRACTOR's periodic payment application
B. Review and comment on CONTRACTOR's update to critical path schedule
C. Review and comment on CONTRACTOR's actual and proposed schedule revisions
D. Identify problems that could impede planned progress, and assign action items along with responsible parties
E. Develop corrective measures and procedures to regain planned schedule.

STEP 3 - CONTRACTOR REVISION:
A. Revise the Narrative Report and Construction Schedule update as agreed at the meeting including the Schedule Change Table.

STEP 4 - FINAL UPDATE SUBMITTAL:
A. Revised electronic file incorporating only those comments agreed to by the ENGINEER, saved in an electronic file entitled “Update”;
B. Revised Narrative Report, Tables and Construction Schedule for validation of conformance with the ENGINEER’s meeting comments.

Orange County Water District
Plant 2 Secondary Effluent -30-
Pipeline Rehabilitation

01310 CONSTRUCTION PROGRESS SCHEDULE
April 2020
Issued for Bid
EXAMPLE CALENDAR - UPDATE PREPARATION AND REVIEW SEQUENCE:

The following example calendar illustrates the sequence of tasks required for the CONTRACTOR and ENGINEER to prepare, discuss and complete a review of the Narrative Progress Report and Construction Schedule update and facilitate a timely determination to support the payment application.

<table>
<thead>
<tr>
<th>Action</th>
<th>Day Dur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Date (Up to 2 Weeks Prior to Due Date)</td>
<td>0</td>
</tr>
<tr>
<td>Informal Review Submittal</td>
<td>7</td>
</tr>
<tr>
<td>Meeting - OCSD &amp; Contractor</td>
<td>0</td>
</tr>
<tr>
<td>Contractor - Update Preparation</td>
<td>7</td>
</tr>
<tr>
<td>Contractor - Revise &amp; Correct Submittal</td>
<td>4</td>
</tr>
<tr>
<td>OCSD Informal Review - Schedule</td>
<td>2</td>
</tr>
<tr>
<td>OCSD Analysis &amp; Report Preparation</td>
<td>7</td>
</tr>
<tr>
<td>OCSD Verify Revisions - Schedule</td>
<td>3</td>
</tr>
<tr>
<td>OCSD Informal Review - Payment Application</td>
<td>2</td>
</tr>
<tr>
<td>OCSD Verify Revisions - Payment Application</td>
<td>3</td>
</tr>
<tr>
<td>OCSD Complete &amp; Forward - Payment Application</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX F TO SECTION 01310
Time Adjustment Request

APPROACH

It shall be the CONTRACTOR’s sole responsibility to make a full, complete and comprehensive case for each time adjustment request. As part of its request the CONTRACTOR shall demonstrate that no concurrent cause would have equally impacted the Work regardless of OCWD action. The following outline provides an overview of requirements which the CONTRACTOR shall confirm with its own review of Contract Documents.

PREPARATION OF INDIVIDUAL TIME ADJUSTMENT REQUEST

Requests for time adjustments shall be submitted in the time and manner specified in the Contract Documents which require the CONTRACTOR to file a written request for time extension within 15 days “from the beginning of the delay” that includes, at a minimum:

1. A written Time Impact Analysis (TIA)

2. A Fragnet (fragmentary network) showing how the CONTRACTOR proposes to incorporate the change or delay into the current construction schedule.

3. The Contract Documents require the CONTRACTOR’s request for time extension to accompany either a:
   A. Request for Change (RFC) if initiated by the CONTRACTOR
   B. Request for Proposal (RFP) if initiated by OCWD

4. The CONTRACTOR is obligated to promptly request each time extension to inform the ENGINEER that the CONTRACTOR believes a discrete time impact affecting a milestone or contract completion date has been encountered, what steps the CONTRACTOR believes must be taken to mitigate it, and engage the ENGINEER in collaborative mitigation efforts as close in “real time” as possible.

5. The schedule in place at the start or occurrence of the impact event is to be used for analysis of all impacts encountered during the period in which the impact event occurs. For example, if an impact is encountered in April 2020, the schedule to be analyzed is the authorized March 2020 periodic update.

6. The CONTRACTOR shall describe its proposed mitigation plan in a written TIA accompanied by a Fragnet that illustrates the sequence of activities required to accomplish the plan in sufficient detail for the ENGINEER to fully understand the scope and magnitude of impact. The Fragnet shall also illustrate how the mitigation activities impact the critical path by including logic tie(s) to its immediate existing predecessor(s) and logic tie(s) to its immediate existing successor(s).

7. The CONTRACTOR is reminded that notice of potential delay shall be deemed insufficient to meet the requirements of the Contract and that reservation of rights to submit a future request may not be made at the sole discretion of the CONTRACTOR and shall be subject to ENGINEER’s written authorization.
TIA EVALUATION

OCWD utilizes contemporaneous period analysis for time impact evaluations as the method least susceptible to analyst manipulation, thus the most equitable to all parties. This methodology is reliant on timely submittal to ensure its integrity. The CONTRACTOR’s failure to make its submittal in the time and manner required by the Contract may impede effective and equitable evaluation of its assertion of time impact. Consequently, OCWD may be compelled to perform a forensic reconstruction of the event, including subjective speculation and assumptions, to more definitively assess the request.

The CONTRACTOR may find it expedient to prepare the TIA schedule (a parallel schedule) in conjunction with the Construction Schedule update. However, the CONTRACTOR shall submit it separately following the normal processes described in the Contract Documents. The review and status recommendation of the Construction Schedule update, in accordance with its accelerated seven-day review window, will take precedence over review and discussion of the TIA submittal.

OCWD will use the checklist provided in this section to initiate review of the CONTRACTOR’s request and confirm its compliance with Contract requirements before proceeding with a technical review. Should the CONTRACTOR’s request fail to meet Contract requirements the checklist will be returned to the CONTRACTOR with deficiencies noted and a request that the CONTRACTOR comply with the Contract in preparing its TIA.
**RFC/RFP: REVIEW CHECKLIST**

**IMPACT EVENT:** *Description*

<table>
<thead>
<tr>
<th>CONTRACT REQUIREMENT</th>
<th>YES</th>
<th>NO</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written Request:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• RFC:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• RFP:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Impact Event:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Start:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• End:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Request Provided Within 15 days:</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• Discovery Date:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Date TIA Submitted:</td>
<td></td>
<td></td>
<td>___ days after discovery</td>
</tr>
<tr>
<td>Evaluation Basis:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Actual - <em>use all available actual information</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Anticipated - <em>estimate if actuals are unavailable</em></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written TIA Demonstrating:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The events of the delay</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>• Status of construction at discovery of event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Event time computation of all activities affected by the change or delay.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fragnet:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Sequence of activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Logic tie(s) to existing predecessor(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Logic tie(s) to existing successor(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Status of construction at discovery of event</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Event time computation of all activities affected by the change or delay.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schedule Update:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Current at the time the change or delay is encountered DD:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• <em>Actual</em> performance of the Work extends:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Beyond current contract completion date</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>▪ Beyond current predicted completion date</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In accordance with the Contract a written request for extension of time or the granting of an extension of time shall not, in itself, constitute a basis for any claim against OCWD for additional compensation.*
APPENDIX G TO SECTION 01310
Contractor Deliverables

1.1 SUBMITTAL REQUIREMENTS

A. The CONTRACTOR shall submit the items required by Specification Section 01310 in accordance with this Appendix and the other Contract Documents unless noted otherwise herein.

B. Following Notice to Proceed (NTP) the CONTRACTOR shall submit the following items within the stipulated timeframes:

1. CONTRACTOR’s Construction Scheduler Qualifications, within seven days following NTP

2. CPM Construction Schedule methodology, within ten days following NTP

3. Work Breakdown Structure (WBS) Code, Activity Coding and ID system plans within ten days following NTP

4. Interim Construction Schedule, within 30 days following NTP

5. Commence submittal of the first three week look ahead schedule, within 30 days following NTP

6. Commence submittal of initial Daily Reports, dated from the start of onsite Work, within 30 days following NTP

7. Narrative Report supported by the Cost-loaded and Resource-loaded Baseline Construction Schedule, including supporting documents, within 90 days following NTP.

C. The CONTRACTOR’s Interim Construction Schedule shall be prepared, maintained and submitted in accordance with this Specification section and the other Contract Documents. It shall be submitted in both electronic and physical forms.

D. The CONTRACTOR’s Baseline Construction Schedule and reports shall be prepared, maintained and submitted in accordance with this Specification section and the other Contract Documents. It shall be submitted in both electronic and physical forms.

E. The CONTRACTOR’s Construction Schedule Update and reports shall be prepared, maintained and submitted in accordance with this Specification section and the other Contract Documents. It shall be submitted in conjunction with the CONTRACTOR’s Progress Period Payment Application and shall be in both electronic and physical forms.

F. The CONTRACTOR’s As-Built Construction Schedule shall be prepared, maintained and submitted in accordance with this Specification section and the other Contract Documents. It shall be submitted in both electronic and physical forms.

G. The CONTRACTOR’s Three Week Look Ahead Schedule shall be prepared, maintained and submitted in accordance with this Specification section and the other Contract Documents no later than 48 hours before each weekly construction
progress meeting. It shall be submitted in electronic form via e-mail or CD at the option of the ENGINEER.

1.2 REQUIRED REPORT SUBMITTAL CYCLES AND COMPONENTS

A. The CONTRACTOR shall include the following reports and report components with its submittals in the time, quantities and manner described in the following table and the other Contract Documents unless noted otherwise herein.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Format</th>
<th>Initial</th>
<th>Interim &amp; Baseline</th>
<th>Progress Reports</th>
<th>3 Week Look Ahead</th>
<th>Daily Reports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CPM</td>
<td>Update</td>
<td></td>
</tr>
<tr>
<td>Submittal Cycle</td>
<td>--</td>
<td>Per</td>
<td>Contract</td>
<td>28 Days</td>
<td>28 Days</td>
<td>Once Weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>As-Built</td>
<td></td>
<td>Daily</td>
</tr>
<tr>
<td>Electronic Files of Submittal Elements</td>
<td>CD</td>
<td>2 CD</td>
<td>2 CD</td>
<td>2 CD</td>
<td>2 CD</td>
<td>e-mail</td>
</tr>
<tr>
<td>Printed Report Components:</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>• Written Narrative Report</td>
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<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• OCWD Activities Report</td>
<td>8.5 x 11</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• Schedule Change Table</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• Cost Summary</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• Cost Curve</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• Critical Path Schedule</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• Four Week Look Ahead Schedule</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>• CPM Schedule</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>4 ea</td>
<td>--</td>
</tr>
<tr>
<td>Required Supplements:</td>
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<td></td>
</tr>
<tr>
<td>• [Price Breakdown]</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>• Schedule of Submittals</td>
<td>11 x 17</td>
<td>4 ea</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>• CPM Schedule Plot</td>
<td>30 x 42</td>
<td>1 ea</td>
<td>--</td>
<td>1 ea</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>• CPM Logic Diagram Plot</td>
<td>30 x 42</td>
<td>1 ea</td>
<td>--</td>
<td>1 ea</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

1.3 REPORT COMPONENTS

A. The CONTRACTOR shall provide electronic files for all components of each submittal required by this Specification section. The files shall include all templates used by the CONTRACTOR with screen shots of each for reference. The CONTRACTOR shall name and label its electronic files in accordance with the file naming convention appended to this Specification section.

B. The CONTRACTOR shall provide printed and bound reports in the quantities and format described in this Specification section and the other Contract Documents. The reports shall be prepared using Arial font no smaller than 10 points, be divided by component section tabs and be bound in new three ring binders. 11” x 17” pages shall be tri-folded to match the 8.5” x 11” pages.
C. At a minimum, report components shall be comprised of and contain the following:

1. Narrative Report with content as described in this Specification section and as illustrated by Plate 1;

2. OCWD Activities Report, shall be generated by the CONTRACTOR from the scheduling software to list each remaining activity on the CPM Schedule which requires OCWD action such as power supplied equipment, plant shutdowns, permits, inspections, approvals, start-ups, training activities, etc., as illustrated by Plate 4;

3. Schedule Change Table, shall be prepared by the CONTRACTOR in an MS Excel® spreadsheet to describe each Schedule activity that has been added or deleted or had a change in planned sequence, duration, logic and/or relationship(s) during the reporting period as illustrated by Plate 2;

4. Cost Summary, shall be generated by the CONTRACTOR from the scheduling software to support each progress payment application to the requisition level of detail. The cost information shall be updated by activity and summarized for each monthly pay application and the sum of all pay applications shall be shown as costs to date, along with the remaining contract balance. The sum of all monthly costs shall be equal to the Contract Price plus approved Change Orders;

5. Cost Curve, shall be generated by the CONTRACTOR from the scheduling software to show cash flow projections by month and include actual partial payment amounts and cumulative total;

6. Critical Path Schedule shall be a Gantt chart generated by the CONTRACTOR from the scheduling software, sorted by start date and show Logic Ties;

7. Four Week Look-Ahead Schedule, shall be a Gantt Chart generated by the CONTRACTOR from the scheduling software, in WBS form sorted by Start Date (SD) and showing all Work planned by the CONTRACTOR for the next progress reporting period;

8. CPM Schedule shall be a Gantt chart generated by the CONTRACTOR from the scheduling software, in WBS form sorted by Start Date (SD). At a minimum the activity table shall include activity ID number, activity description, original durations, start date, finish date, total float and activity constraints.

D. Required Supplemental Submittals:

1. Price Breakdown shall be prepared and submitted by the CONTRACTOR as provided for in the Contract Documents.

2. Schedule of Submittals shall be prepared and submitted by the CONTRACTOR as provided for in the Contract Documents.

3. Three Week Look Ahead shall be prepared and submitted by the CONTRACTOR in an MS Excel® spreadsheet as provided for in this Specification section and the other Contract Documents and shall, at a minimum, provide the data illustrated in Plate 3.
4. CONTRACTOR Daily Reports shall be prepared and submitted by the CONTRACTOR as provided for in the Contract Documents.

5. CPM Schedule Plot shall be a Gantt chart generated by the CONTRACTOR from the scheduling software, in WBS form sorted by Start Date (SD). At a minimum the activity table shall include activity ID number, activity description, original durations, start date, finish date, total float and activity constraints. The CONTRACTOR shall submit a plot of the schedule on 30” x 42” sheets of the Baseline, at 25%, 50%, 75% completion and of the As-Built submittal, and as directed by the ENGINEER for any major re-sequencing, logic revision, re-baseline and/or integration of the commissioning plan.

6. CPM Logic Diagram Plot shall be a Precedence Diagram generated by the CONTRACTOR from the scheduling software, using the Activity Network icon. At a minimum the activity table shall include the Activity ID, Activity Name, Start Date and Finish Date. The CONTRACTOR shall submit a plot of the diagram on 30” x 42” sheets of the Baseline, at 25%, 50%, 75% completion and of the As-Built submittal, and as directed by the ENGINEER for any major re-sequencing, logic revision, re-baseline and/or integration of the commissioning plan.

1.4 EXAMPLE PLATES

A. At its option, the CONTRACTOR shall use its own forms or the templates available from OCWD to report, at a minimum, the required data illustrated in the following example plates:

- Plate 1 - Example Narrative Report
- Plate 2 - Schedule Change Table
- Plate 3 - Three Week Look-Ahead
- Plate 4 - OCWD Activities Report
1. GENERAL.

1.01. Units of Measurement. When both inch-pound (English) and SI (metric) units of measurement are specified herein, the values expressed in inch-pound units shall govern.

2. SCHEDULE OF VALUES. After review of the preliminary schedule at the preconstruction conference, and before submission of the first Application for Payment, Contractor shall prepare and submit to Engineer a Schedule of Values covering each lump sum item. The Schedule of Values, showing the value of each kind of work, shall be acceptable to Engineer before any Application for Payment is prepared.

The sum of the items listed in the Schedule of Values shall equal the Contract Price. Such items as Bond premium, temporary construction facilities, and plant may be listed separately in the Schedule of Values, provided the amounts can be substantiated. Overhead and profit shall not be listed as separate items.

The Schedule of Values shall have sufficient detail such that partial completion of separable items of work can easily be calculated. The Schedule of Values shall have separate lines for manufacturer's field services, O&M manuals, and performance testing for each item of equipment requiring such services. Payment for submittals (other than O&M Manuals) will not be approved.

An unbalanced Schedule of Values providing for overpayment of Contractor on items of Work which would be performed first will not be accepted. The Schedule of Values shall be revised and resubmitted until acceptable to Engineer. Final acceptance by Engineer shall indicate only consent to the Schedule of Values as a basis for preparation of applications for progress payments, and shall not constitute an agreement as to the value of each indicated item.

3. SCHEDULE OF PAYMENTS. Within 30 days after award of contract, Contractor shall furnish to Engineer a schedule of estimated monthly payments. The schedule shall be revised and resubmitted each time an Application for Payment varies more than 10 percent from the estimated payment schedule.

4. SURVEY DATA. All field books, notes, and other data developed by Contractor in performing surveys required as part of the Work shall be available to Engineer for examination throughout the construction period. All such data
shall be submitted to Engineer with the other documentation required for final acceptance of the Work.

5. **LAYOUT DATA.** Contractor shall keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Copies of such data shall be furnished to the Construction Manager for use in checking Contractor's layout as provided in the project requirements section. All such data considered of value to Owner will be transmitted to Owner by Engineer with other records upon completion of the Work.

End of Section
REQUESTS FOR INFORMATION AND CLARIFICATIONS

1. GENERAL. Should the Contractor discover conflicts, omissions, or errors in the contract documents, or have any questions concerning interpretation or clarification of the contract documents, or if it appears to the Contractor that work to be done or any matter relative thereto are not sufficiently detailed or explained in the contract documents, then, before proceeding with the work affected, the Contractor shall immediately notify the Engineer in writing and request interpretation, clarification, or additional detailed instructions concerning the work. In addition to the requirements set forth in the General and Special Provisions, this section details additional procedural requirements for Requests for Information (RFI) and Clarifications.

The Contractor shall be responsible for its costs to implement and administer RFI’s throughout the Contract duration. Regardless of the number of RFI’s submitted, Contractor will not be entitled to additional compensation.

A RFI is not to be used for request for materials/equipment substitutions or value engineering/cost reduction incentive proposals.

2. RFI PROCEDURES.

2-1. Contractor Review and Submittal.

   A. Contractor’s review:

   Before submitting each RFI, the Contractor shall carefully review the following for relevant information:

   1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto

   2. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work

   3. All information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto

   4. The coordination of each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents
5. The Contract Documents
6. The Project correspondence and documentation

B. Submittal requests:

The Contractor shall submit all requests for clarification and/or additional information in writing through the Engineer. Contractor shall provide a detailed written statement that indicates the specific Drawings or Specifications in need of clarification and the nature of the clarification requested.

Contractor shall upload RFI electronically on project website and inform Engineer. Each RFI shall be dated and bear a signed certification that Contractor has performed the review defined above. No consideration for review by Engineer of any RFI will be made for any item which has not been certified by the Contractor. All non-certified RFI’s will be returned to Contractor without action taken by Engineer, and any delays caused thereby shall be the total responsibility of Contractor.

Each RFI shall be limited to one subject.

2-2. RFI Numbering System.

The Engineer will assign blocks of numbers for the Contractor, Engineer, Owner’s Representative, and for substitutions. The Contractor will use the block of numbers consecutively with the date of issue, except for re-issuance of a respective RFI in which the subscript A, B, C, etc., will be added until the RFI is resolved. If Contractor believes the RFI reviewer’s response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter "A" indicating if it is a follow-up RFI) to Engineer clarifying original RFI. Additionally, Engineer may return RFI requesting additional information should original RFI be inadequate in describing condition.

End of Section
1. CONSTRUCTION PHOTOGRAPHS BY CONTRACTOR. Contractor shall be responsible for the production of construction photographs as provided herein. Engineer shall designate the subject of each photograph. Photographs before, during and after construction are an important record of site conditions, construction progress, as-built features and significant planned/unplanned events. The Contractor is to employ a competent photographer to record this important factual information. Contractor shall be responsible for the production of construction photographs as provided herein. Engineer shall designate the subject of each photograph. All construction photographs shall be provided in both print and digital format per the requirements in this section.

1-1. Pre-Construction Photographs. The Contractor shall provide one hundred (100) pre-construction photographs prior to commencement of Work on the along the 66” pipeline alignment.

Preconstruction photographs shall be taken at locations to be designated by the Engineer. These photographs shall be submitted prior to beginning construction.

1-2. During Construction Photographs. The Contractor shall provide construction color photographs showing the progress of the Work. Contractor shall take photos of all Work prior to being buried or covered, including piping, fittings, transitions, tie-ins and valves. Contractor shall take photos of any significant planned or unplanned events. Contractor shall also take photos from the same five locations at monthly intervals to record progress of work from same vantage points. These vantage points will be determined by the Engineer.

A minimum of sixty (60) photographs shall be provided every month during construction. Photographs shall be submitted with each month’s Application for Payment.

1-3. Post-Construction Photographs. Upon acceptance of the Work, the Contractor shall provide one hundred (100) photographs of the Work where directed by the Engineer. Post-construction photographs shall be taken at locations to be designated by the Construction Manager. These photographs shall be submitted as part of Contract Closeout.
2. DELIVERABLE PRODUCTS.

2-1. Prints.

A. Color:
   1. Paper: Single weight, first quality, fine grain, minimum resolution 100 lines per inch.
   2. Finish: Smooth surface, glossy.
   3. Size: 4-inch x 6-inch minimum.

B. Identify Each Print on Adhesive Label Placed on Front:
   1. Name of project.
   2. Orientation of view.
   3. Date and time of exposure.
   4. Photo number
   5. Negative identification.

C. Prints shall be indexed chronologically and provided in a three-ring binder with transparent protective sleeves intended for storage of photographs.

D. Provide 8-1/2” x 11” color printed page with thumbnail views and file name identification for each photo. All printed pages shall be indexed chronologically and provided in a three-ring binder.

2-2. Digital. Digital images shall be compiled on CD and provided with a descriptive index of the images. All CD’s shall be labeled and protected in an individual plastic case.

End of Section
1. CONTRACTOR’S QUALITY CONTROL.

1-1. General. The Contractor is to ensure that products, services, workmanship and Site conditions comply with the requirements of the Contract Documents by coordinating, supervising, testing and inspecting its Work. The Contractor shall utilize only suitably qualified, skilled and trained personnel experienced in the tasks required to complete the Work in accordance with the quality requirements of the Contract Documents. Should there be no quality basis specifically prescribed for any portion of the Work, the quality and testing procedures shall be in accordance with the best-accepted practices of the construction industry in the State of California, for projects of this type, or standards set by engineering or technical societies (e.g. ASTM or ASHRAE), whichever is more stringent.

1-2. Quality of Work. The Contractor’s quality of Work shall include, but not be limited to, the following requirements:

A. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects, and fit for the intended use.

B. Quality of installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements, as shown on or required by Contract Documents.

C. Protection of Completed Work: Take all measures necessary to preserve completed Work free from damage, deterioration, soiling, and staining, until acceptance by Owner.

D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting, and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's instructions and Recommendations: Secure Owner's advanced written consent. Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including
acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.

F. Verification of Quality: All Work shall be subject to verification of quality by Owner in accordance with provisions of the Contract Documents.

1-3. **Defective Work.** Defective Work shall be modified, replaced, repaired or redone by the Contractor at the Contractor's expense as described in the General and Special Provisions to the satisfaction of the Engineer.

2. **INSPECTION AND TESTING.** Additional requirements for tests are described in the Testing, Startup and Training Requirements section and other Technical Specifications of these Contract Documents.

2-1. **General.** Where the Contract Documents require work to be field tested or approved, it shall be tested in the presence of the Engineer or its authorized representative. The Engineer shall have the right to witness all on-site tests performed by the Contractor and any shop tests. The results of any tests performed by the Contractor shall be made available for the information of the Engineer. Inspections, tests or favorable reviews by the Engineer or others shall not relieve the Contractor from its obligation to perform the work in accordance with the requirements of the Contract Documents or for its sole responsibility for the quality of workmanship and materials.

Except as specifically required under the technical specifications for testing and inspection, all tests for materials furnished by the Contractor will be done in accordance with commonly recognized standards of national organizations approved by the Engineer. Where tests are to be performed by the Engineer or by an independent laboratory or agency, the Contractor shall furnish such samples of all materials as required by the Engineer without charge.

The sample or samples of materials to be tested shall be selected by such laboratory or agency, or the Engineer, and not by the Contractor. No material for which the Contract Documents require the submittal and approval of tests, certificates of compliance or other documentation shall be incorporated in the Work until such submittal has been made and approved. The Contractor shall provide safe access, including plants where materials or equipment are manufactured or fabricated, for the Engineer and inspectors to adequately inspect the quality of work and the conformance with the Contract Documents. The Contractor shall furnish the Engineer the necessary labor and facilities for such things as excavation in the compacted fill to the depths required to take samples. The Contractor shall provide adequate lighting, ventilation, ladders and other protective facilities as may be necessary for the safe performance of inspections.
Upon completion of the Work the Engineer will conduct a final inspection. Records shall be available at all reasonable hours for inspection by other local or State agencies to ascertain compliance with laws and regulations.

Neither the employment of independent testing and inspection agency nor observations or tests by Owner and Owner’s consultants shall in any manner relieve the Contractor of obligation to perform Work in full conformance to all requirements of the Contract Documents. The Owner reserves the right to reject all Work not in conformance to the requirements of the Contract Documents, or otherwise Defective.

2-2. Notice. The Contractor shall notify the Engineer in writing at least forty-eight (48) hours before any field testing or special inspections are required to be performed by the Engineer or independent laboratory furnished by the Owner. The Contractor shall notify the Engineer at least two hours before any inspection is required to be performed or to witness the Contractor’s on-site field testing.

Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give due notice to the Engineer so that proper inspection may be provided. Any work done in the absence of the Engineer shall be considered to be rejected. It will be the responsibility of the Contractor to demonstrate to the satisfaction the Engineer that the work meets all conditions of the specification and if such conditions are not met to remove the work at the Contractor’s expense.

The Contractor shall give the Engineer written notification at least thirty (30) days prior to the shipment of materials and equipment to be tested and/or inspected at the point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or re-inspection at the site of the Work.

2-3. Work Covered Prior to Inspection and/or Testing. Work requiring inspection and/or testing shall not be concealed or buried prior to the acceptance of such inspection or testing. Work covered without the favorable review or consent of the Engineer shall, if required by the Engineer, be uncovered for inspection and/or testing at the Contractor's expense.

2-4. Work Covered With Prior Inspection and/or Testing. If the Engineer considers it necessary or advisable that covered work which was favorably inspected and tested be uncovered for re-inspection and/or retesting, the Contractor, at the Engineer’s request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the Contractor will bear all expenses of such uncovering, exposure, observation, inspection and testing.
and of satisfactory reconstruction. If, however, such work is not found to be
defective the Contractor will be allowed an increase in the Contract price or an
extension of the Contract time, or both, directly attributable to such uncovering,
exposure, observation, testing and reconstruction, and a Change Order shall be
issued for such additional work.

2-5. **Special Tests and Inspections.** As provided for in the Contract Documents,
laws and regulations, specialized tests and inspections shall be performed by
special inspectors certified by the International Conference of Building Officials
(ICBO). Unless otherwise stated in the Contract Documents, each of these tests
will be performed on site and paid for by the Owner.

2-6. **Inspections and Tests by Serving Utilities.** Unless otherwise indicated in the
Contract Documents, the Contractor shall cause, schedule and conduct
inspections and tests by serving Utilities required for the Work under this
Contract.

2-7. **Inspections and Tests by Serving Manufacturers.** Unless otherwise
indicated in the Contract Documents, the Contractor shall cause all required tests
and inspections to be conducted by materials, equipment or systems
manufacturers. Additionally, all tests and inspections required by materials,
equipment or systems manufacturers as conditions of warranty or certification of
Work shall be made, the cost of which shall be included in the Contractor’s bid.

Each manufacturer’s representative shall furnish to Owner, through Contractor, a
written report certifying that the equipment has been properly installed and
lubricated; is in accurate alignment; is free from any undue stress imposed by
connecting piping or anchor bolts; and has been operated under full load
conditions and that it operated satisfactorily.

All costs for these services shall be included in the Contract Price.

2-8. **Offsite Inspection.** When the Contract Documents require inspection of
material or equipment during the production, manufacturing, or fabricating
process, or before shipment, such services will be performed by Owner or an
independent testing firm or inspection organization acceptable to Owner. The
Contractor shall note that offsite inspection is not considered factory witness
testing, which is described in the Testing, Startup and Training Requirements
section and select equipment specifications.

Contractor shall require the producer, manufacturer, or fabricator to arrange for
and pay an independent organization to perform the inspection services specified
herein the Contract Documents.

Owner shall send a representative to the factory or shop to review the assembly
and witness the factory testing and performance for the equipment specified.
Contractor shall give appropriate written notice to Owner not less than 10 days before offsite inspection services are required, and shall provide for the producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.

The inspection organization will submit a written report to Owner, with a copy to Contractor, at least once each week.

2-9. Transmittal of Test Reports. Written reports of tests and engineering data furnished by Contractor for Owner’s review of materials and equipment proposed to be used in the Work shall be submitted as specified for Shop Drawings.

The laboratory retained by Owner will furnish four copies of a written report of each test. Three copies of each test report will be transmitted to the Owner and one copy to Contractor, within 3 days after each test is completed.

End of Section
1. OFFICE AT SITE OF WORK. During the performance of this Contract, Contractor shall maintain a suitable office at or near the Site which shall be the headquarters of its representative authorized to receive drawings, instructions, or other communication or articles. Any communication given to the said representative or delivered at Contractor's office at the Site in the representative's absence shall be deemed to have been delivered to Contractor.

Copies of the Drawings, Specifications, and other Contract Documents shall be kept at Contractor's office at the Site and available for use at all times.

Contractor shall pay all electricity, water, sewer, cleaning services, cable, and heating bills and shall provide telephone and internet service to the Contractor's field office.

The Contractor shall coordinate the laydown/staging area with OCWD/OCSD (location tbd). 5,000 sq. ft will be provided for laydown/staging.

2. CONSTRUCTION WATER. Owner will furnish, with charge to the Contractor, potable water required for and in connection with the Work to be performed within the pipeline alignment at a connection to the OCWD existing water supply system on the south side of the UV Facility (Area 610). See approximate location on Drawing G-05.

OCSD will furnish, with charge to the Contractor, potable water required for and in connection with the Work to be performed on the OCSD Plant 2 site at a connection to a fire hydrant located near the northwest side of TFSC Clarifier F. See approximate location on Drawing G-05.

The maximum volume of water available at these locations will be up to half (0.5) million gallons per day at a cost of $150 per acre-foot.

Contractor shall use a flowmeter when connected to the OCWD and OCSD systems.

The Contractor shall install an approved Backflow Prevention System at each of the connection points along with a flow meter with totalizer to track water usage. Contractor shall be responsible for transporting water from the designated connection point location to the location of use. The Backflow Prevention System shall be approved by the Engineer, Owner, and OCSD.
Contractor shall furnish necessary pipe, hose, nozzles, meter, and tools and shall perform all necessary labor. Contractor shall make arrangements with the Owner as to the amount of water required and the time when the water will be needed. Unnecessary waste of water will not be tolerated.

The Contractor may make any other arrangements with the City of Huntington Beach or City of Fountain Valley for the purchase of water.

3. CONSTRUCTION POWER. Power required for and in connection with the Work to be performed shall be provided by the Contractor.

Contractor shall provide sufficient standby power and automatic power transfer to provide continuous operation of all dewatering systems in the event of an outage.

Contractor shall provide all power for heating, lighting, operation of Contractor’s plant or equipment, or for any other use by Contractor. Temporary heat and lighting shall be maintained until the Work is accepted.

The Contractor shall comply with the City of Huntington Beach and City of Fountain Valley on noise limits associated with the Work and dewatering power system.

4. VOICE AND DATA SERVICES. Contractor shall make all necessary arrangements and pay all installation charges and monthly or periodic service for voice and data lines in its offices at the Site.

Contractor shall verify the availability and costs of telecommunications service at and near the site with the local telecommunications provider. The Contractor is responsible for all costs associated with installing and maintaining telephone and data communications.

It shall be the Contractor’s responsibility, and at its own cost, to route and install cable and new telephone poles if service is required further inside within the plant.

5. SANITARY FACILITIES. Contractor shall furnish temporary sanitary facilities at the Site, as provided herein, for the needs of all construction workers and others performing work or furnishing services on the Project.

Sanitary facilities shall be of reasonable capacity, properly maintained throughout the construction period, and obscured from public view to the greatest practical extent. If toilets of the chemically treated type are used, at least one toilet will be furnished for each 20 persons. Contractor shall enforce the use of such sanitary facilities by all personnel at the Site.
6. CONSTRUCTION AIDS. Contractor shall furnish, install, maintain, and operate all construction aids required by it and its Subcontractors in the performance of the Work, except as otherwise provided herein.

Contractor shall provide construction aids necessary for the performance of work by other contractors on the Project. Such construction aids shall be suitable for conditions encountered and shall include:

A. Railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Construction hoists, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.

C. Temporary supports with adequate safety factor to assure adequate load bearing capability under all construction conditions.

When requested, submit design calculations by professional registered engineer prior to application of loads. Submitted design calculations are for information and record purposes only.

D. Accident Prevention:
   1. Exercise precautions throughout construction for protection of persons and property in accordance with this Section and the Contract Documents.
   2. Guard machinery and equipment, and eliminate other hazards.
   3. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
   4. Before commencing construction Work, take necessary action to comply with provisions for safety and accident prevention.

E. Warning Devices and Barricades:
   1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
   2. Provide barriers with flashing lights after dark.
   3. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.
   4. Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers.
5. Warning devices shall conform to OSHA and State agency requirements, which administers OSHA regulations where the Project is located.

F. Hazards in Public Right-of-Way:

1. Mark at reasonable intervals trenches and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours.
   During hours of darkness, provide markers with flashers, or other adequate lights.

2. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades.
   During hours of darkness, provide warning lights at close intervals.

G. Hazards in Protected Areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.

H. Above Grade Protection: On multi-level structures, provide safety protection that meets requirements of OSHA and State agency which administers OSHA regulations where the Project is located.

I. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from damage or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.

Construction aids shall be furnished without charge to the other contractors, and all necessary erection, maintenance, and operating personnel shall be included. In the event of conflict, the contractor furnishing the equipment shall determine priorities in the best interest of the Project.

The use of plant equipment, whether furnished and installed under this Contract or not, including elevators, shop cranes, heating, ventilating, air conditioning, and plumbing fixtures, shall be only with Owner's written permission.

7. MAINTENANCE OF TRAFFIC. Contractor shall conduct its work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when
Contractor has obtained permission from the owner and tenant of private property, or from the authority having jurisdiction over public property involved, to obstruct traffic at the designated location.

In making open-cut street crossings, Contractor shall not block more than one-half of the street at a time. Whenever possible, Contractor shall widen the shoulder on the opposite side to facilitate traffic flow. Temporary surfacing shall be provided as necessary on shoulders.

Contractor shall under no circumstances use residential tract streets adjacent to the Project site for stockpiling construction materials or equipment or for access to the Work site or for parking.

7.01. **GWRS and Plant 1 Site Access.** All construction traffic, including, but not limited to, Contractor's employees, subcontractors, and deliveries of equipment and materials shall use the second access road from Garfield Avenue through the south entrance on Orange County Sanitation District's property to the plant site. The Contractor may need to coordinate access through this entrance with the Contractor at Orange County Sanitation District if construction is continuing at the adjacent site.

No construction traffic will be allowed on Ward Street or Ellis Street.

7.02. **Plant 2 Site Access.** All construction traffic, including, but not limited to, Contractor's employees, subcontractors, and deliveries of equipment and materials shall use the Banning construction access gate from Brookhurst Street as shown on the drawings. Contractor shall provide security at this access gate as specified in the Site Security section.

7.03. **Detours.** Where required by the authority having jurisdiction that traffic be maintained over any construction work in a public street, road, bike trail, or highway, and the traffic cannot be maintained on the alignment of the original roadbed or pavement, Contractor shall, at its own expense, construct and maintain a detour around the construction work. Each detour shall include a bridge across the pipe trench and all necessary barricades, guardrails, approaches, lights, signals, signs, and other devices and precautions necessary for protection of the Work and safety of the public.

8. **BARRICADES AND LIGHTS.** All streets, roads, highways, bike paths, and other public thoroughfares which are closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.
All open trenches and other excavations shall have suitable barricades, signs, and lights to provide adequate protection to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

All barricades and obstructions shall be illuminated with warning lights from sunset to sunrise. Material storage and conduct of the Work on or alongside public streets and highways shall cause the minimum obstruction and inconvenience to the traveling public.

All barricades, signs, lights, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, where within railroad and highway rights-of-way, as required by the authority having jurisdiction. Warning devices, at a minimum, shall conform to the requirements of Cal/OSHA.

9. **FENCES.** All existing fences affected by the Work shall be maintained by Contractor until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use. Gates shall be kept closed and locked at all times when not in use.

On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original locations.

10. **PROTECTION OF PUBLIC AND PRIVATE PROPERTY.** Contractor shall protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by its construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, trails, and medians, shall be restored to their original condition, whether within or outside the easement. All replacements shall be made with new materials.

No trees shall be removed outside the permanent easement, except where authorized by Engineer. Whenever practicable, Contractor shall tunnel beneath trees in yards and parking lots when on or near the line of trench. Hand excavation shall be employed as necessary to prevent injury to trees. Trees left standing shall be adequately protected against damage from construction operations.
Contractor shall be responsible for all damage to streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work or any part or site thereof, whether by Contractor or its Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, the damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage.

All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

A residential community garden is located at approximate STA 134+00 to STA 140+00. Additional measures shall be taken to mitigate dust and provide safe access to garden users.

11. **DAMAGE TO EXISTING PROPERTY.** Contractor will be held responsible for any damage to existing structures, Work, materials, or equipment because of his operations and shall repair or replace any damaged structures, Work, materials, or equipment to the satisfaction of, and at no additional cost to, Owner. Contractor shall protect all existing structures and property from damage and shall provide bracing, shoring, or other work necessary for such protection.

12. **TREE AND PLANT PROTECTION.** All trees and other vegetation which must be removed to perform the Work shall be removed and disposed of by Contractor; however, no trees or cultured plants shall be unnecessarily removed unless their removal is indicated on the Drawings. All trees and plants not removed shall be protected against injury from construction operations.

Trees considered by Engineer to have any significant effect on construction operations are indicated on the Drawings and those which are to be preserved are so indicated.

Contractor shall take extra measures to protect trees designated to be preserved, such as erecting barricades, trimming to prevent damage from construction equipment, and installing pipe and other Work by means of hand excavation or tunneling methods. Such trees shall not be endangered by stockpiling excavated material or storing equipment against their trunks.

When injuring or removal of trees designated to be preserved cannot be avoided, or when removal and replacement is indicated on the Drawings, each tree injured beyond repair or removed shall be replaced with a similar tree of the nearest size possible.
All trimming, repair, and replacement of trees and plants shall be performed by qualified nurserymen or horticulturists.

13. **ACCESS ROADS.** Contractor shall establish and maintain temporary access roads to various parts of the Work as required to complete the Project. Such roads shall be available for the use of all others performing work or furnishing services in connection with the Project.

A. General:
1. The Contractor shall maintain access roads in accordance with this Section, the Contract Drawings, and the General Requirements section.
2. Build and maintain dust free roads, which are suitable for travel at 20 miles per hour.

B. On-site Access Roads:
1. Maintain access roads to storage areas and other areas to which frequent access is required.
2. Maintain similar roads to existing facilities on site of the Work to provide access for maintenance and operation.
3. Protect buried vulnerable utilities under temporary roads with steel plates, wood planking, or bridges.
4. Maintain on-site access roads free of dirt and mud. Under no circumstances shall vehicles leaving the sites track dirt or mud off the site onto the public right-of-way.
5. The Contractor shall provide flagmen to control traffic where construction traffic and OCSD or public traffic share the same roadway.

14. **PARKING.** Contractor shall provide and maintain suitable parking areas for the use of all workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, Owner's operations, or construction activities.

Contractor may be required to, at its own cost, make its own arrangements for off-site parking and storage provided the locations shown on the Drawings are not sufficient for the Contractor.

15. **DUST CONTROL.** Contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with
water or by application of a chemical dust suppressant. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing dust.

Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

16. **TEMPORARY DRAINAGE PROVISIONS.** Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.

Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

Water for flushing and disinfection work, and water used for hydrostatic testing of structures, shall be treated as specified and properly discharged by Contractor. Contractor shall be responsible for obtaining a discharge permit.

17. **EROSION CONTROL.** Contractor shall prevent erosion of soil on the Site and adjacent property resulting from its construction activities. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operation that will disturb the natural protection.

Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

18. **POLLUTION CONTROL.** Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.
19. **TEMPORARY LIGHTING.** Contractor shall provide temporary lighting in all work areas sufficient to maintain a lighting level during working hours not less than the lighting level required by Cal/OSHA standards. As permanent lighting facilities are completed, they may be used in lieu of temporary facilities, provided however, that bulbs, lamps, or tubes of such facilities used by the Contractor shall be replaced prior to final acceptance of the Work.

20. **HEATING AND VENTILATION.** Contractor shall provide means for heating and ventilating all work areas as may be required to protect the Work from damage by high temperatures, weather, or to provide a safe environment for workers. Un-vented direct fired heaters shall not be used in areas where freshly placed concrete will be exposed to the combustion gases until at least two (2) hours after the concrete has attained its initial set.

21. **CHEMICALS AND ENERGY.** Owner will provide chemicals, water, and energy required for testing and regular operation of the expanded Plant and Flow Equalization facilities as described in the Testing, Startup and Training Requirements section. Contractor shall notify the Engineer forty-five (45) days prior to any startup activities to allow the Owner time to order chemicals and have them delivered to the site for startup procedures.

Contractor shall furnish all additional chemicals required for other uses (i.e., disinfection activities following construction) and not specifically for regular operation of the plant.

End of Section
Section 01550

OCSD - VEHICULAR ACCESS, STORAGE AREA AND SECURITY

PART 1 - GENERAL

1-1. THE REQUIREMENT.

A. This Specifications section applies to work all Work areas.

B. Protect Work, existing premises, and OCSD’s operations from theft, vandalism, and unauthorized entry.

C. The Contractor shall initiate a security system program to coordinate with OCSD’s existing security system and Project No. J-117B, P2-122, P2-110, and GWRS-2019-01 contractors at mobilization.

D. Maintain program throughout construction period as specified herein.

1-2. RELATED WORK SPECIFIED ELSEWHERE.

A. The requirements of the following Specifications sections and divisions apply to the Work of this Specifications section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. 01300 Submittal

1-3. CONTRACTOR SUBMITTALS.

A. General: Submittals, including samples of materials, shall be in accordance with the Submittal section as indicated herein.

B. The Contractor shall submit a security plan and map (or series of maps) indicating, as a minimum, the following items:

1. Staging of construction as it relates to traffic flow
2. Entrance gate to be used
3. Location of trailers
4. Laydown area
5. Employee parking
6. Storage
7. Traffic control plans and emergency routes to be maintained
1-4. **EMPLOYEE SHUTTLE ROUTING CLOSURE OF ACCESS ROADS WITHIN PLANT.**

   A. The Contractor shall minimize the inconvenience and minimize the time period that access roads will be closed.

   B. If closure of any access road is required during construction, the Contractor shall apply in writing to the Engineer at least fourteen (14) Days in advance of the required closure and provide proposed detours for consideration.

1-5. **CONTRACTOR’S WORK AND STORAGE AREA.**

   A. No equipment or material storage will be allowed within the public right-of-way.

   B. Contractor’s construction and staging areas, and access routes are shown on Drawings C-01 and C-03.

   C. At completion of the Work, the Contractor shall return these areas to their original condition, including grading and landscaping.

   D. The Contractor shall make its own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the Work.

1-6. **CONTRACTOR ACCESS GATE AND SECURITY.**

   A. The Contractor shall access the site only through the Banning Gate on Brookhurst Street and shall comply with all OCSD security procedures.

   B. Access and use of the Banning Gate will be shared with OCSD, J-117B contractor, P2-122 contractor, the GWRS-2019-01 contractor and other OCSD contractors. The Contractor shall not allow the staging of delivery or construction vehicles in a manner that blocks or unduly restricts access via the Banning Gate to other users thereof.

   C. Gate staffing and security will be provided through other project contractors; however, the Contractor shall comply with all OCSD security requirements and any additional special requirements by the other project’s contractor.

   D. Gate staffing and security will be provided from 6:30 AM to 3:30 PM Monday through Friday. The Contractor shall include in the Bid the cost of providing guard services at the Plant No. 2 Banning Gate for Work outside of these hours.
E. Should any of the Contractor’s operations require temporary closing of the Banning Gate entrance, the gate staffing and security shall be relocated to the Bushard Gate for the duration of the outage and the same security provisions as specified above shall apply with costs therefor to be borne by the Contractor for the duration of the Banning Gate outage. The maximum duration of the Banning Gate outage shall be two (2) Days.

1-7. PARKING.

A. The Contractor’s employee/worker vehicles shall park in the area shown in Drawing C-03.

1-8. PERSONNEL IDENTIFICATION.

A. OCSD will provide badges for workers who will access the OCSD site for more than ten (10) days. All truck delivery drivers shall be required to sign in at the Banning Gate security station to receive a temporary day badge for that day. No workers will be allowed on-site without their identification and the Contractor shall remove any worker from the workforce who is in repeated non-compliance. Badge identification system shall be compatible with system developed and utilized by the P2-110/J-117B contractors.

B. The Contractor shall arrange for utilizing the dual use, keypad and magnetic card access system and the automatic gate operator at the Banning Gate. The system shall include the following:

1. A keypad and magnetic card system in full operation during the term of the Contract. The Contractor shall provide any software required to make the system functional and locate the database control hardware in its field office. The system will not be tied into OCSD’s gate security system.

2. The Contractor shall provide magnetic cards for the Contractor’s staff and Subcontractor’s staff, and shall secure the distribution of magnetic cards and maintain a database log of all cardholders. The Contractor shall maintain the cardholder log current at all times and shall forward a copy of the updated cardholder log to the Engineer whenever a change has occurred.

3. The Contractor shall limit the use of the magnetic access cards to the Contractor’s and Subcontractor’s on-site staff and essential personnel. The magnetic card access system shall log all after work hours entry and exit access for up to a six (6) month period. The entry / exit database from the previous six (6) month period shall be downloaded from the system to an electronic file and database maintained for the duration of the Work.
4. The Contractor shall provide entry/exit data records upon the Engineer’s request. The system shall have a “Failed Open” alarm in the event the access system fails and the gate remains open for thirty (30) minutes. The system shall automatically notify the Contractor’s field office and the Contractor provided security personnel in the event of a failed open alarm. The Contractor shall have a monitoring service to implement the "Failed Open" alarm feature.

5. The Contractor shall respond immediately to an alarm notice on a 24-hour basis, including weekends and holidays. The Contractor shall be responsible for gate repairs, traffic loop repairs and keypad and magnetic card system repairs. If repairs are not made within four (4) hours and the gate remains open, OCSD reserves the right to close and barricade the gate.

1-9. CONSTRUCTION EQUIPMENT ACCESS.

A. Heavy construction equipment including cranes over 20-ton capacity and track vehicles, as well as any vehicles exceeding H-20 loading criteria, shall not be permitted to cross existing tunnels without protective traffic plates in place. The Contractor shall be responsible for obtaining and paying for adequate traffic plates to protect existing structures from damage. The Contractor shall submit for approval access plan for heavy construction equipment to identify were heavy equipment crosses existing tunnels.

B. The Contractor shall plan activities to minimize heavy equipment over the existing 120-inch, 84-inch, and 66-inch diameter pipelines. Where it is necessary for equipment to be located over these pipelines for completion of the Work, the Contractor shall place 1-1/4-inch steel traffic plates over the pipelines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End of Section
PART 1 - GENERAL

1-1. THE REQUIREMENT.

A. This Specifications section supplements the General Requirements. All requirements of General Requirement, Environmental Control, and all SCAQMD rules, in particular SCAQMD Rule 403-Fugitive Dust, shall be strictly enforced. The Contractor shall be responsible to review and be familiar with all applicable SCAQMD rules. Where there are differences, the most stringent of the requirements specified in General Requirement, Environmental Control, this section, and SCAQMD rules, shall apply.

B. This Specifications section applies to all work on the project including work at Plant 2, and OCSD property and easement along the pipeline alignment.

1-2. RELATED WORK SPECIFIED ELSEWHERE.

A. The requirements of the following Specifications sections and divisions apply to the Work of this Specifications section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

- Environmental Control
- 01300 Submittal
- 02050, Demolition
- 02200, OCSD Earthwork

1-3. TRAFFIC CONTROL AND EARTH HAULING.

A. Contractor’s delivery and haul trucks will not be allowed to line up on any public street before normal construction hours. Deliveries shall be scheduled to arrive at the site during normal construction hours, such that they can enter the Plant No. 2 site or the pipeline alignment area immediately upon arrival.
1-4. CONTRACTOR SUBMITTALS.

A. At least thirty (30) Days prior to excavation operations, the Contractor shall submit a truck haul route plan to OCWD, OCSD and to the City of Huntington Beach, Department of Public Works, for acceptance by both entities. The plan shall comply with all requirements of Huntington Beach Municipal Code, Chapter 17.05 Grading and Excavation Code in general, and Section 17.05.210, Import and export of earth material, in particular. The plan shall include the approximate number of truck trips and the proposed truck haul routes. The plan shall specify the hours in which transport activities will occur and methods to mitigate construction-related impacts to adjacent residents. The plan shall include location of a truck washdown area (with water source and drainage shown) to be operated by the Contractor to minimize the material on the trucks that may be deposited on city streets.

1-5. DUST CONTROL.

A. The Contractor shall keep moist roads along the pipeline alignment (paved and unpaved), excavated areas, and stockpiles at all times to prevent fugitive dust. The Contractor shall provide continuous street sweeping at construction access locations along the pipeline alignment and neighborhood streets as applicable, during all Contractor operations that include hauling soiling material on/off-site.

B. During excavation and backfilling of the insertion pits, the Contractor shall spray water to control fugitive dust. In use, dirt access roads to each pit shall be sprayed to control dust in order to protect nearby residents and businesses. Any soil stockpile near the insertion pit shall be kept moist.

C. The Contractor shall provide rumble strips and tire cleaning operations for trucks leaving the work areas onto public streets. The Contractor shall ensure that no dirt or mud is tracked onto public streets.

D. Street Sweepers for applications specified in 1.4 A shall be waterless, vacuum type, approved under South Coast Air Quality Management District Rule 1186, July 11, 2008 (Elgin Pelican P. Elgin Eagle F, or equal). Street sweeping will be allowed between the hours of 8:00 A.M. and 4:30 P.M.

E. The Contractor shall maintain the minimum freeboard specified below on all trucks hauling soil, sand or other loose material.

Minimum 2 feet freeboard, uncovered.
Minimum 6 inches freeboard, covered.
F. Apply non-toxic soil binders to exposed soil stockpiles as necessary to comply with the General Requirements.

1-6. **NOISE AND VIBRATION CONTROL.**

A. Localized sheet piling is required as part of the Work, pile driving will be allowed only between the hours of 10:30 A.M. and 2:30 P.M. on regular work days.

B. Sound dampening devices shall be placed around or adjacent to pile driving activities to minimize noise impacts to the surrounding community.

C. Diesel-driven hammers will not be allowed. The Contractor shall use sound blankets on the west (Brookhurst Street) side of the pile driving hammer.

D. Stationary construction equipment that generate noise or vibration (e.g., compressors, engine-generators, cement mixing, general truck idling) shall be placed on the construction site as far as possible from the nearest residential land uses.

1-7. **OVERSPRAY PREVENTION.**

A. All spray application of coatings or blast cleaning at the Project site which is performed outside of a totally enclosed booth shall be kept to a minimum. Alternative application methods (brushing, rolling, etc.) or off-hour work shall be considered and may be required to minimize potential overspray damage.

B. If spray painting and/or blast cleaning is required, the Contractor shall submit a work plan for review by the Engineer in advance, outlining specific areas where the Work will take place including a schedule and preventative measures being utilized to eliminate the possibility of overspray damage to facilities and vehicles.

C. Tenting or other means of containment shall be utilized for spray coating applications. A minimum of three (3) test panels, 2 feet by 3 feet with a contrasting background to the material being sprayed, shall be placed 10 feet outside of the local work area at elevations to be determined by the Engineer.

D. Tenting and/or wet blasting shall be considered when grit blasting steel or concrete surfaces. Under no circumstances will fugitive dusts or coating particulates be permitted to leave the immediate Work area.

E. Spraying/blasting operations shall be stopped if winds exceed 5 mph.
F. A minimum fourteen (14) Day notice is required to provide adequate notification prior to the scheduled start date.

G. For Work within Treatment Plant Sites, the Contractor shall provide and install signs at Plant entrances, work areas, and roadways to direct traffic as needed to alternate parking areas to prevent overspray damage to vehicles. Parking areas immediately downwind, or otherwise in high-risk areas, shall be delineated to prevent vehicles from parking in these areas.

H. For Work within the pipeline alignment, the Contractor shall provide and install signage to direct construction traffic to the work site and public to Santa Ana River Trail.

I. Any damage incurred by OCSD employees, OCWD employees, or the public due to paint, solvent or sandblasting materials from blasting or coating operations shall be promptly repaired by the Contractor to the satisfaction of OCWD, OCSD and public at no additional Contract cost.

1-8. ODOR CONTROL.

A. Contractor’s attention is directed to the potential that groundwater at the Project site is likely to produce offensive odors when exposed to the atmosphere, and to General Requirement, and Environmental Control. The Contractor shall be responsible to prevent discharge of nuisance odor from its operation.

B. As a minimum odor prevention measure, the Contractor shall limit the sources of air/gas venting from its dewatering system, shall provide air tight covers on desanding boxes and other storage vessels that are part of the dewatering water discharge system, and shall provide and maintain a passive odor adsorption (carbon or equal) unit on all vents from desanding boxes and other storage vessels. The Contractor shall replace the adsorption canisters as often as necessary to prevent odors.

PART 2 - PRODUCTS (NOT USED)
PART 3 - EXECUTION

3-1. VIBRATION AND NOISE MONITORING.

A. To monitor the effects of vibration from the pile driving to existing structures, seismograph equipment shall be installed in the buildings near the pile driving and closest to the west plant property boundary along Brookhurst Street. The seismograph equipment shall be installed and maintained by the Contractor. The purpose of the monitoring will be to identify vibrations from pile driving that could be harmful to the existing structures and a nuisance to nearby residential areas. Modifications to pile driving procedures required by results from vibration monitoring shall be the responsibility of the Contractor.

B. Continuous monitoring of noise shall be recorded to comply with the OCSD regulations. Any shutdown time due to excessive noise shall be borne by the Contractor.

3-2. ATTACHMENT.

A. OCSD Sewer Debris Dumping Procedure.

End of Section
PART 1 - GENERAL

1-1. GENERAL REQUIREMENTS.

A. This Section describes procedures for site access and pedestrian traffic during construction on-site and off-site in public streets and highways. The Contract Drawings show access requirements for the Work.

B. All work shall be performed in accordance with approved traffic control plans and specifications, Caltrans - Manual of Traffic Control Devices for Construction and Maintenance Work Zones, Standard Plans, Standard Specifications; and the WATCH Manual.

C. All work shall be coordinated to minimize the closing of streets or public right-of-way. The Contractor shall keep the City of Fountain Valley, the City of Huntington Beach, Police Department, Fire Department, and the California Department of Transportation informed of streets or lanes that are closed and when they are scheduled to be re-opened. A permit for any street or lane closure on City streets must be obtained from the appropriate agency by the Contractor. The Contractor shall comply with all conditions of said permits.

D. The Contractor shall furnish, install, construct, maintain, and remove detours, road closures, lights, temporary signals, signs, striping, markings, barricades, fences, K-rail, flares, flagmen, drainage facilities, paving, and such other items and services as are necessary to adequately safeguard the public from hazard and inconvenience. All such work shall comply with Laws and Regulations of authorities with jurisdiction over the public roads in which the construction takes place and over which detoured traffic is routed by the Contractor.

E. The Contractor shall maintain and keep temporary traffic control devices in good repair and working order until no longer required. The maintenance shall be at the Contractor's expense. The Contractor shall also pay the cost of replacing such devices that are lost or damaged, to such an extent as to require replacement, regardless of the cause of such loss or damage.

F. Prior to the start of construction operation, the Contractor shall notify the police and fire department, giving the expected starting date and completion date. Notifications on job progress to the emergency service agencies shall be in accordance with procedures and channels to be
established at the pre-construction meeting. In addition, the Contractor shall provide the police and fire departments with the name and telephone number of at least two responsible persons who may be contacted at any hours in the event of a condition requiring immediate correction.

G. The Contractor shall provide reflectorized cones, delineators, or barricades used in the diversion of traffic with flashers, arrow boards, or other approved illumination if in place during hours of darkness. All signs shall be illuminated or reflectorized unless otherwise approved by the appropriate jurisdictional agency.

H. The Contractor shall provide a minimum of 48-hours notice to the appropriate agency for any work that may affect signal loops, equipment, or devices. In the event underground utilities, traffic devices, pipes, or conduits are damaged and require emergency repair by the appropriate agency, all costs incurred by the appropriate agency in making such repairs, plus 25 percent for administration costs, shall be paid by the Contractor.

I. The Contractor shall post temporary "No Parking – Tow Away" signs 48 hours prior to work in areas where parking is normally permitted. Police Departments of the Cities within the project area shall be notified 48 hours prior to the posting of any temporary parking restrictions in the respective City.

J. The Contractor shall coordinate the relocation of bus routes and bus stops with the Orange County Transit Authority staff three weeks in advance of construction activity affecting bus stops.

K. The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices and furnish to the authority having jurisdiction the names and telephone number of the person(s) responsible for this emergency service. The emergency response service shall be reachable using cellular phones to minimize response time to a construction related emergency. In the event these persons do not promptly respond or the authority having jurisdiction deems it necessary to utilize other forces to accomplish emergency service, the Contractor shall pay the cost of such emergency service.

L. The Contractor shall utilize the designated Laydown Areas as shown in the Contract Documents for the exclusive use of delivery, handling and storage of tools, materials and equipment only and no employee parking within the Laydown Area will be allowed.

M. The Contractor shall locate and develop a designated Off-Site Workforce Parking location for utilization of all daily workers at the Contractor’s expense. Only employees housed in the Contractor’s temporary offices shall be permitted to park on-site. Contractor’s Superintendents, Foremen
and Inspectors and Subcontractor’s Superintendents & Foremen shall be allowed access on-site provided they are driving authorized company vehicles.

N. All school district and private schools affected by construction activities shall be notified on construction schedules to lessen potential impacts to instructional and transportation services. Ample time shall be provided so affected schools can prepare and plan for possible disruptions caused by project construction.

O. For work near Garfield Avenue, Adams Avenue, the frontage road at Adams Avenue, Atlanta Avenue, and Hamilton Avenue, safe pedestrian access shall be maintained at all times to the Santa Ana River Trail.

1-2. SUBMITTALS.

A. Traffic control plans shall be prepared by the Contractor for access from public roads (see 1-1.O) to the pipeline corridor along the Santa Ana River. The traffic control plans shall be approved by the City of Fountain Valley, City of Huntington Beach, and applicable agencies.

B. The Plant 2 On-Site Traffic Control Plan shall be submitted to and approved by the Engineer in compliance with all applicable requirements of this specification and all applicable contract documents.

C. The Contractor shall include in the Plant 2 On-Site Traffic Control Plan, the proposed areas for staging and the route(s) for ingress and egress of demolition haul-off trucks, mass excavation and haul-off trucks, import materials trucks, concrete delivery trucks, pipe and equipment materials delivery trucks and vehicles.

D. The Contractor shall meet with the Owner’s and OCSD’s Plant Operations Manager and Engineer for coordination of the traffic plan development with existing operations. The plan shall show the route(s) of Existing Plant Operational deliveries and shall designate areas on the plan for emergency response staging for coordination with local fire & life safety agencies.

E. The Contractor shall coordinate its proposed traffic route(s) that travel on or through the property of the Owner’s and OCSD’s Plant Operation and other construction contractors working on the Owner’s and OCSD’s property.

1-3. DETOURS.

A. Whenever streets or alleys are closed as provided herein, it will be the sole responsibility of the Contractor to adequately mark and light the detours.
B. A minimum of forty-eight (48) hours prior to closing any streets to traffic, the Contractor shall notify the appropriate City and/or County Fire and Police Departments and the California Department of Transportation (if appropriate) of the time of closure, and of the streets closed and the approved detour routing.

1-4. TRAFFIC MAINTAINED OVER CONSTRUCTION.

A. Where traffic is maintained along the street or alley under construction, care shall be used to shape and maintain the roadbed so that a safe and convenient roadway is available to the traveling public. Temporary cold mix asphalt shall be used to cover backfilled trenches at the end of each day's work. Ramps from undisturbed streets onto disturbed areas shall be maintained for traffic on gradual grades and the maximum ramp grade shall be 6 horizontal to 1 vertical slope. The Contractor shall make full provision for dust control.

1-5. BARRICADES AND WATCHMEN.

A. At the end of each workday, it shall be the responsibility of the Contractor to check the job site to insure proper barricading. Barricades will not be removed from each job site until the hazard has been removed.

B. The Contractor shall erect and maintain barricades and sufficient safeguards around all excavation, embankments, and obstructions; shall provide suitable warning lights on or near the work and keep them lighted at night or other times when visibility is limited and shall employ such watchmen as may be necessary for the protection of the public. Barricading shall occur in conformance with California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones and the WATCH Manual and shall be approved by the inspector prior to any work.

1-6. PROTECTION OF STREET SIGNS, TRAFFIC SIGNS, AND SIGNALS.

A. Street signs, traffic signs, signals, and other traffic control devices erected by the City, County, or State for information and to safeguard traffic must be protected by the Contractor. Where it is necessary to disturb or remove any of these items, the Contractor shall secure approval of the Engineer prior to any such work, this approval to be based on concurrence and requirements from the agency having jurisdiction.

B. All traffic control devices shall be restored to their original condition at the end of the Work to the satisfaction of the Owner, OCSD or applicable agency's traffic engineer.

C. Prior to the commencement of construction and ongoing during construction, property owners/residents/businesses within and adjacent to
construction activity shall be notified of the specific construction activity and associated schedule. Additionally, signs shall be posted at strategic locations within the Project area, specifically within the City limits of Fountain Valley and Huntington Beach; easily visible during construction. The notifications and signs shall identify the address, “hotline” number, and name of designated person to contact for response to questions or complaints during the construction period. The notifications and signs shall also identify the hours of permissible construction work and estimated duration.

1-7. MAINTAINING TRAFFIC.

A. Construction warning signs and sign placement shall conform to the latest revision of the California Department of Transportation Manual for Traffic Controls and for Construction and Maintenance Work Zones.

B. As noted in Paragraph 1.2, a traffic control plan will be prepared and will be implemented as part of this Contract. This plan is expected to be used in permit applications to regulatory agencies. Any changes to the traffic control plans must be approved by the applicable permit agencies.

C. The Contractor shall furnish and maintain construction traffic control signing that shall include advance warning signs, as required by the Engineer, when construction work will interface with a moving traffic lane.

D. All materials delivered to the job shall be unloaded and placed in a manner which will not interfere with the flow of necessary traffic.

E. The Contractor shall cleanup all roadways at the end of each work day.

F. The Contractor shall maintain two lanes of traffic on all streets unless otherwise noted.

G. Contractor shall, as necessary, wash truck tires leaving the site to reduce the amount of particulate matter transferred to paved streets as required by SCAQMD Rule 403.

H. Contractor shall sweep on and off-site streets if silt is carried over to adjacent public thoroughfares, as determined by the City Engineers in the affected jurisdictions to reduce the amount of particulate matter on public streets.

1-8. PEDESTRIAN TRAFFIC CONTROL.

A. Unless otherwise shown on the plan, the Contractor shall maintain and delineate a minimum of one 4-foot-wide pedestrian walkway along each public street at all times during construction. Maintain existing pedestrian
accesses at intersections at all times. When existing crosswalks are blocked by construction activity, install signs directing pedestrian traffic to the nearest alternative crosswalk. The Contractor shall also maintain pedestrian and bicycle access to the Santa Ana River Trail.

B. Erect a fence or provide other means to preclude unauthorized entry to any open excavation during all nonworking hours on a 24-hour basis including weekends and holidays. Said fence shall be a minimum of 7 feet high around the entire excavation, consisting of a minimum 9-gage chain link type fence fabric and shall be sturdy enough to prohibit toppling by children or adults. There shall be no openings under the wire large enough for a child to crawl through. Lock any gates if no adult is in attendance. Place warning signs spaced on 50-foot centers on the outside of the fence with the statement "DEEP HOLE DANGER".

1-9. ACCESS TO ADJACENT PROPERTIES.

A. General: Maintain reasonable access from the public streets to all adjacent properties at all times during the construction. Prior to restricting normal access from public streets to adjacent properties, notify each resident, informing him or her of the nature of the access restriction, the approximate duration of the restriction, and the best alternate access.

B. During the progress of the work, the Contractor shall maintain clear access to fire hydrants, water and gas valves; gutters and waterways must be kept open or other suitable provisions made for the removal of stormwater. Access to residential and commercial property must be maintained at all times. The Contractor shall build and maintain temporary driveways, bridges, and crossings such as in the opinion of the Engineer are necessary to reasonably accommodate the public. In the event of the Contractor's failure to comply with the same, the Owner may cause such work to be done by others and deduct the cost of such work from any money due or to become due the Contractor under this Contract. Performance of such work by the Owner shall serve in no way to release the Contractor from his liability for the safety of the Public or the work.

C. Access to police and fire station facilities shall be maintained at all times. Only one driveway of a safety facility shall be closed at any one time.

1-10. SITE SECURITY AND ACCESS CONTROLS.

A. The Contractor shall provide security guard(s) at the entrance to the project sites during normal working hours.

B. The Contractor shall develop a badge identification system with picture identification for all workers that will be assigned to the project for more
than ten working days or who will be required to provide repeated deliveries on an ongoing/return basis. All truck delivery drivers shall be required to sign in at the guard station to receive a temporary day badge for that day. No workers will be allowed onsite without their identification and Contractor shall remove any worker from the workforce that is in repeated non-compliance.

C. The use of plant roads beyond the project areas shown on the Contract Drawings is subject to approval by the Engineer.

The use of the OCSD Plant 1 North Perimeter Road (Administration Area) and Front Security Station and guard are prohibited.

The use of the OCSD Plant 2 Front Security Station and guard is prohibited.

D. The Contractor shall provide a manned Security Station at all points of ingress and egress from the project area. The Contractor shall coordinate the security procedure with the Owner’s and OCSD’s Security Department. The security procedure shall be approved by the Engineer. Copies of all security logs and records shall be submitted to the District each month.

Site security requirements are described in the Site Security section of these specifications.

E. All regular staff shall be issued parking passes which are approved by the Engineer. All other construction traffic should sign IN/OUT at the security station. All the Contractor’s field offices storage facilities and parking shall be contained within the Contractor’s designated staging area. The Contractor shall make plans for offsite overflow parking and provide a copy of the Offsite Parking Plan to the Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End of Section
PART 1 – GENERAL

1-1. SCOPE. Furnish, install and maintain project identification signs. Contractor shall install the Project signs within 30 days of the Notice to Proceed.

Contractor shall remove the signs on completion of construction. No other signs are to be displayed. Project identification signs are to be installed at two locations along the alignment. The final exact location shall be field determine by the Owner.

1-2. SUBMITTALS. Prior to fabrication of the signs, Contractor shall submit a “mock-up” sample of the proposed sign and graphics for review and approval by the Engineer.

1-3. PROJECT IDENTIFICATION SIGN. Contractor shall provide and install two (2) painted sign of not less than 32 square feet (3 square meters) area for installation at locations to be determine. Each of the two (2) signs shall include painted content as follows:

1. Groundwater Replenishment System Final Expansion
2. Orange County Water District
3. Names and Titles of Authorities
4. Project start and completion dates
5. Design Engineer: Black & Veatch Corporation
6. Construction Manager: Butler Engineering, Inc.
7. Prime Contractor: TBD
8. Major Subcontractors: TBD

The Project signs shall be in accordance with the configuration shown on Figure 01580A-1 which follows this section.

1-4. INFORMATIONAL SIGNS. Contractor shall provide informational signs where shown on the drawings. Informational signs shall be painted with painted lettering, or standard products:

1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
2. Colors: as required by regulatory agencies, otherwise uniform colors throughout Project.

PART 2 - PRODUCTS

2-1. SIGN MATERIALS.

Structure and Framing: may be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.

Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

Thickness: As required by standards to span framing member, to provide even, smooth surface without waves or buckles.

Rough Hardware: Galvanized

Paint: Exterior Quality:

Use Bulletin colors for graphics.

Colors for structure, framing, sign surfaces and graphics: As selected by Engineer.

Adequate to resist weathering and fading for scheduled construction period.

PART 3 – EXECUTION

3-1. PROJECT IDENTIFICATION SIGN. Paint exposed surfaces of supports, framing and surface material; one coat of primer and one coat of exterior paint.

Paint graphics in styles, sizes, and colors selected by Owner and Engineer.

3-2. MAINTENANCE. Maintain signs and supports in a neat, clean condition; repair damages to structure, framing or sign.

3-3. REMOVAL. Remove signs, framing, supports and foundations at completion of project.

End of Section
Plant 2 Secondary Effluent Pipeline Rehabilitation

Project Partner: Orange County Sanitation District
Address: 18700 Ward Street, Fountain Valley, CA 92708
Contractor: TBD
Project Start Date: TBD
Project Completion Date: TBD
Normal Work Hours: 7am - 5pm
Design Engineer: Black & Veatch
Construction Manager: Butier Engineer, Inc.

For more information, go to www.gwrsystem.com
Questions/Concerns? Please Contact the OCWD public affairs department at 714-378-8244
1. **SCOPE.** When an equipment specification section in this Contract references this section, the equipment shall conform to the general stipulations set forth in this section, except as otherwise specified in other sections.

2. **COORDINATION.** Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

3. **MANUFACTURER'S EXPERIENCE.** Unless specifically named in the Specifications, a manufacturer shall have furnished equipment of the type and size specified which has been in successful operation for not less than the past 5 years.

4. **WORKMANSHIP AND MATERIALS.** Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

   All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

   Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick. When dissimilar metal components are used, consideration shall be given to prevention of galvanic corrosion.

5. **STRUCTURAL DESIGN REQUIREMENTS.** All equipment, including non-structural components and non-building structures as defined in ASCE 7, and their anchorage, shall be designed and detailed in accordance with the Meteorological and Seismic Design Criteria section. Submittals for equipment and other non-structural components and non-building structures shall include a seal by a professional engineer registered in the state of California, to confirm
that the anchorage design meets the code requirements. Conformance to the building code of the pipe support systems designed by the Contractor shall be certified by a professional engineer registered in the state of California.

6. **LUBRICATION.** Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.

Lubricants of the types recommended by the equipment manufacturer shall be provided in sufficient quantities to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by Owner. Lubricants for equipment where the lubricants may come in contact with water before or during a potable water treatment process or with potable water, shall be food grade lubricants. This includes lubricants for equipment not normally in contact with water, but where accidental leakage of the lubricants may contaminate the water.

Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

7. **ELEVATION.** The elevation of the site shall be as indicated in the Meteorological and Seismic Design Criteria section. All equipment furnished shall be designed to meet stipulated conditions and to operate satisfactorily at the specified elevation.

8. **ELECTRIC MOTORS.** Not used.

9. **DRIVE UNITS.** Not used.

10. **SAFETY GUARDS.** Not used.

11. **ANCHOR BOLTS.** Equipment suppliers shall furnish suitable anchor bolts for each item of equipment. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete is placed. Anchor bolt materials shall comply with the Anchorage in Concrete and Masonry section, and sleeves shall be provided as indicated on the drawings. Unless otherwise specified, anchor bolts shall be at least 3/4 inch in diameter.

Unless otherwise indicated or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2 inches of grout
beneath the baseplate and to provide adequate anchorage into structural concrete.

12. **EQUIPMENT BASES.** Unless otherwise indicated or specified, all equipment shall be installed on concrete bases at least 6 inches high. Cast iron or welded steel baseplates shall be provided for pumps, compressors, and other equipment. Each unit and its drive assembly shall be supported on a single baseplate of neat design. Baseplates shall have pads for anchoring all components, and adequate grout holes. Baseplates for pumps shall have a means for collecting leakage and a threaded drain connection. Baseplates shall be anchored to the concrete base with suitable anchor bolts and the space beneath filled with grout as specified in the Grouting section.

13. **SPECIAL TOOLS AND ACCESSORIES.** Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

14. **SHOP PAINTING.** All iron and steel surfaces of the equipment shall be protected with suitable protective coatings applied in the shop. Surfaces of the equipment that will be inaccessible after assembly shall be protected for the life of the equipment. Coatings shall be suitable for the environment where the equipment is installed. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with an epoxy or polyurethane enamel or universal type primer suitable for top coating in the field with a universal primer and aliphatic polyurethane system.

Surfaces to be coated after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of a universal primer.

Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound as recommended by the equipment manufacturer.

15. **PREPARATION FOR SHIPMENT.** Equipment shall be prepared for shipment as specified in the Shipping section.

16. **STORAGE.** Handling and storage of equipment shall be as specified in the Handling and Storage and Requirements section.
17. INSTALLATION AND OPERATION. Installation and operation shall be as specified in respective equipment sections and the Startup Requirements section.

18. OBSERVATION OF PERFORMANCE TESTS. Where the Specifications require the presence of Engineer, initial tests shall be observed or witnessed by Engineer. Owner shall be reimbursed by Contractor for all costs of subsequent visits by Engineer to witness or observe incomplete tests, retesting, or subsequent tests.

19. BOLTS AND WASHERS. Regardless of whether indicated in the Drawings or not, all anchor bolts shall have one washer and all bolt and nut assemblies shall have two washers.

End of Section
Section 01611

METEOROLOGICAL AND SEISMIC DESIGN CRITERIA

1. **SCOPE.** Buildings, non-structural components and non-building structures shall be designed in accordance with this section. In the event of conflict with requirements in other sections, the more stringent criteria shall be followed.

2. **DESIGN CRITERIA.** Buildings, non-structural components, non-building structures including anchorage of such items, shall be designed in accordance with the following criteria.

General Design Data - AWTF:

- **Building code and references:** CBC 2016 edition, ASCE 7-10

| Site elevation, above mean sea level (ft) | 21.5 (Plant 1) | 13.0 (Plant 2) |
| Design groundwater elevation (ft)        | 16.5 (Plant 1) | 1.50 (Plant 2) |

Wind Design Data:

- **Basic wind speed, V (mph):** 115
- **Exposure category:** C
- **Risk Category (wind loads):** III
- **Building enclosure classification:** Enclosed

Seismic Design Data for Building Structures

- **Mapped MCE short period spectral response acceleration, Ss:** 1.557g (Plant 1)  1.67g (Plant 2)
- **Mapped MCE one second period spectral response acceleration, S1:** 0.579g (Plant 1)  0.62g (Plant 2)
- **Design short period spectral response acceleration, SDS:** 1.038g (Plant 1)  1.12g (Plant 2)
Design one second period spectral response acceleration, $S_{D1}$

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<thead>
<tr>
<th></th>
<th>Plant 1</th>
<th>Plant 2</th>
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<tr>
<td>0.579g</td>
<td>0.62g</td>
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Risk Category

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Building Importance factor, $I$

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Building Seismic Design Category

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Non-Structural Components Importance factors, $I_P$

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<td>As indicated in the Non-Structural Component Schedule</td>
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Non-Structural Components Seismic Design Category

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Non-Building Structures Importance factors, $I$

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<tr>
<td>As indicated in the Non-Building Structure Schedule or in the applicable reference documents, whichever is greater.</td>
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3. **WIND ANCHORAGE.** Equipment that is to be located outdoors shall have anchor bolts designed for the effects of wind forces, as determined in accordance with ASCE 7, Chapter 6. Design of anchorage into concrete shall be in accordance with ACI 318 Chapter 17, shall consider concrete to be cracked, and shall not include the strengthening effects of supplementary reinforcement or anchor reinforcement unless approved by Engineer. Design of anchorage into masonry shall be in accordance with ACI 530. Post-installed anchors into concrete or masonry may be used only when approved by Engineer, and shall be designed in accordance with the anchor manufacturer’s research report. Shop drawings shall include full anchor bolt details, and shall be sealed by a professional engineer licensed in the state of the project. Calculations shall be furnished when requested by Engineer.

4. **SEISMIC DESIGN.**

4-1. **General.** Structural systems shall provide continuous load paths, with adequate strength and stiffness to transfer all seismic forces from the point of application to the point of final resistance.

4-2. **Pre-Engineered Buildings.** Pre-engineered buildings shall have sufficient strength and ductility to resist the specified seismic effects defined for buildings and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code.
"W" for buildings shall include the total dead load, the total operating weight of permanent equipment and the effective contents of vessels, and applicable portions of other loads, as required by the specified building code.

4-3. Non-Structural Components. Non-structural components are architectural, mechanical, and electrical items that are permanently attached to and supported by a structure but are not part of the structural system, as indicated in Chapter 13 of ASCE 7. The Non-Structural Components Schedule identifies the components that require seismic design. The requirements of this paragraph are applicable only to the items listed in the Non-Structural Components Schedule.

4-3.01. General. Design of non-structural components shall be in accordance with all applicable provisions of ASCE 7, Chapter 13. "Wp" shall include the total operating weight of the component or system, including, but not limited to, any insulation, fluids, and concentrated loads such as valves, condensate traps, and similar components.

4-3.02. Anchorage Design. Every component in the Non-Structural Components Schedule shall have its anchorage to the supporting structure designed in accordance with ASCE 7, Chapter 13. Design of anchorage into concrete shall be in accordance with ACI 318 Chapter 17, shall consider concrete to be cracked, and shall not include the strengthening effects of supplementary reinforcement or anchor reinforcement unless approved by Engineer. Design of anchorage into masonry shall be in accordance with ACI 530. Post-installed anchors into concrete or masonry may be used only when approved by Engineer, and shall be designed in accordance with the anchor manufacturer's research report.

Components shall be attached so that seismic forces are transferred to the structural system. Curbs that support roof-mounted equipment shall be designed to transfer forces from the equipment into the main structural roof members. All structural attachments shall be bolted, welded, or otherwise positively fastened. Frictional resistance due to gravity shall not be considered in evaluating the required resistance to seismic forces.

4-3.03. Component Design. Components indicated in the Non-Structural Components Schedule to require design of the component itself, as opposed to an anchorage design alone, shall be designed in accordance with ASCE 7, Chapter 13.

Components shall have sufficient strength and ductility to resist the specified seismic effects, and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code and other referenced codes. Components shall be designed to be operable during and following a design level seismic event without collapsing, breaking away from supports, creating an ignition hazard, or releasing any contents.
Seismic effects that shall be analyzed in the design of piping systems include the dynamic effects of the piping system, contents, and supports. The interaction between piping systems and the supporting structures, including other mechanical and electrical equipment, shall also be considered. Where pipe supports are to be designed by Contractor, as required by the Pipe Supports section, both the piping and support systems shall be designed to meet the applicable requirements of ASCE 7, Chapter 13.

4-3.04. **Submerged Components.** Components that are to be submerged in water shall be designed to withstand loads from the effects of water sloshing during the seismic event. The calculation of the sloshing effects shall be in accordance with the latest edition of ACI 350.3.

4-3.05. **Seismic Certification.** Design of components and their anchorage shall be certified by one of the following methods.

1. Analysis and design by a design professional registered in the state of the project.
2. Shake table testing based upon a nationally recognized testing standard procedure, such as ICC-ES AC 156, acceptable to the authority having jurisdiction.
3. Experience data, based upon nationally recognized procedures acceptable to the authority having jurisdiction.

Components indicated in the Non-Structural Components Schedule to require special seismic certification shall be certified only by methods 2 or 3 above, except that certification for containment of hazardous materials may be by any of the three methods.

4-3.06. **Construction Documents.** Construction documents (fabrication or shop drawings) of non-structural components shall be sealed by a design professional that is registered in the state of the project. Documents shall be sealed whether the basis for certification is analysis and design, shake table testing, or experience data. The sealing method shall clearly indicate that the anchorage system, and the component itself when applicable, have been designed for the code required seismic forces.

4-3.07. **Submittals.** The construction documents, structural design calculations, shake table certification, and experience data certification, as applicable, shall be submitted in accordance with the Submittal Procedures section.

4-4. **Non-Building Structures.** Non-building structures are the items described as such in Chapter 15 of ASCE 7. The Non-Building Structures Schedule identifies the items that require seismic design. The requirements of this paragraph are applicable only to the items listed in the Non-Building Structures Schedule.
4-4.01. **General.** Design of non-building structures shall be in accordance with all applicable provisions of ASCE 7, Chapter 15. Design of anchorage into concrete shall be in accordance with ACI 318 Chapter 17, shall consider concrete to be cracked, and shall not include the strengthening effects of supplementary reinforcement or anchor reinforcement unless approved by Engineer. Post-installed anchors into concrete may be used only when approved by Engineer, and shall be designed in accordance with the anchor manufacturer’s research report.

"W" shall include the total dead load and shall also include all normal operating contents of tanks, vessels, bins, and piping.

Non-building structures shall provide sufficient strength and ductility to resist the specified seismic effects, and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code and other referenced codes.

The seismic design of non-building structures shall provide sufficient stiffness, strength and ductility to resist the effects of seismic ground motions during the design level earthquake.

Non-building structures shall be designed to be operable during and following a design level seismic event, without collapsing, breaking away from supports, creating an ignition hazard, or releasing any contents.

4-4.02. **Construction Documents.** Construction documents (fabrication or shop drawings) depicting all seismic force resisting elements of non-building structures shall be sealed by a design professional that is registered in the state of the project.

4-4.03. **Submittals.** The construction documents shall be submitted in accordance with the Submittal Procedures section.

End of Section
<table>
<thead>
<tr>
<th>Component</th>
<th>Applicable Specification Section</th>
<th>Importance Factor (I_p)</th>
<th>Component Design Required</th>
<th>Special Seismic Certification Required</th>
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<tbody>
<tr>
<td>Piping Systems and Related Pipe Supports</td>
<td>15140</td>
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<tr>
<td><em>pipes sizes 12&quot; diameter and smaller</em></td>
<td></td>
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</tr>
<tr>
<td>Surge Protection Device</td>
<td>16050</td>
<td>1.0</td>
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Note: Some specification sections listed in the Non-Structural Components Schedule cover multiple items. Within those sections, some components may be exempt from seismic design based on their weight and/or their height above the floor. Reference ASCE 7, Paragraph 13.1.4 for specific conditions of the exemptions. Some ductwork and piping systems may also be exempt from seismic design based on criteria in their respective paragraphs in ASCE 7, Chapter 13.
Section 01612

SHIPPING

1. **SCOPE.** This section covers packaging and shipping of materials and equipment.

2. **PREPARATION FOR SHIPMENT.** All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

   Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.

   Grease and lubricating oil shall be applied to all bearings and similar items. Contractor shall refer to Figure 1 - 01612 for export shipping packing instructions.

3. **SHIPPING.** Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment. Figure 2 - 01612 shall be referenced for marking instructions.

End of Section
STYLE 4

STYLE 2
(BANDED)

STYLE X

STYLE 2
(PALLETIZED)

OPEN CRATE

STRAPPING 1 3/8" (35 mm)
SPACED ON 24" (600 mm) CTRS.
WITH CORNER PLATES.

EXPORT SHIPMENT PACKING INSTRUCTIONS
1. **SCOPE.** This section covers delivery, storage, and handling of materials and equipment.

2. **DELIVERY.** Contractor shall bear the responsibility for delivery of equipment, spare parts, special tools, and materials to the site and shall comply with the requirements specified herein and shall provide required information concerning the shipment and delivery of the materials specified in this Contract. These requirements also apply to any subsuppliers making direct shipments to the Site.

Contractor shall, either directly or through contractual arrangements with others, accept responsibility for the safe handling and protection of the equipment and materials furnished under this Contract before and after receipt at the port of entry. Acceptance of the equipment shall be made after it is installed, tested, placed in operation and found to comply with all the specified requirements.

All items shall be checked against packing lists immediately on delivery to the site for damage and for shortages. Damage and shortages shall be remedied with the minimum of delay.

Delivery of portions of the equipment in several individual shipments shall be subject to review of Engineer before shipment. When permitted, all such partial shipments shall be plainly marked to identify, to permit easy accumulation, and to facilitate eventual installation.

3. **STORAGE.** Upon delivery, all equipment and materials shall immediately be stored and protected until installed in the Work.

Stacked items shall be suitably protected from damage by spacers or load distributing supports that are safely arranged. No metalwork (miscellaneous steel shapes and reinforcing steel) shall be stored directly on the ground. Masonry products shall be handled and stored in a manner to hold breakage, chipping, cracking, and spalling to a minimum. Cement, lime, and similar products shall be stored off the ground on pallets and shall be covered and kept completely dry at all times. Pipe, fittings, and valves may be stored out of doors, but must be placed on wooden blocking. PVC pipe, geomembranes, plastic liner, and other plastic materials shall be stored off the ground on pallets and protected from direct sunlight.
Pumps, motors, electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above 60°F. Electrical equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.

Equipment having moving parts, such as gears, bearings, and seals, shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer. Manufacturer's storage instructions shall be carefully followed by Contractor.

When required by the equipment manufacturer, moving parts shall be rotated a minimum of twice a month to ensure proper lubrication and to avoid metal to metal "welding". Upon installation of the equipment, Contractor shall, at the discretion of Engineer, start the equipment at one-half load for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.

When required by the equipment manufacturer, lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment by Contractor at the time of acceptance.

Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

In addition to the protection specified for prolonged storage, the packaging of spare units and spare parts shall be for export packing and shall be suitable for long-term storage in a damp location. Each spare item shall be packed separately and shall be completely identified on the outside of the container.

4. HANDLING. Stored items shall be laid out to facilitate their retrieval for use in the Work. Care shall be taken when removing the equipment for use to ensure the precise piece of equipment is removed and that it is handled in a manner that does not damage the equipment.

During handling, carbon steel constructed material including chains, straps, and forks on lifting equipment shall not directly contact any equipment or material constructed of stainless steel. It shall be the Contractor's responsibility to correct any carbon steel contamination of stainless steel.

End of Section
1-1. GENERAL-EQUIPMENT START-UP. After all acceptance tests have been completed by the Contractor, but prior to final acceptance, the Contractor shall recheck all equipment for proper alignment and adjustment, check oil levels, re-lubricate all bearing and wearing points, and, in general, assure that all equipment is in proper condition for regular continuous operation.

Section includes: Contract closeout requirements including:

1. Final cleaning.
2. Preparation and submittal of closeout documents.
3. Final completion certification.

1-2. FINAL CLEANING.

1-2.01. Final Clean Up. Before final inspection of the Work, the Contractor shall promptly remove from the vicinity of the completed work, all rubbish, trash, unused materials, concrete forms, construction equipment, tools, and temporary structures and facilities used during construction. All surrounding site areas, including the temporary construction trailer, equipment and material storage areas shall be restored to their original state, including grading as required. All parts of the Work shall be left in a neat and presentable condition.

Access roads, paved pathways, and parking lots used or crossed by the Contractor shall be cleaned.

Contractor shall provide for a professional cleaning service to clean, dust, sanitize as necessary, and provide a mop or vacuum clean condition for the complete project and in particular in all offices, control rooms, restrooms, laboratory, shop processes areas, and any other enclosed area subject to daily or periodic personnel use and shall complete this cleaning service no later than the commencement of the acceptance testing.

Contractor shall provide for weekly professional cleaning services after initial cleaning and sanitizing for the complete project and in particular in all offices, control rooms, restrooms, laboratory, shop, process areas and any other enclosed area subject to daily or periodic personnel use and maintain the weekly cleaning service from commencement of Acceptance Testing until issuance of Project Completion.

1-3. WASTE DISPOSAL.

   A. Arrange for and dispose of surplus materials, waste products, and debris off-site.

       Prior to making disposal on private property, obtain written permission from Owner of such property.

   B. Do not fill ditches, washes, or drainage ways which may create drainage problems.

   C. Do not create unsightly or unsanitary nuisances during disposal operations.

   D. Maintain disposal site in safe condition and good appearance.

   E. Complete leveling and cleanup prior to final acceptance of the Work.

1-4. TOUCH-UP AND REPAIR.

   A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Final Acceptance.

   B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

1-5. CLOSEOUT DOCUMENTS.

   A. Submit following Closeout Submittals upon Completion and at least seven (7) days prior to submitting Application for Final Payment:

       1. Evidence of Compliance with Requirements of Governing Authorities.
       2. Project Record Documents.
       3. Operation and Maintenance Manuals.
       4. Warranties and Bonds.
       5. Electronic version of all approved project submittals in pdf form.
       7. Evidence of Payment and Release of Liens and Stop Payment Notices as outlined in Conditions of the Contract.
9. Survey Record Documents as specified in the Field Engineering section.

10. Certificate of Final Completion.

1-6. PROJECT RECORD DOCUMENTS.

A. Maintain at Project site, available to Owner, Construction Manager, and Engineer, one (1) copy of the Contract Documents, shop drawings and other submittals, in good order.

1. Mark and record field changes and detailed information contained in submittals and change orders.

2. Record actual depths, horizontal and vertical location of underground pipes, duct banks and other buried utilities. Reference dimensions to permanent surface features.

3. Identify specific details of pipe connections, location of existing buried features located during excavation, and the final locations of piping, equipment, electrical conduits, manholes, and pull boxes.

4. Identify location of spare conduits including beginning, ending and routing through pull boxes, and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.

5. Provide schedules, lists, layout drawings, and wiring diagrams inclusive of any applicable Contractor derived CAD drawings pertinent to equipment installation.

6. Make annotations with erasable colored pencil conforming to the following color code:

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<tr>
<th>Additions:</th>
<th>Red</th>
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<tr>
<td>Deletions:</td>
<td>Green</td>
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<tr>
<td>Comments</td>
<td>Blue</td>
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<tr>
<td>Dimensions</td>
<td>Graphite</td>
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</table>

B. Maintain documents separate from those used for construction.

1. Label documents "RECORD DOCUMENTS".

C. Keep documents current.

1. Record required information at the time the material and equipment is installed and before permanently concealing.

D. Deliver record documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.
E. Record documents shall be available for the Engineer to review to ascertain that changes have been recorded. Engineer shall review Contractor’s record documents on a monthly basis to determine that documents have been updated.

F. Failure of the Contractor to keep current with the updating of the Record Documents shall be grounds for withholding monies from partial payment estimates.

Requests for partial payments will not be approved if the record drawings are not kept current, and not until the completed record drawings, showing all variations between the Work as actually constructed and as originally shown on the Contract Drawings or other Contract Documents, have been inspected by the Owner.

Final payment will not be approved until the Contractor-prepared record drawings have been delivered to the Owner. Said up-to-date record drawings may be in the form of a set of prints with carefully plotted information overlaid in pencil.

Upon substantial completion of the Work and prior to final acceptance, the Contractor shall complete and deliver a complete set of record drawings to the Owner conforming to the construction records of the Contractor. This set of drawings shall consist of corrected plans showing the reported location of the Work. The information submitted by the Contractor and incorporated into the Record Drawings will be assumed to be reliable, and the Owner will not be responsible for the accuracy of such information, nor for any errors or omissions which may appear on the Record Drawings as a result.

The Contractor within 30 days after Notice of Substantial Completion date, shall submit the following items in the form of a Final Project Report to the Engineer:

1. A final updated master schedule indicating actual completion date, schedule of values and cash flow curves.

2. Written warranties, guarantees and information for each mechanical, electrical, process equipment, architectural and other materials, products or equipment specified in the contract documents.

3. Operations and Maintenance Manuals, both in hard copy and electronic form.

4. Certificate of Completion for each component of the Project.

5. New permanent cylinders and key blanks for all locks.

6. Maintenance stock items: spare parts; special tools and record of missing items.
7. Final completed and verified record drawings in both hard copy format and electronic PDF format. Contractor shall refer to the Submittals section for the record drawing electronic PDF format requirements.

8. Final photographs and all progress photographs in both electronic and hard copy formats. Hard copies shall be included in photo-album binders.

9. Warranties, Guarantees or Bonds that cover the warranty period of each contract such as for roofing, landscape maintenance, etc., as required.

10. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

11. Affidavit of Release of Liens – Releases from all parties who are entitled to claims against the subject project property, or improvement pursuant to the provisions of law.


14. Affidavit of Payment of All Taxes.

15. Affidavit of Payment.


17. Contractor’s Certification of Completion.

18. Final completed punchlist.

19. Electronic version of all approved project submittals in pdf format.

1-6.01. Guarantee. The Contractor shall provide a one-year guarantee per the General Provisions “GUARANTEES” Section. Contractor shall submit a complete binder containing copies of all specified warranties and bonds per the Product Warranties and Bonds section.

Prior to the expiration of the Guarantee period, the Owner reserves the right to hold a meeting and require the attendance of the Contractor. The purpose of the meeting is to review warranties, bonds, and maintenance requirements, and determine required repair or replacement of defective items.

End of Section
PART 1 - GENERAL

1.01 SECTION INCLUDES.

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Submit to Engineer for review and transmittal to Owner.

F. Schedule of submittals.

1.02 SUBMITTAL REQUIREMENTS.

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.

B. Number of Original Signed Copies Required: Two each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item:
   1. Product or work item.
   2. Firm, with name of principal, address and telephone number.
   4. Date of beginning of warranty, bond or service maintenance contract.
   5. Duration of warranty, bond or service maintenance contract.
   6. Provide information for Owner's personnel:
      a. Proper procedure in case of failure.
      b. Instances which might affect the validity of warranty or bond.
   7. Contractor, name of responsible principal, address and telephone number.
1.03 **FORM OF SUBMITTALS.**

A. Prepare in duplicate packets.

B. Format:
   1. Size 8-1/2 by 11 inch.
   2. Punch sheets for standard ring binder.
   3. Fold larger sheets to fit into binders.
   4. Cover:
      a. Identify each packet with typed or printed title "WARRANTIES AND BONDS".
      b. List the following:
         1) Title of Project.
         2) Name of Contractor.

C. Binders: Commercial quality, three-ring, 2 inch with durable and cleanable plastic covers, white.

1.04 **TIME OF SUBMITTALS.**

A. Make submittals within 10 days after Date of Substantial Completion, prior to final request for payment.

B. For items of Work, where acceptance is delayed materially beyond Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

C. For items of Work, where equipment is available to be placed into service for Owner's beneficial occupancy prior to Substantial Completion, Owner may, in writing accept beneficial occupancy prior to use of equipment. Within 10 days after this acceptance of beneficial use, Contractor shall supply Owner with an interim submittal of the warranties, bonds, and service and maintenance contracts as specified herein. This interim information shall again be included in the final submittal required after Substantial Completion regardless of the warranty start and end dates.

1.05 **SCHEDULE OF SUBMITTALS.**

A. Submit warranties, bonds and service and maintenance contracts as specified in individual sections.
PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers the demolition of existing pipe and the salvage of existing materials and equipment as indicated on the Drawings and as specified herein. Miscellaneous demolition at other locations on the Project is also covered by this section.

1-2. GENERAL. Contractor shall be responsible for all work under this section.

Work includes the demolition of the 66” diameter pipe segments as shown on the Drawings for the construction of insertion pits. Demolition and salvage work shall create minimum interference with Owner’s and OCSD’s operations and minimum inconvenience to Owner. Care shall be taken to ensure that contamination does not occur on the site.

It is the responsibility of the Contractor to remove and dispose of all material, etc., taken from the existing construction during the demolition unless directed otherwise by the Engineer. All disposal shall be done in accordance with federal, state, and local laws governing waste disposal.

Storage of demolition debris shall not be stockpiled in any area of the site other than the location where demolition occurs.

Any excavation done as part of the demolition shall be limited to no more than 2 feet beyond the structure exterior that is to be demolished. Contractor shall be responsible for the design, permits, and work plan for any excavation and demolition that requires temporary shoring. All excavation work shall comply with all federal, state and local laws and regulations. Refer to California’s Trenching and Shoring Manual for acceptable practices and methods. All excavation adjacent to existing structures shall be adequately designed and installed to protect the existing structure from damage caused from settlements, soil movement, or any loads associated with the demolition work. Contractor shall submit any temporary shoring plans to Engineer for review prior to the start of excavations.

The perimeter of excavations shall be protected with sand bags or other acceptable method to prevent runoff surface water from entering the excavated area. A sump shall be provided at one corner of the excavation and the bottom surface sloped towards the sump.
Blasting will not be permitted.

Refer to Earthwork Section for restoration of area after demolition.

1-3. **COORDINATION.** Contractor shall plan, schedule, and coordinate its operations in a manner which will facilitate minimum disruption to the existing structures, operation of OCWD’s Advanced Water Purification Facility (AWPF) and OCSD’s Plant No. 1 and 2, and surrounding environment (i.e. residences, etc.). The Contractor shall also coordinate demolition so that the work is performed in a safe, logical sequence to expedite the overall completion of the demolition.

1-4. **LEAD AND ASBESTOS REQUIREMENTS AND OTHER HAZARDOUS MATERIALS.** Contractor shall be responsible for effective identification, abatement, packaging, storage, and disposal of materials to be impacted by the demolition and/or construction requirements including compliance with all federal, state, and local standards. Contractors performing any abatement work shall be qualified and properly licensed and insured for asbestos and lead abatement, and staff such work only with workers properly trained, certified, and under medical surveillance as required to perform such work.

1-4.01. **Asbestos Removal.** No asbestos removal is anticipated on the project. Contractor shall take necessary precautions to handle asbestos-containing materials.

Contractor shall notify SCAQMD and fill out and submit a copy of the asbestos demolition notification form prior to any demolition work as described in the Regulatory Requirements and Permits section.

1-4.02. **Lead Removal.** Per Cal-OSHA, Section 1532.1 in Title 8 of the CCR Contractor shall be responsible for basic steps in recognizing lead in construction. Contractor shall conform to Section 36100, Title 17 of the CCR, which covers lead abatement as part of the demolition work.

A Safety and Health Fact Sheet regarding lead is available from Cal-OSHA as described in the Regulatory Requirements and Permits section.

Regarding abatement of lead-containing building materials and paint, Contractor shall remove lead-containing paint from metal surfaces that would be potentially impacted by cutting, grinding, or other hot-work, prior to those activities. Scope of lead-paint removal will be determined by the Contractor but shall be of sufficient quantity to prevent the burning or oxidation of lead-containing paint or coatings.
PART 2 - PRODUCTS

2-1. MATERIALS. Not used.

PART 3 - EXECUTION

3-1. DEMOLITION. The Contractor shall assume full responsibility for any and all damages to existing buildings, facilities, and utilities not to be demolished. Contractor shall take any necessary photographs of existing construction to verify existing conditions and shall file a report with the Engineer listing any existing damaged construction before the work is started.

The Contractor shall protect and maintain duct banks, conduits, drains, sewers, pipes and wires that are to remain on the property.

3-1.01. Demolition. The following components pipeline shall be demolished, and the debris shall be removed from the jobsite unless specifically required to be salvaged.

   66" Pipeline: Segments of the 66" pipeline and manways/manholes as shown in the Drawings for the construction at insertion pits.

3-1.02. Sitework Demolition. Sitework demolition shall include the following as shown on the Demolition Drawings:

   Removal of reinforced concrete drives, pavement, sidewalks, curbs, and slabs on grade within the limits indicated on the Drawings.
   Removal of asphaltic concrete pavement within the limits indicated on the Drawings.
   Removal of existing yard piping within the limits indicated on the Drawings.

3-2. SALVAGE.

3-2.01. Items to Be Salvaged by Owner. Owner knows of no items to be salvaged by Owner.

3-2.02. Items to Be Salvaged by Contractor. Removed and salvaged equipment or facilities shall include removal and salvage of all accessories, piping, wiring, supports, associated electrical starters and devices, baseplates and frames, and all other appurtenances, unless otherwise directed.

Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified herein or indicated to be salvaged and to remain the property of Owner. Contractor shall store and protect salvaged items specified or
indicated to be reused in the work. Any items damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items.

Contractor may, at his option, furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor's property.

End of Section
PART 1 - GENERAL

1-1. THE REQUIREMENT. Contractor shall furnish all tools, equipment materials, and supplies and shall perform all labor to complete the Work associated with removal of all natural and artificial objectionable material from the designated areas of Work as indicated in the Contract Documents.

This Work shall also include the protection from damage and preservation of existing improvements, adjacent property, utility vegetation, and existing objects designated to remain.

Prior to commencing the Work, obtain acceptance from the Engineer regarding methods to be used and disposal of removed materials.

1-2. RELATED WORK SPECIFIED ELSEWHERE. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

   1. Section 02200, Earthwork
   2. Section 02050, Demolition

1-3. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS. All Work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following publications to the extent that the provisions thereof are not in conflict with other provisions of these Specifications.

Comply with the applicable editions of the following codes, regulations, and standards.

   1. Industry Standards:
      
      SSPWC Section 7-8       Standard Specifications for Public Works
                               Construction, Project Site Maintenance
      SSPWC Section 300-1     Standard Specifications for Public Works
                               Construction, Construction Methods, Clearing
                               and Grubbing
      SSPWC Section 300-6     Standard Specifications for Public Works
                               Construction, Construction Methods, Earthwork
                               for Debris Dams, and Basins
Comply with the applicable reference Specifications as directed in the General Requirements and the Additional General Requirements.

1-4. CONTRACTOR SUBMITTALS. Submittals shall be made in accordance with the General Requirements, Additional General Requirements and as specified herein.

Submit schedule of clearing, grubbing, and erosion control measures to be put in place for all work.

1-5. QUALITY ASSURANCE.

1-5.01. General. Comply with the requirements specified herein and the applicable reference Specifications of the General Requirements and Additional General Requirements.

PART 2 - PRODUCTS

2-1. CLEARING. Clearing shall consist of removing all vegetable growth such as trees, roots, stumps, shrubs, brush, limbs, and other vegetative growth. Remove all evidence of their presence from the growth surface. Clearing shall also include the removal and disposal of trash piles, rubbish, pavement, curbs, gutters, and fencing.

2-2. PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATION. Protect trees, shrubbery, and other vegetation not designated for removal from damage resulting from the Work. Cut and remove tree branches only where, in the opinion of the Engineer, such cutting is necessary to affect construction. Scars resulting from the removal of branches shall be treated with an approved tree sealant.

All trees that are planned to be cut shall be clearly marked with a red marker a minimum of 7 days prior to cutting.

2-3. GRUBBING. Grubbing shall consist of the removal and disposal of wood, stumps, or root matter a minimum of 36 inches below existing ground surface or bottom of subgrade, whichever is deeper, unless otherwise shown on the Drawings. Clearing shall include stumps, logs, roots, or root systems greater than 1.5 inches in diameter or thickness.

2-4. CLEARING AND GRUBBING FOR TRENCHING. The Contractor shall obtain Engineer’s acceptance before beginning excavation. The Contractor shall
complete clearing and grubbing prior to the start of trenching. The Contractor shall not permit excavated materials to cover vegetation prior to disposal.

2-5. **REMOVAL AND DISPOSAL OF CLEARING AND GRUBBING DEBRIS.**

2-5.01. **General.** All materials removed shall be disposed of outside the street right-of-way. Remove all rubbish and debris or those resulting from work operations as soon as possible. Do not allow pile up. Do not burn rubbish and debris on the job site. No accumulation of flammable material shall remain on or adjacent to the right-of-way. The roadway and adjacent areas shall be left with a neat and finished appearance.

2-6. **PAVEMENT, SIDEWALKS, CURBS, AND GUTTERS REMOVAL.** (NOT USED)

2-7. **STRIPPING.** Stripping shall include the removal and disposal of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped.

**PART 3 - EXECUTION**

3-1. **CLEARING AND GRUBBING.** Clearing and grubbing shall be in conformance with the SSPWC Section 300-1.NTS.

3-2. **STRIPPING.**

1. Comply with SSPWC 300-6.3.
2. Treat roots remaining in the soil with a weed killer.

3-3. **TOPSOIL.** (NOT USED)

End of Section
PART 1 – GENERAL

1-1. SUMMARY

A. The Work of this Specifications section includes all earthwork required for construction of the Work.

1-2. RELATED WORK SPECIFIED ELSEWHERE

A. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Section 02110, Clearing, Grubbing and Stripping
2. Section 02210, Excavation Support and Protection
3. Section 02220, Dewatering
4. Section 02270, Stormwater Pollution Prevention Plan

1-3. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. All Work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following publications to the extent that the provisions thereof are not in conflict with other provisions of the Specifications.

B. Comply with the applicable editions of the following codes, regulations, and standards.

1. Codes and Regulations:

   CERCLA  Comprehensive Environmental Response, Compensation and Liability Act
   SARA    Superfund Amendments and Reauthorization Act
   CA Test 217 California Department of Transportation, California Test 217, Method of Test for Sand Equivalent
2. Industry Standards:
   - ASTM B3: Standard Specification for Soft or Annealed Copper Wire
   - ASTM C12: Standard Practice for Installing Vitrified Clay Pipe Lines
   - ASTM D422: Standard Test Method for Particle-Size Analysis of Soils
   - ASTM D1248: Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
   - ASTM D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)
   - ASTM D2487: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
   - ASTM D2774: Standard Practice for Underground Installation of Thermoplastic Pressure Piping
C. Comply with the applicable reference specifications as directed in the General Requirements and Additional General Requirements.

1. Environmental Control: In accordance with General Requirements.

   a. Fugitive Dust – Dust Control Plan.

   b. Soils, Soil Borings, and Soil-Related Waste Disposal – Management plan for staging, storage, and disposal of all soil-related waste material.

   c. Hazardous Waste:

      (1) Project-Wide Hazardous Waste Management Plan.

      (2) Certifications of designated Hazardous Waste On-Site Project Manager.

   d. Construction Site Storm Water Management:

      (1) Stormwater Pollution Management.

      (2) OCSD On-Site Stormwater Management Plan.
e. Waterway Protection:
   (1) Spill Prevention, Control, and Countermeasure Plan (SPCCP).
   (2) Erosion Control Plan (ECP).

2. Plant Access Roads: In accordance with General Requirements:
   a. Emergency access.

1-2. DEFINITIONS

A. Backfill: Consists of the preparation and placement of materials for structural foundations, pipeline bedding, backfill for excavations, and fill for roadways and embankments.

B. Contaminated Soil: Contaminated soil contains chemical or biological substances which are hazardous to the health of individuals working near the soil as defined under Sections 101(14) and 101(33) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), volatile organic compounds listed in Rule 1166 of the South Coast Air Quality Management District (SCAQMD), hazardous waste as defined in California Health and Safety Code 25141, and/or hazardous waste as defined in California code of Regulations Title 22 Section 66261. Contamination is most likely to be found near underground fuel storage tanks, industrial waste disposal sites, and near freeways.

C. Embankments and roadway fills: All earth fills in holes, pits, or depressions necessary to bring the final grade or pavement subgrade to the specified contours.

D. Pipe Zone: The portion of the vertical trench cross-section occupying the space between a plane twelve (12) inches below the bottom surface of the pipe, i.e. the trench foundation line at subgrade, and a plane at a point twelve (12) inches above the top surface of the pipe. Refer to Standard Drawing No. S-010 for a pipe trench section illustration.

E. Street/Surface Zone: The portion of the vertical trench extending from the existing natural surface thirty (30) inches down to the top of the trench zone. In case the area to be trenched is under pavement, the street zone then extends from the bottom of the aggregate road base course thirty (30) inches down to the top of the trench zone. Refer to Standard Drawing No. S-010 for a pipe trench section illustration.

F. Trench Zone: The portion of the vertical trench extending from a plane twelve (12) inches above the top surface of the pipe to the bottom plane of the street zone. Refer to Standard Drawing No. S-010 for a pipe trench section illustration.
G. Unclassified Fill: Fill generated from unclassified excavation on the Work site. Consists of all fill unless separately specified.

1-3. SUBMITTALS

A. General: Submittals shall be in accordance with the General Requirements and additional requirements below.

B. Product Data: Provide product data for the following:
   1. Odor control products.
   2. Material for fill and backfill.
      a. Each on-site and borrow soil material.
      b. Test reports of each test specified under “Source Quality Control” of this section of the Specifications.
   3. Samples: Provide a sample of each type of fill material in a five (5) Gallon bucket or as requested by Engineer.
      a. Sample shall be clearly identified and easily referenced to the product data submittal and identify intended use.
      b. Sample shall be representative of the excavation or borrow. It shall not be surfaced influenced; samples within one (1) foot of surface are not acceptable.

C. Provide Certifications and other submittal documentation that confirm compliance with Article entitled “Quality Assurance” of this Specifications section.

D. Excavation Plan:
   1. Show all Project excavation areas, haul routes, and disposal sites.
   2. Work start and finish dates for each area and route.
   3. Haul truck traffic flow rates for all routes.
   4. Temporary storage of material locations.
   5. Plant, tree, lawn, irrigation, and other feature protection and repair or replacement details.
   6. Upon request by the Engineer, submit this Plan to local agencies as public information or to agencies with jurisdiction over the haul routes.

E. Odor Control - Malodorous Mitigation Plan:
   1. Identify activities that may cause odors and the mitigation options to be used.
2. Mitigation options include wetting, covering, and odor masking.

F. Contaminated Soil Mitigation Plan:

1. Soil separation processes and procedures. Include the soil segregation location.
2. Containment processes and procedures
3. Disposal procedures, including the disposal location
4. Control of particulate emissions from soils with toxic air contaminants
   a. Comply with SCAQMD Rule 1466.
   b. OCSD will submit the Contractor provided plan to SCAQMD for approval.
   c. The plan shall be written to minimize particulate emissions of soil with toxic air contaminants to the atmosphere during excavation, grading, handling and treatment of toxic contaminated soil.
   d. Provide map indicating the specific location(s) of each earth-moving activity and the concentrations of applicable toxic air contaminant(s) and location of PM10 monitors.
5. Volatile Organic Compound (VOC) emissions from Contaminated Soil
   a. Comply with requirements of SCAQMD Rule 1166.
   b. OCSD will submit the Contractor's provided plan to SCAQMD for approval.
   c. The plan shall be written to minimize VOC emissions to the atmosphere during excavation, grading, handling and treatment of VOC contaminated soil.
6. The Contaminated Soil Mitigation Plan must be approved by SCAQMD prior to starting Work.
7. Engineer will notify the SCAQMD Executive Officer as required by SCAQMD prior to any excavation.

1-2. QUALITY ASSURANCE

A. Qualifications:

1. Geotechnical Testing Agency: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1-3. DELIVERY, HANDLING, AND STORAGE

A. Soil must be accepted by the Engineer prior to delivery.
PART 2 - PRODUCTS

2-1. MATERIALS

A. Suitable Fill and Backfill Material Requirements:

1. Fill, backfill, and embankment materials shall be suitable selected or processed clean, fine earth, rock, or sand, and free from grass, roots, brush, or other vegetation; contamination; or deleterious material. Suitable materials may be obtained from onsite excavations, may be processed onsite materials, or may be imported provided these materials meet all the requirements of the Contract Documents. All necessary testing and test reports by the Contractor to verify and demonstrate suitability of materials shall be at no additional cost to OCSD.

2. Select Material: Select material shall be free from organic matter or debris. All the material shall pass through a one and a half (1-1/2)-inch screen. Not more than ten (10) percent by weight shall pass the 200-mesh sieve and the material shall have sufficient gradation to compact as directed in the Specifications. Use of select material shall be subject to the Engineer’s acceptance.

3. Granular Soil: Wherever the Term “granular soil” is used in the Contract Documents, it shall be defined as a soil having a minimum sand equivalent of 30 as determined in accordance with the latest revision of the California Department of Transportation, California Test 217 and not more than twenty (20) percent of it by weight shall pass through a 200-mesh sieve.

4. Imported Sand: Wherever the term “imported sand” is used in the Contract Documents, it shall be defined as sand having a minimum sand equivalent of seventy (70) as determined by the latest revision of the California Department of Transportation, California Test 217.

5. Granular Materials: The following types of suitable granular materials are designated and defined as described below:

   a. Crushed Aggregate Base (CAB): CAB shall conform to the requirements of SSPWC Subsection 200-2.2.

   b. Crushed Miscellaneous Base (CMB): CMB shall conform to the requirements of SSPWC Subsection 200-2.4.

   c. Crushed Rock: Crushed rock shall be the product of crushing rock or gravel.

      (1) Fifty (50) percent of the particles retained on a 3/8-inch sieve shall have their entire surface area composed of faces resulting from fracture due to mechanical crushing.
(2) Not over five (5) percent shall be particles that show no faces resulting from crushing.

(3) Less than twenty (20) percent of the particles that pass the 3/8-inch sieve and are retained on the No. 7 sieve shall be waterworn particles. Gravel shall not be added to crushed rock.

d. 3/4-inch Maximum Crushed Rock: Where crushed rock is specified on the Contract Documents, it shall conform to the following gradation:

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inches</td>
<td>-</td>
</tr>
<tr>
<td>1 1/2 inches</td>
<td>-</td>
</tr>
<tr>
<td>1 inch</td>
<td>100</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90-100</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>30-60</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>0-20</td>
</tr>
<tr>
<td>No. 4</td>
<td>0-5</td>
</tr>
<tr>
<td>No. 8</td>
<td>-</td>
</tr>
</tbody>
</table>

e. Gravel: Gravel shall be defined as particles that show no evidence of mechanical crushing, are fully waterworn and are rounded. Where gravel is specified on the Contract Documents, the material shall have the following gradations:

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>1-inch Max. Gravel Percent Passing</th>
<th>3/8-inch Max. Gravel Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 inches</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1-1/2 inches</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>1 inch</td>
<td>90-100</td>
<td>-</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>60-80</td>
<td>100</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>0-15</td>
<td>90-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>0-5</td>
<td>0-15</td>
</tr>
<tr>
<td>No. 8</td>
<td>-</td>
<td>0-5</td>
</tr>
</tbody>
</table>
f. **Drainrock**: Drainrock shall be crushed rock or gravel, durable and free from slaking or decomposition under the action of alternate wetting or drying. It shall have a sand equivalent value not less than seventy-five (75). The material shall be uniformly graded and shall meet the following gradation requirements:

<table>
<thead>
<tr>
<th>Sieve Sizes</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in</td>
<td>100</td>
</tr>
<tr>
<td>3/4-inch</td>
<td>90 - 100</td>
</tr>
<tr>
<td>3/8-inch</td>
<td>40 – 100</td>
</tr>
<tr>
<td>No. 4</td>
<td>25 – 40</td>
</tr>
<tr>
<td>No. 8</td>
<td>18 – 33</td>
</tr>
<tr>
<td>No. 30</td>
<td>5 – 15</td>
</tr>
<tr>
<td>No. 50</td>
<td>0 – 7</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 - 3</td>
</tr>
</tbody>
</table>

6. **Sand**: Sand shall conform to the requirements of SSPWC Subsection 200-1.5.

7. **Controlled Low Strength Material (CLSM)**: Controlled low strength material shall be in accordance with Specifications Section 02251, Controlled Low Strength Material.

8. **Sand-Cement Slurry**: Sand-cement slurry material mixture shall have one point five (1.5) sacks of cement per cubic yard of material.

9. **Soil Cement Material**: Soil cement material shall conform to the requirements of SSPWC Subsection 201-8.

10. **Topsoil Material**: Topsoil material shall conform to the requirements of SSPWC Subsection 800-1.1.

**B. Use of Fill, Backfill, and Embankment Material Types:**

1. **Backfill Material**: Backfill material used in the Work shall be uniform and shall contain no trash, wood, vegetation, sludge, peat, rocks or clods larger than the size allowed by the Contract Documents.

2. **Pipe Zone Backfill / Bedding Material**: Bedding material shall be as indicated in Table below.
<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Bedding Material</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Pressure Pipe</td>
<td>Granular Material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLSM</td>
<td></td>
</tr>
<tr>
<td>Ductile Iron Pipe</td>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Granular Material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLSM</td>
<td></td>
</tr>
<tr>
<td>Ductile Iron Pipe with Polyethylene Wrap</td>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Granular Material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLSM</td>
<td></td>
</tr>
<tr>
<td>Fiberglass Pressure Pipe</td>
<td>Class I</td>
<td>ASTM D3839</td>
</tr>
<tr>
<td></td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>HDPE Pressure Pipe</td>
<td>Class I</td>
<td>Class per ASTM D2774</td>
</tr>
<tr>
<td></td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Plastic Pipe</td>
<td>Class II</td>
<td>Class per ASTM D2774</td>
</tr>
<tr>
<td>Prefabricated Concrete Pipe</td>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Granular Material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLSM</td>
<td></td>
</tr>
<tr>
<td>PVC Pressure Pipe</td>
<td>Class II</td>
<td>Class per ASTM D2774</td>
</tr>
<tr>
<td>Reinforced Concrete Pipe</td>
<td>Category I</td>
<td>Category per American Concrete Pipe Association</td>
</tr>
<tr>
<td></td>
<td>Category II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Category III</td>
<td></td>
</tr>
<tr>
<td>Steel Pipe</td>
<td>Sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Granular Material</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLSM</td>
<td></td>
</tr>
</tbody>
</table>

3. Trench Zone Backfill Material: Trench backfill material shall be Select Material.
4. Street Zone Backfill Material: Street backfill material shall be Select Material.
5. Structure Backfill Material: Backfill around or behind structures shall be Select Material.
6. Pervious Backfill Material: Pervious backfill material shall be Drainrock.
7. Embankment Fill: Embankment fills shall be Select Material.
C. Unsuitable Material:

1. Material containing excessive amounts of organic matter, peat, blue clay, trash, or debris.
2. Debris produced by clearing, grubbing, and demolition of existing structures, pavement, or pipe.
3. Soil classified by test method ASTM D2487 as groups OL, CH, MH, OH or PT.
4. Soil not meeting the grading or classification specified for the Work.
5. Soil designated by the Engineer.

2-2. COMPONENTS

A. Malodorous Mitigation Products:

1. Manufacturer shall be one of the following, or equal:
   a. Simple Green
   b. Liqua-fog by Vapex, Inc.
2. Materials for odor masking shall be safe for human contact and environmentally safe.

2-3. SOURCE QUALITY CONTROL

A. Material Tests:

1. Soil:
   a. The grain size distribution of soils shall be determined using ASTM D422.
   b. The sand equivalent of soils shall be determined using ASTM D2419.
   c. The consolidation of soils shall be determined using ASTM D2435.
   d. The unconfined compressive strength of soils shall be determined using ASTM D2166.
   e. The expansion index of soils shall be determined using ASTM D4829.

2. Aggregate and Base:
   a. The gradation of concrete aggregate and base materials shall be determined using ASTM C136.
PART 3 - EXECUTION

3-1. PREPARATION

A. Protection:

1. Protect surrounding structures, utilities and other features from damage created by earthwork operations.
2. Protect and maintain erosion and sedimentation controls.

B. Preparation:

1. Clearing, grubbing and stripping shall be performed in accordance with Specifications Section 02110 Clearing, Grubbing and Stripping.

3-2. INSTALLATION

A. General: In case of conflict with the requirements of any local agency having jurisdiction, or the requirements of a manufacturer, the Contractor shall follow the most stringent requirements, as determined by the Engineer.

B. Construction activities shall be implemented in a manner that prevents damage to all existing features in the vicinity. Such features may include existing treatment and office facilities, residential structures, driveways, property walls, sidewalks, curb and gutter, or adjacent utilities.

C. Settlement Control: Prevent the settlement or collapse of soil and its negative impact to surrounding features. Any damage from settlement to new Work or existing above and below ground structures and pipes caused by the Contractor shall be repaired to the satisfaction of the Engineer, at the Contractor’s expense.

3-3. GRADING AND STOCKPILING

A. General: Control grading in a manner to prevent water from running into excavations. Obstruction of surface drainage shall be avoided, and means shall be provided whereby storm water flow is not interrupted in existing gutters, and other surface drains, or temporary drains.

B. The Contractor shall not abandon or remove any penetrations without prior acceptance of the penetration abandonment submittal and shall perform the Work only in the presence of the Engineer. Abandonment of any penetration not observed by the Engineer shall be rectified by over-drilling of the hole to its original depth and re-abandoning at the Contractor’s expense.
C. Backfill penetrations and voids with satisfactory soil.

D. Penetration abandonment of Water Wells, Monitoring Wells and Cathodic Protection Wells shall comply with California Department of Water Resources Water Well Standards.

E. The finish-graded surface of the drainrock immediately beneath hydraulic structures shall be stabilized to provide a firm, smooth surface upon which to construct reinforced concrete floor slabs.

F. Material for backfill or for protecting excavation in public roads from surface drainage shall be neatly placed and kept shaped to cause the least possible interference with public travel.

G. Stockpiling of excavated or imported materials on projects located outside of the treatment plant boundaries is only allowed in quantities sufficient to cover 2 day’s Work. At the end of the workday no stockpiles shall remain in the public right-of-way. Free access shall always be provided to all fire hydrants, water valves, meters, and private drives. It shall be the Contractor’s responsibility to locate and secure permission from agencies having jurisdiction for areas that can be used for intermediate stockpiling, if needed.

H. Temporary storage of material shall be acceptable to the Engineer prior to any storing if the locations involve OCSD property.

I. Pits and fills used for the erection of the Contractor’s construction facilities shall be filled or removed upon the completion of the Work and leveled to meet the existing contours of the adjacent ground. After all structures have been completed, the ground surface shall be brought to the finished grade elevations and relative compaction as specified in “Compaction Requirements”.

3-4. EXCAVATION

A. General: Excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the Work. The removal of said materials shall conform to the lines, grades, and cross-sections shown or ordered.

B. Furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations per Specifications Section 02210, Excavation Support and Protection.

C. Furnish, place, and maintain all pumping, ditching, or other measures for the removal or exclusion of water, including taking care of storm water,
groundwater (dewatering if required), and wastewater reaching the site of the Work from any source per Specifications Section 02220, Dewatering.

D. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable OSHA and Cal/OSHA requirements, and the Contract Documents.

E. Structure excavation shall conform to the dimensions and elevations indicated on the Contract Documents for each structure. Excavations shall extend at least twenty-four (24) inches from walls and footings to allow for placing and removal of forms, installation of services, and inspection. Undercutting shall not be permitted.

F. Notification of Engineer: Notify the Engineer at least two (2) working days in advance of completion of any structure excavation.

G. Excavation Beneath Structures: Excavations under structures shall be as shown on applicable plan details and as recommended in the geotechnical report, with the more stringent governing.

H. Excavation for Paved Areas: Excavation under areas to be paved shall extend to the bottom of the aggregate base, if such base is called for; otherwise it shall extend to the paving thickness.

I. Unsuitable Material:
   1. If excessively wet, soft, spongy, unstable, or otherwise unsuitable material is encountered, notify the Engineer for direction.
   2. Removal and replacement of material so ordered shall be paid for by OCWD as "Extra Work" unless provided for in the Schedule of Prices.
   3. Additional stabilization measures shall be paid for by OCWD as "Extra Work" unless provided for in the Schedule of Prices.
   4. If the necessity for such additional excavation and material has been occasioned by an act or failure to act on the part of the Contractor, the Contractor shall bear the full expense of the additional excavation and backfill.

J. Trenching:
   1. Maximum Length of Open Trench:
a. Unless otherwise specified or approved by the Engineer, the maximum length of open trench shall be one-hundred (100) feet or less if excavation adversely impacts an existing utility or structure whichever is less. The Contractor may employ measures to mitigated impact to impacted utilities or structures to maximize trench length up to 100 feet. This distance shall be defined as the total length at any location of open trench excavation, pipe laying, and appurtenant construction, and backfill over which temporary resurfacing has not been placed.

b. Unless otherwise specified or approved by the Engineer, the maximum length of open trench in any one location where concrete structures are cast-in-place shall be that which is necessary to permit uninterrupted progress of the structure construction.

c. In Project areas where the pipe alignment lanes have to be ready for vehicular travel at the end of each workday, all affected trenches shall be fully backfilled and base paved with the first course of pavement at the end of each day or, in lieu thereof, shall be covered by non-skid heavy steel plates adequately braced and welded, if required, to support vehicular traffic and provide a smooth ride without excessive noise.

d. All open trench shall be properly shored.

2. Unless specified otherwise elsewhere in this section of the Specifications or Drawings, the bottom of the trench shall be excavated uniformly to at least twelve (12) inches below the grade of the bottom of the pipe.

3. Trench bottom raked by toothed excavators is not acceptable.

4. Trench Width For Pipes Over forty-two (42) inches In Diameter: The overall trench width for pipes with diameters larger than forty-two (42) inches shall not be more than twenty-four (24) inches nor less than twelve (12) inches wider than the largest outside diameter of the pipe to be laid therein, measured at a point twelve (12) inches above the top of the pipe, exclusive of branches. Excavation and trenching shall be true to the line so that the pipe is centered within the trench and a clear space of not more than twelve (12) inches nor less than six (6) inches in width is provided on each side of the largest outside diameter of the pipe in place. For this purpose, the largest outside diameter shall be the outside diameter of the bell on bell and spigot pipe.

5. Trench Width For Pipes Under forty-two (42) inches In Diameter: The overall trench width for pipes with diameters of forty two (42) inches or less shall not be more than sixteen (16) inches nor less than twelve (12) inches wider than the largest outside diameter of the pipe to be laid therein, measured at a point twelve (12) inches above the top of the pipe, exclusive of branches. Excavating and trenching shall be
true to line so that the pipe is centered within the trench and a clear space of not more than eight (8) inches nor less than six (6) inches in width is provided on each side of the largest outside diameter of the pipe in place. For this purpose, the largest outside diameter shall be the outside diameter of the bell, on bell and spigot pipe.

K. Excavation in Lawn Areas: (Not used)

L. Excavation in Vicinity of Trees:

1. Except where trees are shown to be removed, trees shall be protected in place from injury during construction operations. No tree roots over two (2) inches in diameter shall be cut without expressed permission of the Engineer. Trees shall be supported and irrigated during excavation by means previously submitted to and reviewed by the Engineer. The Contractor shall replace all trees shown on the Contract Drawings to be protected in place that have sustained permanent damage.

M. Rock Excavation:

1. General: Rock excavation shall include removal and disposal of the following:
   a. Rip rap located at grade and below grade.
   b. All boulders measuring twelve (12) inches or larger.
   c. All rock material in ledges, bedding deposits, and unstratified masses which cannot be removed without systematic drilling and blasting.
   d. Concrete or masonry structures which have been abandoned.
   e. Conglomerate deposits which are so firmly cemented that they possess the characteristics of solid rock and which cannot be removed without systematic drilling and blasting.

2. Where solid rock or rock excavation as defined above is encountered, it shall be removed below grade and the excavation backfilled and properly compacted with approved material to provide a compacted foundation cushion with a minimum thickness of twelve (12) inches.

3. In areas where proposed pipelines cross over rock, cobbles or boulders, the pipe bedding cushion shall be twenty-four (24) inches thick and properly compacted, or, if required by the Engineer, slurry-encased at the crossing locations.

4. Removal of rock undisclosed in the Contract Documents, and installation of additional bedding material or slurry encasements over and above Contract requirements shall be paid for by OCSD as “Extra Work” unless provided for in the Schedule of Prices.
5. Explosives and Blasting: Blasting shall not be permitted.

N. Over-Excavation:

1. Where excavation is carried below the limits shown on the Contract Documents, adjustments shall be made as determined by the Engineer to meet requirements incurred by the deeper excavation.

2. In general, over depth excavation in such locations shall be rectified by backfilling with approved fill material and compacted as specified in “Compaction Requirements”, unless directed otherwise by the Engineer.

3. Over-excavations neither required by the Contract Documents nor directed by the Engineer shall be rectified at the expense of the Contractor.

O. Disposal of Excess and Unsuitable Excavated Material:

1. All unsuitable and surplus material shall be disposed of in a legal manner by the Contractor and all costs associated with disposal shall be borne by the Contractor.

2. Temporary storage of material for disposal shall be acceptable to the Engineer prior to any storing if the locations involve OCSD property or the public right-of-way.

3. No unsuitable or surplus material shall be dumped on public or private property unless the Contractor secures written permission to do so.

P. Foundation Material Treatment:

1. Footings on rock: The rock shall be fully uncovered, and the surface thereof shall be removed to a depth sufficient to expose sound rock. The rock shall be toughly leveled off or cut to approximate horizontal and vertical steps and shall be roughened. Seams in the rock shall be grouted under pressure or treated as the Engineer may direct and the cost thereof will be paid for as “Extra Work”.

2. Footings on excavated surface other than rock and no piles are used: Care is to be taken not to disturb the bottom of the excavation. Final removal of the foundation material to grade shall not be made until just before the concrete or masonry is placed.
a. Except when over excavation is directed by the Engineer, excavation below grade shall be replaced at the Contractor’s expense with the same class of concrete specified for the structure and at the time the concrete for the structure is being placed. Where it is determined by the Engineer that it will not be detrimental to the structure, the Contractor may backfill above grade with not less than the relative compaction as specified in “Compaction Requirements” and then trim to the specified grade.

b. Where the original ground is below the specified elevation for footings, the Contractor shall backfill to six (6) inches above grade with not less than the relative compaction as specified in “Compaction Requirements” and then excavate to the prescribed grade prior to placing concrete.

Q. Malodorous Soil:

  1. In the event soils are malodorous, nuisance odors which may cause odor complaints, shall be mitigated by pre-approved methods in the accepted “Odor Control - Malodorous Mitigation Plan” submittal.

3-5. CONTAMINATED SOIL

A. General:

  1. All regulatory imposed notifications not specifically identified as an OCSD responsibility shall be executed by the Contractor in accordance with SCAQMD written approval and in accordance with Rules 1166 and 1466.

  2. In the event OCWD finds the soil to be non-contaminated, the Contractor will be notified and required to dispose/reuse the soil as originally planned by the Contractor at no additional cost to OCWD.

B. Discovery of Potentially Contaminated Soil:

  1. Immediately notify the Engineer within twenty-four (24) hours if any soil suspected of being contaminated or malodorous is encountered. If the initial notification was not in writing due to time considerations, a written notification shall follow within twenty-four (24) hours, or a timeline accepted by the Engineer of the initial notification. The written notification shall indicate the Contractor’s basis for suspecting contaminated soil and identifying the location and soil depths within the project area that is suspected to be contaminated. All applicable construction activity in the potentially contaminated soil area shall immediately cease until resolved.
2. Upon notification of suspected soil, OCSD will immediately test the atmosphere near the soil and take soil samples as appropriate to determine the nature and extent of potential contamination.
   a. Samples are to be representative of the excavation or borrow. Individual samples shall be taken at varying depths throughout the Project. Samples shall not be surfaced influenced; samples within one (1) foot of surface are not acceptable.
   b. Samples shall be taken in accordance with soil laboratory testing guidelines, preferably by a laboratory technician or representative. Soil samples shall be sealed in five (5) gallon plastic bags and/or five (5) gallon buckets and be transported to the laboratory testing facility within twenty-four (24) hours of collection.
   c. VOC concentrations will be measured by OCSD as specified by SCAQMD Rule 1166.
   d. If VOC concentrations meet or exceed SCAQMD Rule 1166 contaminated soil limit, OCSD will notify SCAQMD prior to proceeding with any additional Work.
   e. After notification and approval from SCAQMD, the Engineer may direct the Contractor to segregate the potentially contaminated soils on 8-millimeter plastic sheeting from the non-contaminated soil and minimize Project delays by continuing the Work.

3. Excavate, grade, handle, treat (if required), and/or dispose-of VOC or toxic contaminated soil in strict compliance with the provisions set forth in the approved Contaminated Soil Mitigation Plan, SCAQMD Rule 1166, Rule 1466, and the procedures and practices set forth in the emergency SCAQMD VOC or Toxic Contaminated Soil procedures as provided by the Engineer.

C. Minimize Fugitive Dust Emissions with Toxic Air Contaminants per SCAQMD Rule 1466.

1. The applicable toxic air contaminant(s) are defined by SCAQMD.
2. Follow SCAQMD dust control, signage, and notification provisions.
3. Follow SCAQMD dust control supervisor oversight and training provisions.
4. Follow SCAQMD PM10 monitoring and recordkeeping provisions.
   a. Toxic air contaminants will be measured by Contractor as specified by SCAQMD using PM10 monitors.
   b. If toxic air contaminant concentrations meet or exceed the PM10 SCAQMD contamination limit, cease earth moving operations and apply dust control measures.
c. Apply dust control measures until PM10 concentration is ≤25 µg/m³ averaged over 30 minutes.

5. Coordinate Work with Engineer who will notify the SCAQMD Executive Officer as required by SCAQMD.

3-6. BACKFILL

A. General:

1. Backfill shall not be dropped directly upon any structure or pipe.
2. Backfill shall not be placed around or upon any structure until the concrete has attained specified strength to withstand the loads imposed.
3. Backfill around water retaining structures shall not be placed until the structures have been tested, coated (if applicable), and the structures shall be full of water while backfill is being placed.
4. No material greater than three (3) inches in any dimension shall be placed within two (2) feet of any pipe, manhole or structure.
5. Excavated material and material from borrow sites may be used where they meet the requirements of the Contract Documents. Blending or other processing may be necessary before a material is acceptable to the Engineer.
6. Borrow sites shown on the Plans shall be excavated within the limits indicated.
7. All costs for testing, processing and transporting materials shall be included in the Contract Price.
8. All imported fill material shall be sampled at the Contractor’s expense and shall be subject to acceptance by the Engineer.
9. Temporary storage of material shall be acceptable to the Engineer prior to any storing if the locations involve OCSD property or the public right-of-way.
10. Water in Excavation: Except for materials being placed in over-excavated areas or trenches, backfill shall be placed after all water is removed from the excavation. In general, starting at subgrade level, excavations shall always be dry.

B. Placement of Bedding, Pipe, And Trench Backfill:

1. General: Bedding shall be provided for all sewers, drainage pipelines, and other gravity flow pipelines, unless otherwise specified or shown on the Plans.
2. Bedding: An initial minimum pipe bedding thickness of twelve (12) inches shall be placed on the trench bottom, mechanically worked into the trench bottom if required by subgrade soil conditions, and shall be given a final trim, using a string line for establishing grade.

   a. Replace any material below the foundation line that has been disturbed or removed during excavation with bedding material at no additional cost to OCWD. This bedding material shall be compacted to a minimum relative density as specified in “Compaction Requirements”.

   b. Shape the bedding underneath the pipe bells such that bell holes are fully supported, including full support along the pipe barrel without point loading.

   c. Pipe shall be carefully bedded as shown on the appropriate bedding detail and as recommended by the pipe manufacturer.

   d. Provide a firm bedding support along the full length of the pipe and fittings.

3. Pipe Zone Backfill:

   a. Prior to pipe zone backfill, ensure that pipe sections have been properly joined per manufacturer’s requirements.

   b. Normal width Trench: The trench area around the pipe shall be backfilled with Bedding Material as shown on OCSD Design Standard Drawings S-010. Backfilling of the pipe zone shall be carried out simultaneously on each side of the pipe to prevent displacement. Care shall be exercised in backfilling to prevent damage to the pipeline coating, cathodic bonds, the pipe joint, or the pipe itself. The Contractor shall ensure by means such as use of a vibrator or shovel slicing that the pipe haunches are completely filled with bedding material with no voids remaining.

   c. Over width Trench: For sewer pipe of all materials, where the trench width, measured at a point twelve (12) inches above the top of the bell of the pipe is wider than the maximum set forth under “Trenching”, the trench area around the pipe shall be set with steel reinforcing and backfilled with 2,500 psi concrete to form a cradle for the pipe as shown on OCSD Design Standard Drawings S-011 and S-012. Special care shall be used when pouring the concrete cradle around the pipe so no displacement will occur. In the event of movement, remove and replace all pipe and cradle affected. Concrete cradle Work as required above shall be performed at the expense of the Contractor and shown on the As-Built Drawings.

4. Trench Zone Backfill: After the pipe zone backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the trench zone may proceed. Backfill
shall proceed in lifts not greater than can be compacted by the mechanical equipment used.

5. Surface Zone Backfill: The Street/Surface Zone is the final backfill zone and shall be of the following:
   a. Under areas with no roads, structures, or any type of heavy traffic, final backfill for the street zone shall be with the same material as for the trench zone, with topsoil where required, unless conditions require the use of another designated material as indicated in the Contract Documents.

6. Backfill Around Manholes: Backfill around manholes in public streets above the concrete cast-in-place base and below the street zone shall be by sand-cement slurry with one point five (1.5) sacks of cement for each cubic yard of slurry.

7. Pipes Under Structures: Backfill for pipes under structures shall be with the same material as used in the pipe zone, except where the Contract Documents require concrete encasement or other backfill.

C. Embankment Construction:

1. Unacceptable Ground Surface Condition: If the ground surface is in a loose, uncompacted condition, it shall be excavated to the maximum depth shown in the Plans, as stated in the geotechnical report, or as defined by the Engineer and compacted to the minimum relative compaction as specified in “Compaction Requirements”.

2. Acceptable Ground Surface Condition: If the ground surface is in an acceptable condition, it shall be moistened, scarified to a depth of six (6) inches, and rolled or otherwise mechanically compacted to a minimum relative compaction as specified in “Compaction Requirements”.

3. Embankment fill material shall be placed and spread evenly in horizontal layers not deeper than eight (8) inches. Each layer shall be moistened or aerated, as necessary, and compacted as specified in “Compaction Requirements”. No material shall be placed beyond the sloping lines of embankment unless so ordered by the Engineer.

4. Slopes: When an embankment fill is to be made and compacted against hillsides or fill slopes steeper than four to one (4:1), the slopes of hillsides or fills shall be horizontally benched to key the embankment fill to the underlying ground. A minimum of twelve (12) inches normal to the slope of the hillside or fill shall be removed and re-compacted as the embankment fill is brought up in layers. Material thus cut shall be re-compacted along with the new fill material at the Contractor’s expense.
5. Pipe Installation in Fill: Where pipelines are to be installed in embankment or structure fills, the fills shall first be constructed to a level at least one foot above the top of the pipe, followed by trench excavation for the pipe.

6. Fill over Pipes: Where embankment or structure fills are constructed over pipelines, the Contractor shall take great care not to damage the pipes. Initial layers of fill over the pipes shall be constructed using light placement and compaction equipment that does not damage the pipe.

D. Placement of Backfill Materials for All Structures:

1. General: Structure backfill shall not be placed until the structure has been inspected by the Engineer and approved for backfilling.

2. Backfill materials shall be evenly placed in uniform horizontal loose lifts and moisture-conditioned or aerated as necessary. Unless otherwise specified, each lift shall not exceed eight (8) inches in thickness and compacted to a minimum relative compaction as specified in “Compaction Requirements”.
   a. Each layer of fill material shall cover the length and width of the area to be filled before the next layer of material is placed.
   b. The moisture content of the material shall be controlled, and water shall be applied as necessary to achieve the specified compaction in “Compaction Requirements” at optimum moisture content and for the prevention of dust nuisance.
   c. No fill material shall be placed on standing water in any excavation.

E. Compaction:

1. General: In accordance with the Plans and Standard Drawings, soil material shall be required to be compacted to a percentage of maximum dry density. The maximum dry density at optimum moisture content shall be determined in accordance with the latest version of ASTM D1557. In-place field density tests shall be performed in accordance with ASTM D6938 and ASTM D3017 (nuclear gauge). The type, number and location of field density tests will be determined by the Engineer.
   a. Nuclear tests per ASTM D6938 and D3017 for field compaction test results.
   b. If soil material is not within two (2) percentage points of optimal moisture content, the Contractor shall either add water or dry the soil material by moving the soil to aerate it sufficiently such that the optimum moisture content is achieved at no additional cost to OCWD.
c. Testing of soils shall also comply with any permit conditions included as part of this Contract.

2. The backfill shall be placed in horizontal layers of the specified depths or, where not specified, of such depths accepted by the Engineer and compatible with the compacting equipment being used and the backfill material being placed.

3. Each layer shall be evenly spread, properly moistened or dried as necessary, and compacted to the relative compaction as specified in “Compaction Requirements”.

4. Compaction Requirements: The following compaction test requirements shall be in accordance with ASTM D1557. Where agencies other than OCSD or utility company requirements govern, the highest compaction densities shall apply.

<table>
<thead>
<tr>
<th>Location or Use of Fill</th>
<th>Percentage of Maximum Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe zone backfill of bedding material and over-excavated</td>
<td>90</td>
</tr>
<tr>
<td>zones under bedding</td>
<td></td>
</tr>
<tr>
<td>Trench zone backfill material</td>
<td>90</td>
</tr>
<tr>
<td>Street zone and ABC subgrade backfill material</td>
<td>95</td>
</tr>
<tr>
<td>Embankments, not beneath paved areas or structures</td>
<td>90</td>
</tr>
<tr>
<td>Embankments, beneath paved areas or structures</td>
<td>95</td>
</tr>
<tr>
<td>Backfill beneath structures, hydraulic structures</td>
<td>95</td>
</tr>
<tr>
<td>Backfill around structures, on reservoir or structure roof</td>
<td>95</td>
</tr>
</tbody>
</table>

5. Compaction Equipment Restrictions:
   a. Equipment weighing more than ten-thousand (10,000) pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time, but not less than five (5) feet.
   b. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations.

6. Any damage or displacement to pipes or structures as a result of the Contractor’s operation shall be repaired or replaced at the Contractor’s expense.
3-7. **FIELD QUALITY CONTROL**

A. Field Testing and Inspections:

1. Compaction:
   a. OCWD will pay for the initial cost of compaction tests. OCWD will monitor soils compaction efforts by the Contractor using a testing laboratory of the Engineer's choice.
   b. Notify the Engineer twenty-four (24) hours in advance of compacting operations.
   c. Stop Work as required to provide safe access to conduct the tests. Make all necessary excavations for compaction tests as directed by the Engineer.
   d. All Contractor’s Work in connection with compaction testing shall be included in the Contract Price, and no additional allowance will be made therefore.

B. Corrective Actions:

1. Should material test results not comply with Contract requirements, remove the unacceptable material and replace it with acceptable material at no cost to OCWD.
2. Should compaction failures occur, testing frequencies shall increase at the discretion of the Engineer. Any required re-testing shall be at the Contractor’s expense.

3-8. **PROTECTION**

A. General: Comply with the General Requirements.

B. Maintenance of Protective Measures: Maintain protective devices until Work is ready for acceptance.

C. Removal of Protective Measures: Unless otherwise directed, remove protective devices and complete final cleaning for acceptance of the Work.

End of Section
ON-SITE EXCAVATED MATERIAL

- SUITABLE
- UNSUITABLE
  - UNCONTAMINATED
  - CONTAMINATED
    - NON-HAZARDOUS
    - HAZARDOUS
LATERAL EARTH PRESSURE

\[ P = P_g + P_s \\
= 0.4q + 40H_1 \text{ (300 psf minimum)} \]

\[ P_d = 300 \frac{H_1}{2} \leq 2,000 \text{ psf} \]
(applied over twice the pile width)

Notes:
1. All values of height \( H \) in feet, pressure \( P \) and surcharge \( q \) in pounds per square foot (psf).
2. Values for temporary excavations in medium stiff to stiff clay using braced flexible walls.
3. For traffic surcharge, assume a 250 psf uniform pressure along the top 10 feet.
4. Earth pressures assume no hydrostatic pressures. If hydrostatic pressures are allowed to build up, the incremental earth pressures below the groundwater level should be reduced by 50 percent and added to hydrostatic pressure for total lateral pressure.

TIEBACKS

ACTIVE WEDGE LINE

\[ B = 10-15 \text{ degrees} \]
\[ C = 10 \text{ ft (minimum)} \]

\[ l_u = \text{Unbonded length, 20'} \text{ min beyond active wedge (not to be used for tieback capacity)} \]

\[ l_b = \text{Bonded length, 20'} \text{ min (allowable tieback length for capacity)} \]

\[ f_{all} = \text{Allowable tieback friction/square foot surface area} = 2,000 \text{ psf} \]
OCSD Section 02200-3

SCHEMATIC FILL PROFILE

STRUCTURAL BACKFILL

UNCLASSIFIED FILL

SLOPE AS SHOWN ON DRAWINGS OR AS SPECIFIED HEREIN

2'–0" CRUSHED ROCK OR COMPACTED CAB

GEOTEXTILE AS REQ’D BASED ON SOIL CONDITIONS

PILES AS SHOWN ON DRAWINGS

GEOTEXTILE
PIPE PLACEMENT OUTSIDE OF TRAVELED RIGHT-OF-WAY AND IN OPEN COUNTRY

CONTRACTOR SHALL MATCH EXIST NATURAL SURFACE OR FINISHED GRADE

EXISTING NATURAL SURFACE

STREET ZONE 2'-6"

TRENCH ZONE

PIPE ZONE

FOUNDATION LINE 12" MIN.

PIPE

UNDISTURBED BOTTOM OR RECOMPACTED TO 90% RELATIVE COMPACTION.

0.4 OD

PIPE INSTALLATION AND PAVEMENT REPLACEMENT

NOTE:
TRENCH WIDTH, BEDDING AND BACKFILL MATERIALS, COMPACTION AND PAVING PER SPECIFICATIONS.
OCSD Section 02200-S-020

TYPE I

EXISTING SEWER

2' MIN.

2' MIN.

6" CONCRETE ENCASEMENT OF VCP
(OR INSTALL DUCTILE IRON PIPE W/O ENCASMENT.)

BANDED RUBBER COUPLINGS (TYP.)

3' MIN. CLEARANCE

6" MIN. (TYP.)

PIPE ENCASEMENT PER S-100

W

DEPTH OF COVER

0' TO 8'

8' TO 16'

W

D

BAR #

D

BAR #

3'

12"

4(13)

12"

4(13)

4'

12"

4(13)

12"

5(16)

5'

12"

4(13)

16'

5(16)

6'

12"

5(16)

16'

5(16)

7'

12"

5(16)

16'

6(19)

8'

12"

5(16)

16'

6(19)

9'

12"

6(19)

16'

8(25)

10'

12"

6(19)

16'

8(25)

NOTE:

() DENOTES METRIC SYSTEM.
PART 1 - GENERAL

1-1. SUMMARY. Furnish all labor, equipment, and materials to construct, install, and remove the entire shoring system including removal of lagging, soldier beams, bracing, and de-tensioning of tiebacks. Full compensation for the shoring and its removal shall be considered as included in the Contract Price and no additional compensation will be allowed. Contractor shall, at its cost, obtain permits from all regulatory agencies as required for all its shoring Work.

Without exception, no component of any of the shoring system shall extend into OC Flood Property.

1-2. RELATED WORK SPECIFIED ELSEWHERE. The requirements of the following sections and divisions apply to the Work of this section. Other sections and divisions of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Section 02200, Earthwork

1-3. REFERENCE CODES, REGULATIONS, AND STANDARDS. All Work specified herein shall meet or exceed the applicable requirements of the publications referenced in this Specifications section. The publication references are summarized in this Article for Contractor’s convenience. However, Contractor shall be responsible for compliance with all requirements referenced in this Specifications section, even if they are not included in this summary Article. If there is a conflict between the requirements of the referenced publications and other provisions of the Specifications, the other provisions shall prevail.

Comply with the applicable editions of the following codes, regulations, and standards.

1. Codes and Regulations:
   - CFR: Code of Federal Regulations
   - CCR: California Code of Regulations, Title 8, Industrial Relations (Cal/OSHA)
   - CLC: California Labor Code
2. Industry Standards:
   SSPWC "Greenbook", Standard Specifications for Public Works Construction

3. Other Standards:
   a. Submissions for Review: In accordance with General Requirements
      1) Shoring and Bracing Plan:
         a) Method for shoring.
         b) Sequence of construction.
         c) Noise abatement measures as required.

The construction and installation of all equipment and materials shall comply with all provisions of the codes, regulations, and standards specified above, as applicable, and other applicable Federal, State and local codes, laws and regulations.

1-4. SUBMITTALS. Submittals shall be made in accordance with the general requirements, additional general requirements and as specified herein.

Review by the Engineer shall not relieve the Contractor of the responsibility for the adequacy of the shoring. If, during the progress of the Work, it is determined by the Engineer or agencies having jurisdiction that the various plans are inadequate, the Contractor shall, at its expense, make adjustments as may be necessary to perform the Work in a manner acceptable to the Engineer and the agencies having jurisdiction.

A. Shoring and Bracing Plan:

1. Pursuant to California Labor Code Section 6705, Contractor shall submit to the Engineer a detailed design for all shoring. Design of shoring shall be in accordance with the applicable requirements of the Construction Safety Orders of the Division of Industrial Safety (California Code of Regulations, Title 8. Provide more extensive shoring and/or bracing systems than those required by the Construction Safety Orders when necessitated by conditions indicated in the Contract Documents, or otherwise required by the Work.

2. Trenches five (5) feet deep or greater require a protective system.

3. Excavations twenty (20) feet or deeper shall be prepared, signed and stamped by a qualified Civil or Structural Engineer and employed by an independent design consultant firm insured against errors and omissions to the extent required by OCSD.
4. The Shoring and Bracing Plan shall also include installation and removal methods.

B. Shop Drawings:

1. Site location map referencing existing structures, utilities, and features potentially influenced by the performance of shoring, bracing, sloping, trenching, or structure excavation.

2. Include detailed plans, elevations, and various sections indicating all equipment, dewatering systems, excavation slopes, shoring components and connections and showing all structures and utilities potentially influenced by the performance of shoring, trenching or structure excavation along with supporting calculations.

3. Notes including sequence of construction, materials, and other clarification as required by the California Labor Code, SSPWC, and the Contract Documents.

4. Design of all shoring, bracing, and sloping of the sides of excavation, and other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation, in compliance with California Labor Code Section 6705, SSPWC Section 7-10.4.2 and, if applicable, the Specifications section entitled “Measurement and Payment”.

C. Survey:

1. Submit copies of all shoring monitoring survey sheets showing all survey points and dates, including baseline shots, to the Engineer. Also provide a comprehensive summary spreadsheet.

1-5. QUALITY ASSURANCE.

A. Qualifications:

1. Surveyor: licensed in the State of California
2. Civil Engineer: licensed in the State of California
3. Structural Engineer: licensed in the State of California

1-6. SITE CONDITIONS. Field Measurements and Conditions: In addition to the provisions of the General Requirements, verify dimensions and obtain field measurements prior to producing shop drawings and ordering products. Verify
field conditions and adjoining Work before proceeding with Work specified in this section.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION**

3-1. **PREPARATION.** Identify all features and facilities, including but not limited to structures, utilities, roads, sidewalks, curb & gutter, in jeopardy due to excavation. Contractor shall take all measures necessary, subject to acceptance by the Engineer, to protect these facilities.

Contractor shall, at its cost, obtain permits from all regulatory agencies as required for all its shoring Work.

3-2. **INSTALLATION.** Contractor shall not begin excavation operations until the shoring design has been accepted by the Engineer.

Contractor shall be entirely responsible for designing, providing, and constructing shoring and bracing to prevent slides and/or cave-ins, to protect all existing and new facilities, structures, utilities (above and below grade) and other improvements in the vicinity from damage, and to protect workers as required. All costs associated with these protective measures shall be borne by the Contractor. All costs associated with repair of disturbed materials under existing facilities, including pipelines, shall be the Contractor's responsibility.

1. Shoring support systems adjacent to features or facilities shall be designed to withstand all loads applied to the shoring system. Where shoring needs to be utilized to support such adjacent structures or facilities and the potential for excessive deflection that can lead to structure settlement is present, braced or tieback shoring shall be utilized.

2. Shoring and sheeting shall also be installed during excavation as necessary to prevent disturbing material that is under an adjacent structure or pipe.

3. Responsible for providing more extensive shoring and/or bracing systems than those required by the OCSD Safety Standards and the Construction Safety Orders when necessitated by conditions indicated in the Contract Documents, or otherwise required by the Work.

The design of excavations, pits, and shoring should consider space necessary for air monitoring and ventilation equipment to maintain a safe environment for workers and construction.
Shoring and sheeting/bracing needs to be installed and removed carefully such that the bedding surrounding the installation of pipes does not slough or move within the pipe zone which would affect the proper support for bedding material under the haunches of the pipe. If the bedding material moves from under the pipe haunches after removal of shoring or sheeting/bracing, the Contractor shall backfill the pipe haunches with cementitious flowable fill at no additional cost to OCSD.

Shoring shall be removed cautiously such that no damage of any type is caused to existing or newly constructed facilities. Where holes are left from beams or other components used for shoring, the Contractor shall use sand-cement grout as determined by the Engineer to consolidate the holes.

3-3. FIELD QUALITY CONTROL.

A. Field Testing and Inspections:
   1. Monitoring of shoring deflection shall be performed.
   2. Inspect shoring daily for visible signs of defects, deficiencies, irregularities, or damage.

B. Corrective Actions:
   1. Notify the Engineer immediately of any damage or if shoring deflection exceeds the allowable limit.
   2. Replace or repair Work to eliminate defects, deficiencies, or irregularities.

End of Section
PART 1 - GENERAL

1-1. SUMMARY. The Work of this Specifications section includes construction dewatering. The capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and allow excavation and construction to proceed on dry, stable subgrades.

1-2. RELATED WORK SPECIFIED ELSEWHERE. The requirements of the following sections and divisions apply to the work of this section. Other sections and divisions of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

See 01140 Work Restrictions for potential use of 84-inch for conveyance of dewatering flow to Plant 2.

1-3. REFERENCE CODES, REGULATIONS, AND STANDARDS. All work specified herein shall meet or exceed the applicable requirements of the publications referenced in this specifications section. The publication references are summarized in this article for Contractor's convenience. However, Contractor shall be responsible for compliance with all requirements referenced in this specifications section, even if they are not included in this summary article. If there is a conflict between the requirements of the referenced publications and other provisions of the specifications, the other provisions shall prevail.

Comply with the applicable editions of the following codes, regulations, and standards.

1. Codes and Regulations:
   - NPDES National Pollutant Discharge Elimination System
   - RWQCB Regional Water Quality Control Board
   - OCSD Orange County Sanitation District
   - NEC National Electric Code
   - NFPA National Fire Protection Agency

2. Industry Standards:
   - SSPWC “Greenbook”, Standard Specifications for Public Works Construction
3. Other Standards:
   a. Submissions for Review: In accordance with General Requirements
      1) Dewatering Plan - Location(s) and capacity of equipment.
      2) Permit Application for Authorization to Discharge to the OCSD sewer system.

The construction and installation of all equipment and materials shall comply with all provisions of the codes, regulations, and standards specified above, as applicable, and other applicable Federal, State and local codes, laws and regulations.

1-4. SUBMITTALS.

A. Submittals shall be made in accordance with the General Requirements, Additional General Requirements and as specified herein.

1. Submit a Groundwater Control Plan (GWCP) for the dewatering of the Project excavations for review and acceptance by the Engineer.

   a. The GWCP shall be prepared by a Dewatering System Geotechnical Engineer or a Dewatering System Designer in collaboration with a Dewatering System Geotechnical Engineer.

   b. Detailed description of the design methods, schedule, and equipment the Contractor proposes for the dewatering systems maintaining the excavation in a dewatered, hydrostatically controlled condition. Include any supplemental water control systems, water treatment systems, and observation systems.

   c. Drawings indicating the location and size of all dewatering system elements. This includes berms, dikes, ditches, wells, vacuum well points, sumps, observation wells, gravel drains, treatment facilities, discharge lines, flow meters, and discharge.

   d. Design data and calculations. Information supporting the dewatering systems performance capability and adequacy of the Dewatering System.

      1) Information supporting the location, size, adequacy and number of wells, vacuum well points, gravel drains, sumps and discharge lines

      2) Information supporting the adequacy and suitability of discharge pipe sizes, pumps, filters/gravel packs, screens, and treatment facilities.

      3) Documentation in support of its filter grain size determination including grain size distributions, calculations, and formulae used in matching filter material to formation.
4) Specifications and manufacturer’s literature of materials
   
e. Contingency plan in the event that it becomes necessary to reduce or cease dewatering flows due to storm events, unforeseen circumstances, or as directed by the Engineer.
   
f. The dewatering schedule, operation, maintenance, removal and abandonment procedures.

B. Field Quality Control Reports:

1. Certificate of gravel pack material quality and gradation prior to delivery.
2. Provide flow meter calibration documentation to the Engineer prior to use.
3. Provide the Engineer with driller’s logs and formation samples at five (5)-foot depth intervals for each dewatering well. Information to be submitted within one (1) week of competed well.
4. Within forty-eight (48) hours of completion of each observation well, provide the Engineer with a draft well log and in-situ, continuous core samples boxed and labeled with the well number, depth of sample, and date collected.
   a. Survey the coordinates of each observation well and include them on the log provided to the Engineer. Survey measuring point elevations on all observation wells to zero point zero one (0.01)-foot precision. Survey all measuring points to a Plant Datum.
5. Monthly submission of the daily record of the flow of the entire dewatering system.
   a. Notify Engineer within twenty-four (24) hours of any changes in dewatering discharge flow of twenty-five (25) percent or more.

C. If the point of discharge is a sanitary sewer not owned by OCSD, those owners shall also receive the required submittal information, plus any other information deemed necessary by that owner.

D. If the Engineer determines it is necessary to dewater to the MS4 system, provide all documents to the Engineer for submission to the RWQCB. The Engineer will notify the Contractor once permit coverage has been obtained and discharge can commence.

E. Provide copies of all Permits and letters obtained from all authorities having jurisdiction.

F. Submit written documentation of abandonment of all well points, wells, or other penetrations below the excavation subgrade including unique
identification number, location coordinates, date and time of abandonment, and the names of the Contractor’s personnel performing the abandonment.

1-5. QUALITY ASSURANCE.

A. Qualifications:

1. Use a California state licensed water well driller for installation of all well points and wells.

2. Professional Engineer: A professional engineer licensed in the State of California

3. Land Surveyor: A land surveyor licensed in the State of California

4. Geotechnical Engineer: A geotechnical engineer licensed in the State of California

B. Desilting Requirements:

1. Provide, install, remove, operate, and maintain all materials and equipment (including tanks, filters, pumps, and piping) for distribution and treatment of the discharge from the groundwater control systems.

2. Install, operate, and maintain a water treatment system to provide for settling of suspended solids in the discharge from the dewatering and sumping systems.

3. All dewatering operations require the use of a desilting tank with a stainless-steel sampling port and a drip container so that the Engineer may collect periodic dewatering samples. The desilting tanks shall be covered with sturdy and air-tight covers so no odors can escape, and no illegal dumping is possible. The air-tight covers shall be maintained throughout the dewatering period, and only removed when necessary for silt removal or other maintenance activities.

4. The desilting tank shall be located in a safe and easily accessible location. The system used for desilting the water shall be a baffled structure and shall provide not less than five (5) minutes detention time and have a "flow-through" velocity not exceeding zero-point two (0.2) foot per second at the anticipated peak flow. The desilting box shall be cleaned as required to maintain the detention time and flow-through limitations specified above. The intent is to avoid any addition of soil materials from dewatering operations into the receiving sewer.

5. An equivalent to the desilting box is particle filtration, sized to filter down to four hundred (400) microns. The particle filtration device shall be water tight and the filter element shall be cleaned/changed as required to maintain flow-through. The filter shall be located in a safe
and easily accessible location. It is the responsibility of the Contractor to dispose of spent filters and accumulated silt in a safe and legal manner.

6. The method of desilting and point of disposal of water shall be subject to the Engineer’s acceptance.

7. Monitor discharge from all parts of the system to ensure that the TSS remains below one hundred (100) ppm. Contractor shall repair or replace the system that does not comply with this requirement.

8. Provide all of the equipment and fittings for observation and measurement of sand content. Monitor system discharge sand content daily for one week after installing any well point, pumped well, or sump/drain trench and weekly, thereafter.

C. OCSD Sanitary Sewer Discharge Requirements:

1. Direct or indirect discharge (e.g. a non-OCSD operated sewer that ties into the OCSD system) of water from dewatering operations into OCSD sanitary sewer system first requires a Contractor application for a no-fee permit issued by OCSD prior to any discharge.

2. For permit application, obtain and complete required documents from the Engineer to secure an Authorization to Discharge Letter from OCSD’s Source Control staff. Allocate a minimum of ten (10) working days for this process.

3. Discharge of dewatering to OCSD’s collection system shall be monitored by the Contractor for Total Suspended Solids (TSS).

D. Storm Drain Discharge Requirements:

1. Discharge of water from dewatering operations into the municipal separate storm sewer system (MS4, aka: storm drains and flood control channel system) is governed by National Pollutant Discharge Elimination System (NPDES) Permit No. CAG998001 (adopted by the RWQCB), or NPDES Permit No. CAG998002 (adopted by the RWQCB).

2. Provide all documentation, reporting, notifications, and other information to OCSD for the RWQCB.

3. Install, operate, and maintain the appropriate monitoring program and to subcontract a certified lab to run the required analyses.

E. Flow Metering and Sampling Access:

1. Provide a sample collection point immediately upstream of all points of discharge. Provide OCSD’s Source Control staff and Engineer
unrestricted access to the facility and site to inspect, monitor, or verify compliance with Permits and Ordinance requirements.

2. Make provisions to allow the Engineer entry to the site at all times.

PART 2 - PRODUCTS

2-1. FILTER MATERIAL FOR WELLPOINTS AND PUMPED WELLS. Provide gravel/sand pack filter material consisting of clean, rounded, washed select silica gravel or sand free from silt, clay, and other deleterious material.

Design gravel/sand pack to maximize the flow of water into the well points and pumped wells and minimize the amount of fine-grained material removed from the formation.

Alter the sizes of gravel/sand pack material for each installation as necessary in accordance with the grain size distribution of the materials encountered during installation of the pumped wells or well points.

Provide sufficient gravel/sand for initial gravel packing of the well points or pumped wells, and such additional gravel as the wells may take during development.

2-2. SCREENS AND CASINGS FOR VACUUM WELLPOINT AND PUMPED WELLS. Screens, casing, and riser pipes for well points and pumped wells shall be capable of lasting and performing their intended function throughout the duration of the Project.

For all pumping wells, design well screens to minimize entrance velocity, maximize flow to the well, and prevent entry of the gravel/filter pack into the well casing.

Screens shall be factory slotted and sized appropriately for the gravel pack or formation to prevent the removal of fines from the formation. Screen slots cut using hand tools will not be allowed.

2-3. FLOWMETERS AND SAMPLING ACCESS. Provide calibrated, non-resettable effluent flow meters capable of accurately measuring the flow a pumped well, vacuum well point pump, and sump pumps directly upstream of each disposal point to within five (5) percent (plus or minus) of the anticipated/design flow.

Flow meters shall be McCrometer, Flow Technology, or equal.

Flow meters shall clearly indicate instantaneous flow rates in gallons per minute (gpm) and the total flow volume in gallons. The flow meter range shall be no more than five (5) times the average flow through the meter. All flow meters shall
be installed in accordance with the manufacturer’s specifications and requirements. Test and document the accuracy of all installed flow meters.

Provide all wells with fittings to attach a temporary in-line flow meter if directed by the Engineer to ensure accurate measurement of the total flow from each well.

2-4. SUMPS AND SUMP PUMPING. Sumps shall include a filter to minimize the pumping of fines and a perforated or slotted casing. Use sumps only where groundwater and hydrostatic heads are less than two (2) feet above subgrade or in areas where the potentiometric surface has been previously lowered to within two (2) feet below subgrade using pumped wells or vacuum well points. All sumps and sump pumping shall be considered incidental to trench, access shaft and tunnel excavation and no separate payment shall be included for sump pumping.

Furnish sump pumps that have sufficient head and volume capacity to transport pumped water into the Contractor’s water quality treatment facility.

2-5. PUMPS, SUPPLY AND DISCHARGE PIPE, AND DISCHARGE LOCATIONS. Select and use pumps for the vacuum well point and pumped well systems that are industry standard for the applications with sufficient capacity, head, horsepower, wiring, fittings, and switching facilities to maintain continuous operation throughout the life of the Project.

PART 3 - EXECUTION

3-1. PREPARATION.

The Dewatering Plan shall be accepted by the Engineer prior to excavation and installation of dewatering equipment.

1. Submit changes or modifications to the GWCP at least two (2) weeks prior to dewatering any part of the alignment covered by the proposed changes.

2. Responsible for obtaining all permits for construction, water treatment, and discharge. Obtain and comply with all requirements of the Authorization to Discharge letter prior to discharge into the OCSD system. Obtain and comply with all requirements of NPDES permit issued by the RWQCB prior to discharge into the MS4 system or any body of water.

Responsible for ensuring that all dewatering operations comply with all local city and county and Regional Water Quality Control Board (Santa Ana Region) ordinances.

Responsible for implementation of the accepted Contingency Plan for the discontinuation of dewatering discharge into OCSD’s sewer system.
Protect structures, utilities, and other facilities from hazards caused by dewatering.

Provide adequate marking of all well, pump, and pipeline locations.

Control surface runoff to prevent entry or collection of water in excavations or in other isolated areas of the site. Employ sumps to pump any perched, pocketed, or undrained water groundwater not otherwise collected or removed by the pumped wells or vacuum well points. However, the Contractor shall not rely solely upon open and cased sumps for dewatering.

1. Protect and maintain erosion and sedimentation controls.
2. Prevent water from entering excavations and ponding on subgrades.

3.2. INSTALLATION.

3.2.01. General. Dewatering shall be accomplished by methods and to the extent required to ensure a dry excavation, prevent loss of fines from the foundation, maintain stability of all excavated slopes and bottoms of excavations, preserve the final lines and grades of the bottoms of excavations and adjacent paved surfaces or structures, and permit placement of fill materials.

Provide complete and functional dewatering system.

1. Provide, install operate, and maintain the dewatering system. Remove all equipment and materials upon completion of the Work.
2. Provide water supply and electrical services needed.

Contractor shall not use flight augers, cable tool drive and drill, mud rotary, or any other drilling technique that will result in the smearing of fine-grained formation over coarse-grained formation.

Observation Wells (NOT USED).

Develop all wells to maximize well yield and remove fines resulting from drilling.

1. If the dewatering system fails to achieve the target drawdowns due to inadequate or insufficient development, the Contractor shall, at the Contractor’s own expense, redevelop the existing well(s) or install additional wells or vacuum well points until the target drawdowns are achieved.

Discharge all development water to a sediment settling tank prior to discharge.

Contractor shall not discharge any development water directly to the ground surface or surface water body.
Groundwater Level Control:

1. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the proposed bottom of excavation.

2. Dewatering for structures and pipelines shall commence prior to when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise.
   a. Lower the groundwater level a minimum of three (3) feet below foundation grade prior to foundation preparation and placement of structural foundations.
   b. Water shall not be allowed to rise against walls or slabs until concrete has attained its twenty-eight (28) day strength or as allowed by the Engineer.
   c. During the placement and compaction of fill or bedding materials, the water level at every point within the limits of fills being placed shall be maintained a minimum of three (3) feet below fill placement level.
   d. Water shall not be allowed to rise above pipe subgrade during pipe laying operations.
   e. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with an appropriately engineered backfill.

3. The return of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill, and prevent flotation or movement of structures, pipelines, and sewers.

Dispose of water from the Work in a suitable manner without damage to adjacent property.

1. Water shall be filtered using the accepted method in the GWCP before disposal into any discharge point.
2. Responsible for meeting the requirements of any permits that may be necessary to dispose of water.
3. No water shall be drained into Work built or under construction without prior written consent of the Engineer.

Continuously monitor dewatering systems and provide and maintain, at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water.
Standby Equipment:

1. Maintain on site sufficient equipment and materials for necessary modification and to ensure continuous and successful operation of the Dewatering System for all ordinary emergencies, including power outage and flooding.

2. Provide one hundred (100) percent standby electrical generating capacity with automatic switching from line to generator, including all safety features to prevent back-feeding the electrical supply system. Test all backup electric systems weekly in the presence of the Engineer. These tests shall include at least four (4) hours of operation under full system load.

3. Maintain on site sufficient number of pumps, valves, tees, elbows, connections, tools, and parts or other system hardware for immediate repair or modification of any part of the groundwater control system. Spare pumps of each type and size used in the dewatering systems shall be maintained on site at all times.

Dewatering System Removal And Abandonment:

1. Upon written authorization of the Engineer, the Contractor shall remove all dewatering system facilities and abandon all well points and pumping wells, and all Contractor-installed observation wells. Contractor or Subcontractor shall be a licensed water well contractor, in accordance with California standards Bulletin 74-81 and 74-90.

2. Abandonment of any well points, wells, or other penetrations below the excavation subgrade not observed by the Engineer shall be over-drilled to the original depth of the installation and re-abandoned at the Contractor’s own expense.

3. Upon completion of the dewatering and control of water operation, all temporary works and dewatering facilities shall be removed. All well casings shall be fully removed.

4. Abandonment of Water Wells, Monitoring Wells and Cathodic Protection Wells shall comply with California Department of Water Resources Water Well Standards.

3-3. FIELD QUALITY CONTROL.

3-3.01. Field Testing and Inspections:

1. Maintain observation wells and piezometers.

2. Provide, observe, and record daily elevation of ground water and piezometric water levels in observation wells.
3. Repair or replace observation wells that become inactive, damaged, or destroyed.

4. Sampling:
   a. An accessible sample collection point shall be provided immediately upstream of all points of discharge.
   b. Desilting tank(s) shall be equipped with a sample port on the discharge line for effluent quality monitoring before connection and discharge.
   c. OCSD may collect periodic dewatering samples.

5. Desilting tank(s) shall be cleaned adequately to maintain detention time and TSS requirements

3-3.02. Corrective Actions. Replace or repair Work to eliminate defects, deficiencies or irregularities.

1. Replace or repair Work to eliminate defects, deficiencies or irregularities.

2. Any damage to Work, existing adjacent above and below ground structures, and pipes, due to settlement caused by dewatering activities or any failure of the dewatering system, shall be repaired to the satisfaction of the Engineer, at the Contractor’s expense.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers materials, labor and equipment required to rehabilitate by sliplining an existing 66-inch diameter unlined RCP secondary effluent pipe that is fully deteriorated as defined by ASTM F1216. The primary contract objective is the structural and hydraulic renewal of the existing pipeline for use in the Groundwater Replenishment System. The existing RCP pipe shall be rehabilitated with a nominal 62-inch outside diameter Fiberglass Reinforced Polymer Mortar (FRPM) Pipe for a sliplining installation.

When complete, the liner pipe shall extend from approximate STA 25+50 to STA 70+25, and from approximate STA 81+05 to STA 181+50 as indicated on the Drawings. FRP tees with steel extensions will replace select existing manhole/manways. When completed the existing pipe shall be continuously lined with new pipe and there shall be completely water tight seals preventing any infiltration into the rehabilitated sewer.

1-2. GOVERNING STANDARDS. Except, as modified or supplemented herein, FRPM shall comply with the following:


AWWA M45 – Fiberglass Pipe Design.

1-3. SUBMITTALS. Contractor shall furnish data covering design and installation and shall be submitted in accordance with the Submittals Section. The data to be submitted shall include the following:

A. Contractor shall submit the Vendor's specific technical data with complete physical properties of the liner pipe including pipe pressure class, pipe...
stiffness, maximum rated working pressures, test pressures, and
dimensions pertinent to this job.

B. Contractor shall submit a certificate of "Compliance with Specifications" for
all materials supplied.

C. Contractor shall submit a site health and safety plan, a spill containment
plan and a traffic control plan which provides for the passage of pedestrians
and vehicles, before beginning any work.

D. Contractor shall submit all appropriate construction permits once they have
been paid for and obtained.

E. Contractor shall submit an installation access plan which includes access
manhole locations, a site plan sketch showing dimensions of access
within work limits and utilities, approximate installation rate (ft/day),
appropriate excavation, backfill, and resurfacing procedures, and a
schedule and timeline of sliplining activities.

F. Contractor shall submit engineering design calculations and shop drawings
with details of the pipe joint, gasket material, and test reports for the
Owner’s review and approval. Calculations confirming that the pipe can
adequately resist anticipated installation and other associated design
loads, provides the required factor of safety against buckling, and meets
the required maximum allowable long term deflection. These calculations
and drawings shall address the pipe proposed, strength requirements, grout
design, strength, and thickness required. The calculations shall be based
on an evaluation of the existing condition of the host pipe and ground water
intrusion resolutions, the long-term design loads on the renewed conduit,
loads on the conduit during installation, and the required chemical
resistance and flow capacity of the renewed pipe. These calculations shall
be performed and certified by a qualified Professional Engineer in the State
of California. All calculations shall include data that conforms to the
requirements of these specifications.

G. Contractor shall submit a public information and notification program as
specified herein, including examples of information that shall distributed to
each property owner.

H. Contractor shall submit all pre installation videos as required in the
Television Inspection of Pipelines Section for review prior to the installation
process and all post installation videos for acceptance prior to final
payment.

I. Contractor shall submit a work plan for acceptance. The work plan shall
address preparation steps required for pre-installation, installation, and
clean up. Pipeline layout and profile drawing showing the location, stationing, and invert elevation of pipe sections, fittings, and closure pieces.

J. Contractor shall submit the grout mix design with test data and lining manufacturer certification showing that the proposed grout mix will satisfy the requirements of this project, the lining manufacturer’s requirements and the Contractor’s design submittal. Contractor shall submit a minimum of four compressive strength test results for the annulus grout from each section to be filled.

K. Contractor shall submit work plan for annulus grouting that addresses the spacing and details of bulkheads, details of any bracing system (including design calculations), grout injection/vent holes, the number of grout lifts required to fill the annular space, and methods for repairing holes in the pipe. Providing grouting holes in the pipe will require the owners prior approval.

L. Testing and certification for workmanship, dimensions, pipe stiffness, and joint tightness in accordance with ASTM D3262. Testing results and certificates for all field testing of installed FRPM as detailed in Part 3 of this specification.

1-4. DELIVERY, STORAGE, AND HANDLING. Packaging, handling, shipping, and delivery shall be in accordance with the Storage and Handling Section, ASTM D3262 requirements, manufacturer’s instructions, and the requirements specified below.

Factory test results must be reviewed and accepted by Engineer before shipment of pipe materials.

Pipe materials shall be unloaded in a manner to prevent damage. Receipt of pipe materials at the Site shall be recorded. Storage shall be arranged in a manner to provide easy access for inspection. Contractor shall make periodic inspections of stored pipe materials to assure that materials are maintained under specified conditions and free from damage or deterioration. Pipe shall not be placed directly on rough ground but shall be supported in a manner which will protect the pipe against injury whenever stored at the Site or elsewhere. Onsite storage locations shall be approved by the Owner and Engineer.

Pipe and fittings shall be handled carefully and shall not be bumped or dropped. Hooks shall not be permitted to come in contact with joint surfaces. Use of lifting holes is not acceptable. Pipe shall be handled with slings and cradles which do not damage the pipe. Chains, hooks, and other equipment that may damage the pipe shall not be used.
No pipe shall be installed which has interior or exterior cracks or damage that may be harmful as determined by the Engineer. Care shall be taken to prevent dragging the ends of pipe on the ground or allowing ends to be damaged.

1-5. EXPERIENCE REQUIREMENTS. The installing contractor shall have a minimum of 5 years’ experience in sewer rehabilitation. Experience shall include installation of a minimum of 10,000 linear feet of sewer rehabilitation with pipe of 48-inch diameter or larger utilizing the same sliplining trenchless technology sewer rehabilitation as is indicated in the bid. Personal experience of the construction manager with other construction companies may be substituted in lieu of the current company experience as approved by the Engineer and Owner. Additional installation contractor requirements are located in the Front End Documents.

PART 2 - PRODUCTS

2-1. GENERAL. Slipliner pipe shall be Fiberglass Reinforced Polymer Mortar (FRPM) Pipe for sliplining installations similar or equal to pipe manufactured by Hobas Pipe USA, Thompson Pipe Group or Owner approved equal. The Engineer or other designated representative shall be entitled to inspect pipes or witness the pipe manufacturing. All FRP pipe shall be from a single manufacturer.

2-2. FRPM SLIPLINER PIPE AND JOINT.

A. Pipe:

1. The pipe shall be manufactured and tested in accordance with ASTM D3262 and meet or exceed the shall be cell Class Type 1, Liner 2 and Type 3 or Type 1, Liner 1 and Grade 1. The pipe shall be designed to withstand all installation and other associated design loads in accordance with the AWWA M45 Fiberglass Pipe Design Manual utilizing the design parameters in the table below. The pipe shall have a minimum pipe stiffness of 46 psi or as required based upon the depth of cover and the embedment condition. The pipe stiffness shall be verified in accordance with ASTM D3262 using as determined by the ASTM D2412 parallel plate loading test in accordance with ASTM D2412.
### DESIGN PARAMETER

<table>
<thead>
<tr>
<th>Parameter</th>
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<tr>
<td>Host Pipe</td>
<td>66-inch Reinforced concrete pipe</td>
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<tr>
<td>Internal Working Pressure</td>
<td>25 psi</td>
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<tr>
<td>Occasional Surge Pressure (Emergency Shutdown)</td>
<td>50 psi</td>
</tr>
<tr>
<td>Soil Depth (maximum above crown)</td>
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<td>Soil Density</td>
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<td>Ground Water Depth (below ground surface)</td>
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<td>Live Load, general alignment</td>
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<td>Live Load, road crossings</td>
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</tr>
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</tr>
<tr>
<td>Design Service Life</td>
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</tr>
</tbody>
</table>

2. The manufacturer shall use only polyester or vinyl ester resin systems with a proven history of performance in fabricating FRPM pipe. The historical data shall have been acquired from a composite material of similar construction and composition as the proposed product.

3. The reinforcing glass fibers used to manufacture the components shall be of highest quality commercial grade E-glass filaments with binder and sizing compatible with impregnating resins.

4. The sand shall be minimum 98% silica with a maximum moisture content of 0.2%.

5. Resin additives, such as curing agents, pigments, dyes, fillers, thixotropic agents, etc., when used, shall not detrimentally affect the performance of the product.

6. Gaskets shall be made of synthetic rubber. Natural rubber will not be acceptable. A certificate of gasket suitability shall be submitted. Gaskets shall be furnished by the pipe manufacturer and shall be supplied by qualified gasket manufacturers and be suitable for the service intended.

7. The actual outside diameter of the pipe barrel shall be sized to allow proper insertion into the existing pipe while allowing enough space for grouting in accordance with ASTM D3262.
B. Joints:

1. Flush fiberglass bell and spigot pipe is required for all pipe slip lining operations. Sleeve joints may be used for excavated exterior pipe connections as acceptable to the Owner. When tested in accordance with ASTM D4161 joints shall demonstrate a 29.5 psi internal and 11.4 psi external pressure rating under deflected conditions.

2. Elastomeric sealing gaskets made of synthetic rubber, as the sole means to maintain joint water tightness.

3. Meet the performance requirements of ASTM D4161.

4. Fiberglass, gasket-sealed closure couplings, or equal, for joints at tie-ins, when needed.

5. Pipe joints or couplings are not to be located inside any manhole or structure and shall not located closer than 3 feet from the outside of any structure.

C. Fittings:

1. Service connections, flanges, elbows, reducers, tees, wyes, and other fittings shall be capable of withstanding all operating conditions when installed. They may be contact molded or manufactured from mitered sections of pipe joined by glass-fiber-reinforced overlays.

PART 3 - EXECUTION

3-1. CONTRACTOR’S RESPONSIBILITIES.

A. Locate and designate all manhole and access structure access points as necessary for the Work.

B. Provide water from hydrants or tankers for cleaning, installation and other process related work items requiring water.

C. Locate and mark all existing utilities in areas where excavation is to be performed prior to beginning any excavation. Protect in place or relocate at no additional cost to the Owner.

D. Contractor shall conduct operations in strict accordance with all applicable Federal, State, City, and OSHA standards and shall secure the site for the working conditions in compliance with the same.

1. The Contractor shall submit a proposed safety plan, prior to beginning any work, identifying all competent persons. The plan shall include a description of a daily safety program for the job site and all emergency
procedures to be implemented in the event of a safety incident. All work shall be conducted in accordance with the Contractor's submitted safety plan.

2. Contractor shall provide temporary support to the pipe wall as needed if man entry is required prior to completion of lining operations.

3-2. INSTALLATION AND ACCESS PLAN.

A. Submit an Installation Access Plan. Plan shall include:
   1. Proposed access/insertion pit locations.
   2. Site plan sketch showing dimensions of access within work limits and utilities.
   3. Approximate installation rate (ft/day).

B. Appropriate excavation/backfill/resurfacing procedures including permits according to the Earthwork Section.

C. Schedule and timeline of slilining activities identified by line segment.

3-3. TRAFFIC CONTROL PLAN.

A. Contractor shall prepare and submit for approval a traffic control plan which provides for the passage of pedestrians and vehicles, before beginning any work. The Contractor shall maintain access to all entrances adjacent to or within the Project Site. The plan shall indicate detours and conform to the requirements of Huntington Beach and local requirements.

3-4. FIELD VERIFICATION OF DIMENSIONS.

A. The existing sewer originally was a 66-inch inside diameter RCP; however, due to corrosion, the interior pipe surfaces has deteriorated and exposed rebar in some locations. The cross-sectional area has been laser profiled at several locations and the report shall be available to the Contractor. The Contractor is responsible for field verifying the inside dimensions of the pipe and the lengths between access manholes/structures prior to ordering the liner pipe.

3-5. CLEANING.

A. Contractor shall remove all internal debris and sediment, hanging gaskets, protruding rebar, accumulated solids or other materials as specified in the Pipeline Cleaning Section.
B. After cleaning, inspection of pipelines shall be performed by the Contractor using closed circuit television (CCTV) inspection techniques as specified in the Television Inspection of Sewer Pipelines Section to confirm the pipe is prepared for lining.

C. A mandrel of at least the outside diameter of the liner pipe shall be pulled through the line prior to any insertion attempts to verify that the sizing profile will be suitable for the host pipe. A 10-foot long section of liner pipe may be used in place of a mandrel for size testing. If there are offset joints, sags, depressions or slight bends in the line, a full length of the liner pipe shall be pulled through the line to verify the planned diameter and length will fit.

3-6. PUBLIC RELATIONS.

A. The Contractor shall be responsible for contacting each home or business within the area impacted by the work to coordinate work schedules.

3-7. EXCAVATIONS.

A. Neither the excavation or the shoring shall be outside OCSD’s east property and/or easement. See drawings and requirements for property line and easement staking requirements prior to excavation. Excavation within the Santa Ana River ROW / OC Flood Property is not permitted and will result in significant delay and cost to the project which will be solely borne by the Contractor.

B. Excavation shall be performed as specified in the Trenching and Backfilling section.

C. Asphalt shall be sawcut at least 2 feet outside of the edge of the pit.

D. Contractor shall choose the location of the insertion or access pits and submit to the Owner for approval. Restricted areas for access pits along the pipeline are indicated on the drawings. The locations shall consider conditions of the existing pipe, directional changes, surface conditions, existing utilities, and pulling or pushing distances. The insertion pit should be long enough to accommodate a complete length of slipliner pipe, plus a minimum of 5 feet. The width of the insertion pit should be sufficient to allow workers enough room to remove the crown of the existing pipe and install the slipliner pipe. The pit shall not be wider than required and a no time shall extend more than 2 feet past the outside edge of the existing pipe. Pits of excessive width shall be corrected with approved pipe bedding material in the backfill zone. The sides and ends of the insertion pit shall be protected in order to provide a safe working environment.
E. Install safety barriers around pits during normal working hours.

F. The Insertion access pits shall be plated over at the end of each working day.

G. Location of utilities, as shown, are approximate. The Contractor shall verify location of all underground utilities before beginning work.

3-8. INSTALLATION OF FRPM SLIPLINER PIPE.

A. The installation of pipe and fittings shall be in accordance with the Project Plans and Specifications and the manufacturer's requirements. Maximum allowable joint deflection shall be one (1) degree.

B. Joining and Pushing of Segments in-place shall adhere to these requirements:
   1. Clean ends of pipe and joint components.
   2. Apply joint lubricant to both the bell interior surface and the elastomeric seals. Use only lubricants approved by the pipe manufacturer.
   3. Use suitable equipment and end protection to push or pull the pipes together.
   4. Contractor shall monitor and record pushing forces during installation. Do not exceed forces recommended by the manufacturer for joining or pushing pipe. Repair or replacement of delamination and other pipe damage or leakage due to over pressurization or other product mishandling shall be the sole responsibility of the Contractor.

C. Connections at Insertion Pits shall be accomplished as follows:
   1. The liner pipe shall be laid straight through any insertion pit. Pipe joints or couplings are not to be located inside any manhole or structure and not located closer than 3 feet from the outside of any structure. The upstream and downstream sections of the sliplining pipe shall be connected with pipe manufacturer recommended FRPM couplings.
   2. The sliplining pipe shall be grouted, encased and backfilled as specified herein.

3-9. GROUTING ANNULAR SPACE FOR FRPM SLIPLINING.

A. Grouting of the annular space is necessary to provide a load path from the liner pipe to the host pipe and to position the liner pipe within the existing pipe. Grout annular space in accordance with the Low Density Cellular Concrete Grout Section and the liner manufacturer’s recommendation.
3-10. BACKFILL.

A. After the liner material is in place and approved poured in place reinforced concrete arched caps are installed, backfill the access pit excavations as specified in Trenching and Backfilling section and completely restore all disturbed areas as required.

3-11. QUALITY ASSESSMENT/CONTROL.

A. During construction, the Contractor shall submit a minimum of four compressive strength test results for the annulus grout from each manhole to manhole section to be filled. Comparative samples and testing results are to be provided for the grout. One set of two cylinders shall be taken prior to installation and a separate set of two samples shall be taken from each end of the annular space being filled. Testing is to be provided for each portion of pipe rehabilitated and grouted from structure to structure. The Engineer shall approve the sampling and testing procedure.

3-12. FINAL INSPECTION AND ACCEPTANCE.

A. The final inspection by CCTV shall be done prior to flow being placed in the pipe. The finished product shall have no visual and material defects, no defects in smoothness and continuity.

B. Acceptance of the installed liner shall be based on the video CCTV inspection after grouting to assure all joints are properly assembled, no damage exists, and that no visible leakage or deformation exists as determined by the Engineer. Provide MPEG 1 digital video files to Owner as specified in Television Inspection of Pipelines Section.

3-13. SURFACE RESTORATION.

A. All surfaces and disturbed areas shall be restored to a condition equal to or better than it was prior to the Contractor's construction operations. Restoration standards shall be governed by these project documents, and as required by the Owner.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers materials, labor and equipment required to rehabilitate by sliplining an existing 66-inch diameter unlined RCP secondary effluent pipe that is fully deteriorated as defined by ASTM F1216. The primary contract objective is the structural and hydraulic renewal of the existing pipeline for use in the Groundwater Replenishment System. The existing RCP pipe shall be rehabilitated with a nominal 63-inch outside diameter high density polyethylene pipe (HDPE) for a sliplining installation.

When complete, the liner pipe shall extend from approximate STA 25+50 to STA 70+25, and from approximate STA 81+05 to STA 181+50 as indicated on the Drawings. HDPE tees with steel extensions will replace select existing manhole/manways. When completed the existing pipe shall be continuously lined with new pipe and there shall be completely water tight seals preventing any infiltration into the rehabilitated sewer.

1-2. GOVERNING STANDARDS. Except, as modified or supplemented herein, the HDPE shall comply with the following:

ASTM F585 – Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers.


ASTM D3035 (F714) – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.

AWWA M55 – PE Pipe Design and Installation.

AWWA C906 – Standard for Polyethylene (PE) Pressure Pipe and Fittings for Water Distribution and Transmission.

AWWA M45 – Fiberglass Pipe Design.
1-3. **SUBMITTALS.** Contractor shall furnish data covering design and installation and shall be submitted in accordance with the Submittals Section. The data to be submitted shall include the following:

A. Contractor shall submit the Vendor’s specific technical data with complete physical properties of the liner pipe including pipe pressure class, pipe stiffness, maximum rated working pressures, test pressures, and dimensions pertinent to this job.

B. Contractor shall submit a certificate of "Compliance with Specifications" for all materials supplied.

C. Contractor shall submit a site health and safety plan, a spill containment plan and a traffic control plan which provides for the passage of pedestrians and vehicles, before beginning any work.

D. Contractor shall submit all appropriate construction permits once they have been paid for and obtained.

E. Contractor shall submit an installation access plan which includes, insertion pits, access manhole locations, a site plan sketch showing dimensions of access within work limits and utilities, approximate installation rate (ft/day), appropriate excavation, backfill, and resurfacing procedures, and a schedule and timeline of sliplining activities.

F. Contractor shall submit engineering design calculations and shop drawings with details of the pipe and test reports for the Owner’s review and approval. Calculations confirming that the pipe can adequately resist anticipated installation and other associated design loads, provides the required factor of safety against buckling, and meets the required maximum allowable long term deflection. These calculations and drawings shall address the pipe proposed, strength requirements, grout design, strength, and thickness required. The calculations shall be based on an evaluation of the existing condition of the host pipe and ground water intrusion resolutions, the long-term design loads on the renewed conduit, loads on the conduit during installation, and the required chemical resistance and flow capacity of the renewed pipe. These calculations shall be performed and certified by a qualified Professional Engineer in the State of California. All calculations shall include data that conforms to the requirements of these specifications.

G. Contractor shall submit a public information and notification program as specified herein, including examples of information that shall distributed to each property owner.

H. Contractor shall submit all pre-installation videos as required in the Television Inspection of Pipelines Section for review prior to the installation process and all post installation videos for acceptance prior to final payment.
I. Contractor shall submit a work plan for acceptance. The work plan shall address preparation steps required for pre-installation, installation, and clean up. Pipeline layout and profile drawing showing the location, stationing, and invert elevation of pipe sections, fittings, and closure pieces.

J. Contractor shall submit the grout mix design with test data and lining manufacturer certification showing that the proposed grout mix will satisfy the requirements of this project, the lining manufacturer’s requirements and the Contractor’s design submittal. Contractor shall submit a minimum of four compressive strength test results for the annulus grout from each section to be filled.

K. Contractor shall submit work plan for annulus grouting that addresses the spacing and details of bulkheads, details of any bracing system (including design calculations), grout injection/vent holes, the number of grout lifts required to fill the annular space, and methods for repairing holes in the pipe. Providing grouting holes in the pipe will require the Owners prior approval.

L. Testing and certification for workmanship, dimensions, pipe stiffness, and joint tightness in accordance with ASTM D3262. Testing results and certificates for all field testing of installed FRPM as detailed in Part 3 of this specification.

1-4. DELIVERY, STORAGE, AND HANDLING. Packaging, handling, shipping, and delivery shall be in accordance with the Storage and Handling Section, ASTM D3035 requirements, manufacturer's instructions, and the requirements specified below.

Factory test results must be reviewed and accepted by Engineer before shipment of pipe materials.

Pipe materials shall be unloaded in a manner to prevent damage. Receipt of pipe materials at the Site shall be recorded. Storage shall be arranged in a manner to provide easy access for inspection. Contractor shall make periodic inspections of stored pipe materials to assure that materials are maintained under specified conditions and free from damage or deterioration. Pipe shall not be placed directly on rough ground but shall be supported in a manner which will protect the pipe against injury whenever stored at the Site or elsewhere. Onsite storage locations shall be approved by the Owner and Engineer.

Pipe and fittings shall be handled carefully and shall not be bumped or dropped. Hooks shall not be permitted to come in contact with joint surfaces. Use of lifting holes is not acceptable. Pipe shall be handled with slings and cradles which do not damage the pipe. Chains, hooks, and other equipment that may damage the pipe shall not be used.
1-5. EXPERIENCE REQUIREMENTS. The installing contractor shall have a minimum of 5 years’ experience in sewer rehabilitation. Experience shall include installation of a minimum of 30,000 linear feet of sewer rehabilitation with pipe of 48-inch diameter or larger utilizing the same sliplining trenchless technology sewer rehabilitation as is indicated in the bid. Personal experience of the construction manager with other construction companies may be substituted in lieu of the current company experience as approved by the Engineer and Owner. Additional installation contractor requirements are located in the Front End Documents.

Operators performing butt fusion shall be trained by the pipe manufacturer with similar equipment for the fusing of polyethylene pipe. The equipment shall be approved by the pipe manufacturer, including monitoring equipment.

PART 2 - PRODUCTS

2-1. GENERAL. The liner pipe shall be high density polyethylene pipe (HDPE) DR 26 for sliplining installations similar or equal to pipe manufactured by ISCO, JM Eagle, Infra Piping Solutions or Chevron Phillips or Owner approved equal. The Engineer or other designated representative shall be entitled to inspect pipes or witness the pipe manufacturing. The HDPE pipe shall be from a single manufacturer.

2-2. HDPE LINER PIPE AND JOINT.

A. Pipe: The pipe shall be furnished in the maximum pipe lengths normally produced by the manufacturer, except for fittings, closures and specials. The actual outside diameter of the pipe barrel shall be sized to allow proper insertion into the existing pipe while allowing enough space for grouting.

1. The pipe shall be PE 4710 and conform to ASTM D 3350 with a cell classification of 445574C or higher.

2. The pipe shall have a minimum of 2% carbon black for maximum protection against UV light.

3. The pipe shall have an established hydrostatic design basis (HDB) of not less than 1,600 psi for water at 73.4 degree F in accordance with ASTM D 2837.

4. The design shall meet the conditions in AWWA M55 and as described in the table below.

5. The pipe manufacturer shall certify that samples of his production pipe have undergone stress regression testing, evaluation, and validation in accordance with ASTM D-2837.
<table>
<thead>
<tr>
<th>DESIGN PARAMETER</th>
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<td>Design Service Life</td>
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B. Joints:

1. The pipe shall be butt-fused and tested in accordance with manufacturer recommendations and applicable provisions of AWWA C906.

2. Pipe joints or couplings are not to be located inside any manhole or structure and shall not located closer than 3 feet from the outside of any structure.

C. Fittings:

1. All fittings shall conform to the requirements of AWWA C906 and be joined to the pipe as recommended by the pipe manufacturer. Fittings shall be made of HDPE having a cell classification of PE 345434B or higher as defined in ASTM D 3350. The pipe shall have an established HDB of not less than 1,600 psi for water at 73.4 degree F. in accordance with ASTM D 2837. Fittings shall have a minimum wall thickness as shown on the Drawings.

2. The fitting manufacturer shall certify that samples of his production pipe have undergone stress regression testing, evaluation, and validation in accordance with ASTM D-2837. Under these procedures, the minimum hydrostatic design basis shall be certified by the pipe manufacturer to be 1600 psi at 73.4 deg. F and 800 psi at 140 deg. F.

D. Pipe Pull Heads:

1. Pipe pull heads shall be utilized that employ a positive through-bolt design assuring a smooth wall against the pipe cross-section at all
times. The pipe pull heads shall be specifically designed for use with HDPE pipe, and shall be as recommended by the pipe supplier.

E. Pipe Rollers:
1. Pipe rollers shall be of sufficient size to fully support the weight of the pipe during handling and pullback operations. A sufficient quantity of rollers and spacing, per the pipe supplier’s guidelines shall be used to assure adequate support and excessive sagging of the product pipe.

PART 3 - EXECUTION

3-1. CONTRACTOR’S RESPONSIBILITIES.

A. Locate and designate all manhole and access structure access points as necessary for the Work.

B. Provide water from hydrants or tankers for cleaning, installation and other process related work items requiring water.

C. Locate and mark all existing utilities in areas where excavation is to be performed prior to beginning any excavation. Protect in place or relocate at no additional cost to the Owner.

D. Contractor shall conduct operations in strict accordance with all applicable Federal, State, City, and OSHA standards and shall secure the site for the working conditions in compliance with the same.
   1. The Contractor shall submit a proposed safety plan, prior to beginning any work, identifying all competent persons. The plan shall include a description of a daily safety program for the job site and all emergency procedures to be implemented in the event of a safety incident. All work shall be conducted in accordance with the Contractor’s submitted safety plan.
   2. Contractor shall provide temporary support to the pipe wall as needed if man entry is required prior to completion of lining operations.

3-2. INSTALLATION AND ACCESS PLAN.

A. Submit an Installation Access Plan. Plan shall include:
   1. Proposed access/insertion pit locations.
   2. Site plan sketch showing dimensions of access within work limits and utilities.
   3. Approximate installation rate (ft/day).
B. Appropriate excavation/backfill/resurfacing procedures including permits according to Earthwork Section.

C. Schedule and timeline of slipling activities identified by line segment.

3-3. TRAFFIC CONTROL PLAN. Contractor shall prepare and submit for approval a traffic control plan which provides for the passage of pedestrians and vehicles, before beginning any work. The Contractor shall maintain access to all entrances adjacent to or within the Project Site. The plan shall indicate detours and conform to the requirements of Huntington Beach and local requirements.

3-4. FIELD VERIFICATION OF DIMENSIONS. The existing sewer originally was a 66-inch inside diameter RCP; however, due to corrosion, the interior pipe surfaces has deteriorated and exposed rebar in some locations. The cross-sectional area has been laser profiled at several locations and the report shall be available to the Contractor. The Contractor is responsible for field verifying the inside dimensions of the pipe and the lengths between access manholes/structures prior to ordering the liner pipe.

3-5. CLEANING.

A. The Contractor shall clean the pipe with hydraulically powered equipment, high-velocity jet cleaners or mechanically powered equipment if deemed necessary. All debris shall be removed from the pipe and manholes. Contractor shall be responsible for removal and proper disposal of all the debris removed from the pipe during cleaning operation. Contractor shall remove all internal debris and sediment, hanging gaskets, protruding rebar, accumulated solids or other materials as specified in the Pipeline Cleaning Section.

B. After cleaning, inspection of pipelines shall be performed by the Contractor using closed circuit television (CCTV) inspection techniques as specified in the Television Inspection of Sewer Pipelines Section to confirm the pipe is prepared for lining.

C. A pulling head of at least the outside diameter of the liner pipe shall be pulled through the line prior to any insertion attempts to verify that the sizing profile will be suitable for the host pipe. A 10-foot long section of liner pipe may be used in place of a mandrel for size testing. If there are offset joints, sags, depressions or slight bends in the line, a full length of the liner pipe shall be pulled through the line to verify the planned diameter and length will fit.

3-6. PUBLIC RELATIONS. The Contractor shall be responsible for contacting each home or business within the area impacted by the work to coordinate work schedules.
3-7. **EXCAVATIONS.**

A. Neither the excavation or the shoring shall be outside OCSD’s east property and/or easement. See General Notes and requirements for property line and easement staking prior to excavation. Excavation with the Santa Ana River ROW / OC Flood Property is not permitted and will result in significant delay and cost to the project which will be borne by the Contractor.

B. Excavation shall be performed as specified in the Earthwork Section.

C. Asphalt shall be sawcut at least 2 feet outside of the edge of the pit.

D. Contractor shall choose the location of the insertion or access pits and submit to the Owner for approval. Restricted areas for access pits along the pipeline are indicated on the drawings. The locations shall consider conditions of the existing pipe, directional changes, surface conditions, existing utilities, and pulling or pushing distances. The insertion pit should be long enough to accommodate a complete length of liner pipe, plus a minimum of 5 feet. The width of the insertion pit should be sufficient to allow workers enough room to remove the crown of the existing pipe and install the liner pipe. The pit shall not be wider than required and a no time shall extend more than 2 feet past the outside edge of the existing pipe. Pits of excessive width shall be corrected with approved pipe bedding material in the backfill zone. The sides and ends of the insertion pit shall be protected in order to provide a safe working environment.

E. Install safety barriers around pits during normal working hours.

F. The Insertion access pits shall be plated over at the end of each working day.

G. Location of utilities, as shown, are approximate. The Contractor shall verify location of all underground utilities before beginning work.

3-8. **INSTALLATION OF FRPM SLIPLINER PIPE.**

A. The installation of pipe and fittings shall be in accordance with the Project Plans and Specifications and the manufacturer’s requirements.

B. The installation shall adhere to these requirements:
   1. Assemble and join sections of polyethylene liner pipe on site, above ground. Make joints by heating and butt-fusion method in strict conformance to manufacturer’s instructions.
2. Form joints with smooth, uniform double-rolled back beads made while applying proper melt, pressure and alignment. Joints will be inspected by the Engineer before insertion.

3. Preparation: After completing insertion pit excavation, remove the top portion of the existing to provide access to the pipe. Connect power winch cable to end of liner by use of suitable pulling head equal to outside diameter of liner. Secure pulling head to liner and attach to power winch cable so that liner can be satisfactorily fed and pulled through sanitary sewer line. Prevent ragged edges of existing pipe from scarring liner pipe. Follow insertion procedures in ASTM F585. Do not allow sand or other debris to enter liner.

4. Cuts or gouges in the pipe wall must be removed by cutting the damaged section from the pipe string and butt fusing the ends.

5. Pulling Liner:
   a. Maximum length of continuous liner assembled above ground and pulled at any one time: do not exceed length recommended by manufacturer's printed instructions.
   b. Limit pulling force exerted on liner to that indicated by the manufacturer for the appropriate outside diameter of the polyethylene liner. Provide a suitable pulling force measuring device connected to the winch or pulling mechanism.

6. Connections at Insertion Pits shall be accomplished as follows:
   a. The liner pipe shall be laid straight through any insertion pit. Pipe joints or couplings are not to be located inside any manhole or structure and not located closer than 3 feet from the outside of any structure. The upstream and downstream sections of the sliplining pipe shall be connected with pipe manufacturer recommended couplings.
   b. The lining pipe shall be grouted, encased and backfilled as specified herein.

3-9. PIPE JOINING PROCESS WITH BUTT FUSION.

A. General:
   1. Fusible polyvinylchloride pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier’s guidelines.
   2. Fusible polyvinylchloride pipe will be fused by qualified fusion technicians, as documented by the pipe supplier.
   3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) affixed to the fusion machine.
4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following properties, including the following elements:

B. HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly, cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier’s guidelines.

C. CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

D. GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

E. DATA LOGGING DEVICE - The current version of the pipe supplier's recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

F. Other equipment specifically required for the fusion process shall include the following:
   1. Pipe rollers shall be used for support of pipe to either side of the machine
   2. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement and/or windy weather.
   3. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times.

3-10. JOINT RECORDING. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of thermoplastic pipe. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.
3-11. **GROUTING ANNULAR SPACE FOR HDPE SLIPLINING.** Grouting of the annular space is necessary to provide a load path from the liner pipe to the host pipe and to position the liner pipe within the existing pipe. Grout annular space in accordance with the Low Density Cellular Concrete Grout Section and the liner manufacturer’s recommendation.

3-12. **BACKFILL.** After the liner material is in place and approved poured in place reinforced concrete arched caps are installed, backfill the access pit excavations as specified in Trenching and Backfilling section and completely restore all disturbed areas as required.

3-13. **QUALITY ASSESSMENT/CONTROL.** During construction, the Contractor shall submit a minimum of four compressive strength test results for the annulus grout from each manhole to manhole section to be filled. Comparative samples and testing results are to be provided for the grout. One set of two cylinders shall be taken prior to installation and a separate set of two samples shall be taken from each end of the annular space being filled. Testing is to be provided for each portion of pipe rehabilitated and grouted from structure to structure. The Engineer shall approve the sampling and testing procedure.

3-14. **FINAL INSPECTION AND ACCEPTANCE.**

   A. The final inspection by CCTV shall be done prior to flow being placed in the pipe. The finished product shall have no visual and material defects, no defects in smoothness and continuity.

   B. Acceptance of the installed liner shall be based on the video CCTV inspection after grouting to assure all joints are properly assembled, no damage exists, and that no visible leakage or deformation exists as determined by the Engineer. Provide MPEG 1 digital video files to Owner as specified in Television Inspection of Pipelines Section.

3-15. **SURFACE RESTORATION.** All surfaces and disturbed areas shall be restored to a condition equal to or better than it was prior to the Contractor’s construction operations. Restoration standards shall be governed by these project documents, and as required by the Owner.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section includes the requirements for cleaning and removal of any internal obstructions prior to installation of the liner pipe. The Contractor shall furnish all labor and equipment to remove and dispose of accumulated sediments and materials from the pipe. Cleaning shall remove sediment, rocks, debris, roots, grease accumulations, loose mortar and obstructions from the pipe and prepare the surface for installation of the liner. All materials dislodged and removed during cleaning shall be removed from the pipe and disposed of by the Contractor in an approved method.

The cleaning has the potential to impact the organic loading at the Wastewater Treatment Plant. If this occurs the cleaning work may be suspended until the impacts to the loading at the plant reach acceptable levels.

1-2. SUBMITTALS.

   A. Contractor shall submit a cleaning plan that includes the means and methods that will be used for cleaning the pipe. The plan shall include a schedule of activities and a list of actions to mitigate the impacts to the public during the cleaning operations.

   B. Contractor shall submit catalog and manufacturer's data sheets for cleaning equipment.

   C. Contractor shall submit receipts for the debris and sediment disposal.

PART 2 – CLEANING EQUIPMENT

The equipment shall provide a clean pipe and be capable of removing dirt, grease, rocks, sand, roots, loose mortar, grease, sludge, debris and obstructions from pipe. The high-velocity cleaning equipment shall include the following:

   A. A High-Velocity Gun capable of producing flows ranging from fine spray to long distance solid stream.

   B. A high velocity nozzle capable of producing a minimum working pressure of 2,000 pounds per square inch at 65 gpm. The nozzle shall be capable of scouring action from 10 to 45 degrees.
C. High pressure hose capable of reaching the distance required between access manholes.

D. The vacuum system equipped with a fluidizing nozzle capable of removing material from beneath water surface at depths from the ground surface to the invert.

PART 3 – EXECUTION

A. The Contractor is responsible for collecting and removing all debris from the cleaning process within the section of pipeline from STA 25+00 to STA 182+00. Debris is not to be pushed beyond STA 182+00 and left but shall be removed.

B. During all sewer cleaning operations, precautions shall be taken to protect the pipe from damage that might be inflicted by the cleaning equipment. Precautions shall be taken to ensure that the cleaning operation will not cause any damage or flooding to public and/or private property along the alignment of the pipeline. Contractor shall bear full costs associated with any flooding or damage to structures.

1. The cleaning operation shall not use chemicals and remove all debris such as grease, scale, encrustation, protruding rebar, gaskets and loose mortar so that no foreign intrusion shall cause imperfections in lining being used and so that each pipe joint can be thoroughly inspected and successfully rehabilitated.

2. Perform cleaning prior to closed-circuit television (CCTV) inspection.

3. Cleaning shall remove the debris required by the rehabilitation procedure. No major deposits, obstructions or debris, based on visual observation provided by CCTV inspection, shall remain in pipe.

4. Cleaning shall make the number of passes required to meet the requirements for the insertion of the liner pipe.

5. Begin cleaning at upstream end of system and proceed in downstream direction. Unless otherwise permitted by Owner, cleaning of pipeline segments upstream of a section of pipe already cleaned will not be allowed. Remove debris at downstream access manholes with a vacuum or approved method.

6. Due to the remote location of the work, water for the cleaning operations shall be supplied by the Contractor. Where hydrant or other water sources are available along the pipeline alignment, the Contractor may contract with the owning agency for use of the water supply.
7. Contractor shall immediately notify Owner if fresh soil, pieces of pipe, or other visible signs of potential problems occur during the cleaning operation.

C. All such debris resulting from cleaning operations shall be removed from the pipe and disposed of in the proper manner. Contractor shall bear all costs associated with testing debris and proper dumping. Dumping of the debris shall be in accordance with all local, state, and federal regulations. Each load of solids and semisolids to be disposed must pass the paint filter test using the most recent version of Method 9095. In addition, each load must be accompanied by a four part manifest to track the load. Manifests shall be provided by the Contractor. Contractor shall be responsible for disposal costs.

1. The Contractor is responsible for obtaining all necessary permits and approval from all regulatory agencies, and to pay all fees required to perform the work, including transport and disposal of sediments.

End of Section
PART 1 – GENERAL

1-1. SCOPE. This section covers field hydrostatic pressure and leakage testing of piping. The term "piping" shall be used in this section to refer to piping systems, pipelines, or sections thereof.

Testing of other piping is covered in the Miscellaneous Piping and Accessories Installation section. Cleaning and disinfection of piping is covered in the Cleaning and Disinfection of Water Pipelines section.

The pipeline shall be tested from the new flange at approximate STA 26+09 to the new flange at approximate STA 180+81. The pipeline shall be tested from insertion pit to insertion pit as sections are completed, and again as a complete system (STA 26+09 to STA 180+81) after all the sections are complete.

1-2. GENERAL. Contractor shall coordinate pressure and leakage testing with adjacent work as necessary to preclude work interferences or duplication of effort and to expedite the overall progress of the work.

Contractor shall provide all necessary piping, piping connections, temporary valves, backflow preventers, and all other items of equipment or facilities necessary to complete the pressure and leakage testing.

In all cases where it is necessary to interrupt service, permission of Owner shall be obtained at least two days before the service will be interrupted. In all cases where it is necessary to interrupt service to water customers, permission of the Owner shall be obtained and each customer affected shall be notified of the proposed service interruption and its possible duration in accordance with the Project Requirements section.

Contractor shall notify federal, state, and local regulatory agencies to determine if any special procedures or permits are required for disposal of water used for pressure and leakage testing and to identify acceptable locations for disposal of the water. All requirements and costs associated with notifications and obtaining any discharge permit or approvals shall be responsibility of Contractor.

Engineer or Engineer’s representative shall be present during testing and shall be notified of the time and place of testing at least 3 days prior to commencement of testing. All testing shall be performed to the satisfaction of Engineer, and in accordance with all governing standards and regulations.
1-2.01. Testing Schedule and Procedure. A testing schedule and procedure shall be submitted to Engineer for review and acceptance not less than 21 days prior to commencement of testing. The schedule and procedure shall include, but not be limited to the following information for each pipe section to be tested:

- limits of each pipe test section;
- proposed time and sequence;
- physical locations and set positions of all valves;
- locations of temporary bulkheads, stops, caps, restraints, supports, and other temporary equipment needed;
- manner of filling and source of water;
- method and location of metering volumes;
- method and location of gauging pressures; and
- method and location of disposal of test water.

1-2.02. Special Testing Requirements. Special testing requirements include the following:

Water for filling the pipeline from the Owner’s existing facilities may not be available during the Owner’s periods indicated in the Work Restrictions specification.

Unless otherwise acceptable to Engineer, the general sequence of work for each pipeline, or valved or bulkheaded section thereof, shall be as follows:

- Initial cleaning and flushing of pipeline.
- Filling pipeline.
- Hydrostatic pressure and leakage testing.
- Disinfection.
- Final flushing and neutralization of heavily chlorinated water.
- Bacteriological tests.

Unless otherwise acceptable, during testing of the pipeline, all valves, except for auxiliary hydrant valve(s), shall be in the open position.

Unless otherwise acceptable, temporary bulkheads shall be provided during testing so that the test pressure is not applied to existing or new valves and hydrants, or to existing water lines, or to any portion of water lines installed under this Contract that have already been put into service.

Unless otherwise acceptable, a temporary pressure gauge shall be installed at each end of the limits of the pipeline to be tested.

Unless otherwise acceptable, tests shall be conducted before connections are made to existing water lines, or to any portion of water lines installed under this Contract that have already been put into service.
Unless otherwise acceptable, upon completion of testing and disinfection, connections made to existing water lines or to any portion of water lines installed under this Contract that have already been put into service, and any other portion of the pipeline not subject to the pressure test, shall be visually inspected for leakage after placing the water line into service and before backfilling the connection.

If testing is permitted against a valve, the maximum differential test pressure across the valve seat (gate) in the closed position shall not exceed the drip-tight rated pressure of the valve.

1-2.03. Water. Water for testing shall be furnished as stipulated in the Temporary Facilities section. Unless otherwise permitted, the water shall be kept out of the remainder of the piping. Following completion of testing, the water shall be disposed of in accordance with the requirements of regulatory agencies and in a manner acceptable to Engineer.

PART 2 - PRODUCTS

2-1. TEST EQUIPMENT. All necessary connections between the piping to be tested and the water source, together with pumping equipment, water meter, pressure gauges, backflow prevention, and all other equipment, materials, and facilities required to perform the specified tests, shall be provided. All required blind flanges, valves, bulkheads, bracing, blocking, and other sectionalizing devices shall also be provided. All temporary sectionalizing devices shall be removed upon completion of testing. Vents shall be provided in test bulkheads where necessary to expel air from the piping to be tested.

Test pressure shall be applied by means of a force pump sized to produce and maintain the required pressure without interruption during the test.

Water meters and pressure gauges shall be accurately calibrated and shall be subject to review and acceptance by Engineer.

Permanent or temporary gauge connections shall be installed at each location where test gauges are connected to the piping during the required test. Drilling and tapping of pipe walls will not be permitted. Upon successful completion of testing, each permanent gauge connection shall be fitted with an isolation valve and a permanent gauge, and each temporary gauge connection, if used, shall be fitted with a permanent sealed plug or cap acceptable to the Engineer.

Permanent or temporary fill and vent connections shall be installed as needed for the required test. Drilling and tapping of pipe walls will not be permitted. Upon successful completion of testing, each permanent fill and vent connection shall be fitted with the permanent fill or vent piping, and each temporary fill and vent
connection, if used, shall be fitted with a permanent sealed plug or cap acceptable to the Engineer.

PART 3 - EXECUTION

3-1. **FILLING AND VENTING.** Before filling the piping with water, care shall be taken to ensure that all air release valves and other venting devices are properly installed and operating properly. Hand-operated vent valves shall not be closed until an uninterrupted stream of water is flowing from each valve. The rate of filling the piping with water must not exceed the venting capacity of the installed air vent valves and devices.

3-2. **BLOCKING AND BACKFILLING.** Piping shall be adequately blocked, anchored, and supported before the test pressure is applied. Underground piping identified in the Pipeline Schedule shall be tested before the joints are covered.

3-3. **PRESSURE TESTING.** After the piping to be tested has been filled with water, the test pressure shall be applied and maintained without interruption within plus or minus 5 psi of test pressure for 2 hours plus any additional time required for Engineer to examine all piping being tested and for Contractor to locate any defective joints and pipe materials. The test pressure shall be in accordance with the requirements specified for pipeline or plant piping.

3-3.01. **Pipeline Test Pressure.** Piping shall be subjected to a hydrostatic test pressure as indicated in the Pipeline Test Pressure Schedule.

The test pressure, expressed in feet of water, to be applied at any point in the piping shall be equivalent to the arithmetic difference between the specified test pressure plane elevation and the elevation of the horizontal center line of the piping at the selected location. The value obtained shall be multiplied by 0.433 to obtain psi.

3-3.02. **Plant Piping Test Pressure.** Piping shall be subjected to the test pressure as indicated in the Pipeline Test Pressure Schedule.

3-3.03. **Pressure Testing of Above Ground or Exposed Piping.** Maintain the test pressure for a minimum of 24 hours. Examine joints, fittings, valves, and connections for leaks. The piping system shall show zero leakage or weeping. Repair leaks and retest until zero leakage is obtained. Air and vacuum valves shall be in place and operational in case of pipe failure during testing.

3-3.04. **Pressure Testing of Buried Piping.** Where any section of the piping contains concrete thrust blocks or encasement, do not pressure test until at least
10 days after the concrete has been poured. When testing cement mortar lined piping, fill the pipe to be tested with water and allow to soak for at least 48 hours to absorb water before conducting the pressure test. Contractor shall apply and maintain the test pressure by means of a hydraulic force pump. The test pressure shall be maintained for the following durations by restoring it whenever it falls an amount of 5 psi:

<table>
<thead>
<tr>
<th>Pipe Diameter (inches)</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 36</td>
<td>24</td>
</tr>
</tbody>
</table>

3-4. **PLANT PIPING LEAKAGE TESTING.** All plant piping shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of Contractor.

3-5. **PIPELINE LEAKAGE TESTING.** The pipeline piping shall be subjected to a leakage test. Leakage testing may be conducted concurrently with pressure testing. The duration of the leakage test shall be 2 hours plus the additional time required for Engineer to make an accurate determination of leakage.

3-5.01. **Above Ground and Exposed Piping Leakage.** All above ground and exposed piping shall be watertight and free from leaks. Each leak which is discovered within the correction period stipulated in the General Provisions shall be repaired by and at the expense of the Contractor.

3-5.02. **Zero Leakage Piping.** In addition to the above ground and exposed piping zero leakage allowance, the allowable leakage for welded steel pipe and flanged joints shall be zero gallons. The allowable leakage for buried piping having threaded, braded, or welded (including solvent welded) joints shall be zero gallons.

3-5.03. **Leakage Test Pressure.** The hydrostatic pressure maintained during the leakage test shall be equal to the pressure specified for pressure testing of the piping and shall be maintained within plus or minus 5 psi during the entire time that leakage measurements are being performed.

3-5.04. **Leakage Measurement.** Measurement of leakage shall not be attempted until all trapped air has been vented, absorption of water by the pipe wall or lining has stabilized, and a constant test pressure has been established. After the pressure has stabilized, piping leakage shall be measured with a suitable water meter installed in the pressure piping on the discharge side of the force pump.
3-5.05. **Allowable Leakage.** The term "leakage", as used herein, refers to the total amount of makeup water which must be added into the piping during the test to maintain the test pressure.

No piping will be accepted if and while it exhibits a leakage rate in excess of that determined by the indicated formulas:

\[ Q = 0.0075 \text{ DLN} \text{ (using inch-pound units)} \]

Where

- \( Q \) = allowable leakage in gallons per hour
- \( D \) = nominal diameter of pipe in inches
- \( L \) = length of section tested in thousand feet
- \( N \) = square root of average test pressure in pounds per square inch

Whenever the piping to be tested contains pipe of different diameters, the allowable leakage shall be calculated separately for each diameter and the corresponding length of piping. The resulting allowable leakage rates shall be added to obtain the total allowable leakage for the entire piping.

All joints in piping shall be free from visible leaks during the leakage test. Each leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of Contractor regardless of the amount that the total leakage may have been below the specified allowable leakage rate during the leakage test.

If the leakage test indicates a higher than allowable leakage rate, Contractor shall locate and repair leaking joints and other defective work and repeat the test until leakage rate is less than the allowable rate.

End of Section
DIVISION 3 – Concrete
PART 1 - GENERAL

1-1. SCOPE. This section covers formwork for cast-in-place concrete.

1-2. GENERAL. All forms shall be accurately and properly placed so cast-in-place concrete may be placed as indicated on the Drawings and as specified. The forms shall produce a smooth concrete finish free from offsets or irregularities.

1-3. SUBMITTALS. All submittals of catalog data sheets, manufacturers' certificates of compliance and other data shall be in accordance with the Submittals Procedures section.

A manufacturer's certificate of compliance, which includes the name of the project and, when requested, copies of independent test results confirming compliance with specified requirements, shall be submitted to Engineer for the following materials:

- Form Coating
- Form Ties

PART 2 – PRODUCTS

2-1. MATERIALS.

Forms

- Prefabricated
  - Simplex "Industrial Steel Frame Forms",
  - Symons "Steel Ply", or Universal "Uni-form".

- Plywood
  - Product Standard PS1, waterproof, resin-bonded, exterior type Douglas fir, face adjacent to concrete Grade B or better.

- Fiberboard
  - ANSI/AHA A135.4, Class 1, tempered, water-resistant, concrete form hardboard.

- Lumber
  - Straight, uniform width and thickness, and free from knots, offsets, holes, dents, and other surface defects.
<table>
<thead>
<tr>
<th>Chamfer Strips</th>
<th>Clear white pine, surface against concrete planed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form Coating</td>
<td>Nonstaining and nontoxic after 30 days. Product shall not exceed VOC limits established by the federal, state, or local regulatory agency having jurisdiction over the project site.</td>
</tr>
</tbody>
</table>

2-2. **FORMS.** Forms shall be designed to produce hardened concrete having the shape, lines, and dimensions indicated on the Drawings. Forms shall conform to ACI 347R and the following additional requirements.

Stay-in-place metal formwork will not be permitted.

Form-facing materials shall be selected in accordance with ACI 347.3R, based upon the applicable formed concrete surface category. Formed concrete surface categories vary by structure and application, and shall be as indicated in the Concrete Finishing section. Other types of forming materials, such as steel or unlined wood, may be used where plywood or lined forms are not required, and may be used as backing for form linings. Forms for exposed surfaces shall be laid out in a regular and uniform pattern with the long dimension of panels vertical and all joints aligned. The forms shall produce finished surfaces that are free from offsets, ridges, waves, and concave or convex areas, within the tolerances specified herein.

All vertical concrete surfaces above footings shall be formed.

Flat segmented forms not more than 24 inches wide may be used for forming curved surfaces 25 feet in diameter or larger.

2-2.01. **Design.** Forms shall be substantial and sufficiently tight to prevent leakage of mortar. Forms shall be braced or tied to maintain the desired position, shape, and alignment during and after concrete placement. Walers, studs, internal ties, and other form supports shall be sized and spaced so that permissible working stresses are not exceeded.

Beams and slabs supported by concrete columns shall be formed so that the column forms may be removed without disturbing the supports for the beams or slabs.

Wherever the top of a wall will be exposed to weathering, the forms on at least one side shall not extend above the top of the wall and shall be brought to true line and grade. At other locations, forms shall be brought to a true line and grade, or a wooden guide strip shall be placed at the proper location on the forms so that the concrete surface can be finished with a screed or template to the
specifying elevation, slope, or contour. At horizontal construction joints in walls, the forms on one side shall not extend more than 2 feet above the joint.

Temporary openings shall be provided at the bottom of column and wall forms and at other points where necessary to facilitate cleaning and inspection.

2-2.02. Form Ties. Form ties shall have removable end and permanently embedded body, and shall have sufficient strength and rigidity to support and maintain the form in proper position and alignment without the use of auxiliary spreaders. Cones shall be provided on the outer ends of each tie, and the permanently embedded portion shall be at least 1 inch back from the concrete face. Form ties for liquid-containing walls shall be provided with water stop washers located on the permanently embedded portions of the ties at the approximate center of the wall. Permanently embedded portions of form ties without threaded ends shall be constructed so that the removable ends are readily broken off without damage to the concrete. Through-wall tapered removable ties will not be acceptable. The type of form ties used shall be acceptable to Engineer. Stainless steel form ties shall be used in structures for ozone treatment.

Form ties in exposed surfaces shall be uniformly spaced and aligned in horizontal and vertical rows.

2-2.03. Edges and Corners. Chamfer strips shall be placed in forms to bevel all salient edges and corners, except the top edges of walls and slabs which are to be tooled and edges which are to be buried. Equipment bases shall have formed beveled salient edges for all vertical and horizontal corners, unless specifically indicated otherwise on the Drawings. Unless otherwise noted, bevels shall be 3/4 inch wide.

2-3. ARCHITECTURAL CONCRETE. Forms for architectural concrete shall be as indicated in Section 6 of ACI 301, and to the additional requirements specified herein. Forms shall be fabricated from plastic overlay plywood or fiberglass reinforced plastic. All joints shall be mortar-tight. Forms shall be reinforced, braced, and supported as necessary to obtain the required straightness tolerance.

PART 3 – EXECUTION

3-1. PLACEMENT. The limits of each concrete pour shall be determined by Contractor and shall be acceptable to Engineer.

Before concrete is placed, forms shall be rigidly secured in proper position; all dirt, mud, water, and debris shall be removed from the space to be occupied by concrete; all surfaces encrusted with dried concrete from previous placements
shall be cleaned; and the entire installation shall be acceptable to Engineer. Remove all frost, ice, and snow from within the formwork before concrete is placed.

3-2. **TOLERANCES.** Tolerances for cast-in-place concrete work shall be as indicated in ACI 347.3R, based upon the relevant formed concrete surface category.

3-3. **FORM COATING.** All concrete forms shall have form release agent applied to them before placement of concrete.

3-4. **FORM REMOVAL.** Forms shall not be removed from structures until the concrete in the structures has sufficient strength to support the weight of the structure and any superimposed load, including loads from construction operations. Contractor shall be responsible for limiting any applied loadings. There shall be no evidence of damage to concrete and no excessive deflection or distortion of members due either to the removal of forms or to loss of support.

Supporting formwork (soffit material only) for horizontal members shall not be removed until the concrete has attained at least 75 percent of the specified 28 day compressive strength as determined by cylinders made and cured in the field. Shoring systems for horizontal members shall not be removed until the concrete has attained the full specified 28 day compressive strength, but may be temporarily removed for the purpose of removing the soffit material as permitted above. Shoring shall be left in place and reinforced as necessary to carry any construction equipment or materials placed thereon.

When forms are removed before the specified curing is completed, measures shall be taken to immediately continue curing and to provide adequate thermal protection for the concrete.

3-5. **PAN-FORMED JOISTS.** New or undamaged metal pans shall be used to produce concrete that is smooth and free from waves and irregularities. Adjustable pans without flanges shall be used to provide joist lines which are straight and true. Pans and joist bottom boards shall be carefully removed to avoid damaging the concrete. Exposed surfaces shall be finished by removing fins and repairing honeycomb. Grout cleaning will not be required.

Nail-down flange type forms may be used for pan-formed joists which are located above suspended ceilings or required in connection with roof slabs for covered basins or reservoirs. Pans and joist bottom boards in such locations shall be removed in a careful manner.

End of Section
PART 1 – GENERAL

1-1. SCOPE. This section covers reinforcement for cast-in-place concrete and precast concrete.

1-2. SUBMITTALS.

1-2.01. Drawings and Data. All submittals of drawings, manufacturers' certificates of compliance, certification of reinforcement, reinforcement bar lists, placement drawings, test data, catalog data sheets and other data shall be in accordance with the Submittals Procedures section.

Bar lists and drawings for the fabrication and placing of reinforcement shall be submitted for review and shall have sufficient plans, elevations, and sections to adequately detail and label all reinforcement. The bar lists and drawings shall also include a reference to the structure in which the reinforcement will be installed and to the Drawing showing the reinforcement.

1-2.02. Manufacturer's Certificate of Compliance. A manufacturer's certificate of compliance, which includes the name of the project and, when requested, copies of independent test results confirming compliance with specified requirements, shall be submitted to Engineer for the following materials:

- Mechanical connectors
- Terminator mechanical anchors

PART 2 – PRODUCTS

2-1. MATERIALS.

Bars, Except Weldable
ASTM A615, Grade 60, deformed.

Bars, Weldable
ASTM A706 or A615, Grade 60, deformed, with maximum carbon equivalent of 0.55%.
Ductile Reinforcing Bars

ASTM A706 or ASTM A615, Grade 60, if the actual yield strength based on mill tests does not exceed the specified yield strength by more than 18,000 psi (retests shall not exceed this value by more than an additional 3,000 psi) and the ratio of the actual ultimate tensile strength to the actual tensile yield strength is not less than 1.25.

Column Spirals

ASTM A1064, cold drawn wire.

Welded Wire Fabric

ASTM A1064.

Bar Supports

CRSI Class 1, plastic protected; or Class 2, stainless steel protected. Precast concrete bricks shall not be used without approval of Engineer.

Bars, Epoxy-Coated

ASTM A775, Annex A1, using ASTM A615 and A706 bars only, minimum dry film thickness of 7 mils.

Welded Wire Fabric and Steel Wire, Epoxy-Coated

ASTM A884, minimum dry film thickness of 7 mils.

Patching Material for the Epoxy Coating

As specified in ASTM A775, Annex A1.

Bar Supports for Epoxy-Coated Reinforcement

Coated wire bar supports, bar supports made of dielectric material, or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2 inches from the point of contact with the epoxy-coated reinforcing bars. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material or coated with dielectric material.
Mechanical Connectors  Splicing system meeting Type 2 tensile requirements of ACI 318. Products shall have a current evaluation report verifying testing per ICC-ES AC 133.

Threaded Type  Dayton Superior “DBDI Splice System”, or Barsplice Products “Grip-Twist” system.

Locking Type  Dayton Superior “Bar-Lock Coupler” system, or Barsplice Products “Zap Screwlock Type 2 Mechanical Connector” system.

2-2. REINFORCEMENT. Reinforcement shall be accurately formed and shall be free from loose rust, scale, concrete splatter, and contaminants which reduce bond. Unless otherwise indicated on the Drawings or specified herein, the details of fabrication shall conform to ACI SP-66 and ACI 318. Reinforcement shall not be bent in the field without approval of Engineer.

2-2.01. Splices. Splices shall conform to the details indicated on the Drawings. Splices at locations other than those indicated on the Drawings shall be submitted to Engineer for review and concurrence.

2-2.02. Mechanical Connectors. Mechanical connectors shall be used only as indicated on the Drawings. Connections in adjacent bars shall be spaced at least 30 inches apart.

2-2.03. Welding. Except where indicated on the Drawings, welding or tack welding of reinforcement is not permitted. Preheating and welding shall conform to AWS D1.4. Reinforcement which has been welded improperly or without Engineer’s concurrence shall be removed and replaced.

PART 3 – EXECUTION

3-1. STORAGE AND HANDLING. Reinforcing steel shall be carefully handled and shall be stored on supports which prevent the steel from touching the ground.

Epoxy-coated reinforcement shall be handled using equipment with protected contact areas. Bundles or stacks of epoxy-coated reinforcement shall be lifted at multiple points to prevent abrasion from sags. Epoxy-coated reinforcement shall not be dropped or dragged and shall be stored on protective cribbing. Faded or chalking coating will not be cause for rejecting epoxy-coated reinforcement.
3-2. **PLACEMENT.** Reinforcement shall be accurately positioned on supports, spacers, hangers, or other reinforcement, and shall be secured in place with wire ties or suitable clips. Tolerances shall be as stipulated in ACI 117 and ACI 318 unless otherwise indicated.

Reinforcement at the bottom of concrete slabs and mats shall not be supported from contact with subgrade by the use of metal supports or bent reinforcement.

Where reinforcement in beams is placed in two or more layers, the bars in the upper layer shall be placed directly above the bars in the lower layer.

Reinforcement for beams or slabs which are supported by concrete columns shall not be installed until after the concrete for the column has been placed.

Before concrete is placed, reinforcement shall be rigidly secured in proper position. All surfaces encrusted with dried concrete from previous placements shall be cleaned and the entire installation shall be acceptable to Engineer. Remove all frost, ice, and snow before concrete is placed.

Epoxy-coated reinforcement shall be fastened with nylon, epoxy, or plastic-coated tie wire.

3-3. **PLACING CONCRETE.** Concrete shall be placed and compacted in wall or column forms before any reinforcement is placed in the system to be supported by such walls or columns.

3-4. **DUCT BANKS.** All reinforcement and other magnetic materials installed in duct banks shall be installed parallel to the individual ducts, unless they enclose all the ducts of the duct bank.

End of Section
PART 1 – GENERAL

1-1. SCOPED. This section covers concrete accessories including construction, contraction and expansion joints for cast-in-place concrete.

Dovetail anchor slots shall be as specified in the Masonry section.

1-2. GENERAL. All accessories shall be accurately placed and all joints shall be accurately and properly constructed so cast-in-place concrete can be placed as specified and as indicated on the Drawings.

1-3. DRAWINGS AND DATA. All submittals of manufacturers' certificates of compliance, test data, reports, catalog data sheets and other data shall be in accordance with the Submittals Procedures section.

PART 2 - PRODUCTS

2-1. MATERIALS.

Metal Waterstops

Carbon steel Uncoated, 12 gage minimum thickness, size as indicated on the Drawings.

Stainless steel ASTM A480/A666, Type 304 or 316, 14 gage minimum thickness, size as indicated on the Drawings.

PVC Waterstops Extruded, virgin, elastomeric, polyvinyl chloride (PVC), white (no pigment), ribbed, 3/8 inch min thick. Reclaimed material will not be acceptable. Provide hog rings or grommets spaced at 12 inches on center entire length.

At construction joints in concrete sections less than 12 inches in thickness 6 inches wide; Greenstreak “679” or Vinylex “R638”.
At construction joints in concrete sections 12 inches or more in thickness

9 inches wide; Greenstreak “646” or Vinylex “R938”.

At control joints in concrete sections less than 12 inches in thickness

6 inches wide with an "O" bulb closed center section; Greenstreak "732" or Vinylex "RB638H".

At control joints in concrete sections 12 inches or more in thickness

9 inches wide with an "O" bulb closed center section; Greenstreak "735" or Vinylex "RB938H".

TPV Waterstops

Extruded, virgin, thermoplastic vulcanizate (TPV), black. Ribbed; center bulb. Ozone resistance – no cracking at 450 pphm per ASTM D1171.

For concrete sections less than 12 inches in thickness

6 inches wide; 3/16 min thick; minimum 0.5 lbs/ft. J.P. Specialties “Earth Shield – Part No. 636” or Westec “Style 619”.

For concrete sections 12 inches or more in thickness

9 inches wide, 3/16 inches min thick, minimum 0.8 lbs/ft. J.P. Specialties “Earth Shield – Part No. 936” or Westec “Style 620”.

Expandable Waterstops, permitted only at locations indicated on Drawings

Hydrophilic; bentonite free, chemically modified rubber. Adeka "Ultra Seal MC-2010MN" or Greenstreak "Hydrotite CJ-1020-2K". Adhesive and sealant as recommended by the manufacturer.

For other concrete sections

Hydrophilic; chemically modified rubber. Adeka "KBA-1510FP" or Greenstreak "Swellstop”. Adhesive and sealant as recommended by the manufacturer.
Expansion joint materials

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filler</td>
<td>Preformed sponge rubber, ASTM D1752, Type I.</td>
</tr>
<tr>
<td>Filler adhesive</td>
<td>As recommended by manufacturer.</td>
</tr>
<tr>
<td>Sealant</td>
<td>As specified in the Joint Sealants section.</td>
</tr>
<tr>
<td>Polyethylene film</td>
<td>NBS Product Standard PS17 or ASTM D4397, 6 mils or thicker.</td>
</tr>
<tr>
<td>Bearing pads</td>
<td>Preformed cotton duck reinforced pads, at least 1/4 inch thick; JVI &quot;Capralon&quot; or Voss Engineering &quot;Sorbtex&quot;.</td>
</tr>
<tr>
<td>Epoxy bonding agent</td>
<td>As specified in Concrete Placing section.</td>
</tr>
<tr>
<td>Wedge inserts</td>
<td>Malleable iron, with galvanized askew-head bolts, nuts, and washers; Hohmann and Barnard &quot;HW&quot;, Richmond &quot;Peerless&quot;, or Weston &quot;WC50&quot;.</td>
</tr>
</tbody>
</table>

PART 3 - EXECUTION

3-1. CONSTRUCTION JOINTS. Construction joints shall be made at locations indicated on the Drawings or where specified. Construction joints shall not be made at other locations without the concurrence of Engineer.

3-1.01. Location. Construction joints shall be located as follows:

   a. In Columns and Walls. At the underside of beams, girders, haunches, drop panels, and column capitals, and at floor levels. All haunches, drop panels, and column capitals shall be considered part of the
supported floor or roof and shall be placed monolithically therewith. Column bases will not be required to be monolithic with the floor beneath. Walls shall be divided into sections not to exceed 60 feet, except at corners which shall be as indicated on the Drawings. Walls supporting beams shall have pockets blocked out so that the full beam cross section penetrates the full thickness of the wall. Where waterstops are required in the joint, the wall pocket shall be widened and deepened to prevent interference between the waterstop and the beam reinforcement.

b. In Beams and Girders. Within the middle third of the span, unless a beam intersects a girder at this point, in which case the joint in the girder shall be offset by twice the width of the beam. Provisions for the transfer of shear and other forces through the construction joint shall be acceptable to Engineer. Members shall be divided into pour sections not greater than 60 feet in length.

c. In Suspended Slabs. At or near the center of the span in flat slab or T-beam construction. No joint will be permitted between a slab and a concrete beam or girder unless specifically required by the Drawings. Suspended floor systems shall be divided by construction joints into approximately square sections not to exceed 60 feet in their longest dimension.

d. In Bottom Slab. Each bottom slab shall be divided into approximately square sections not to exceed 60 feet in their longest dimension.

Construction joints in beams, girders, joists, and slabs shall be perpendicular to the planes of their surfaces.

3-1.02. Watertight Joints. Construction joints in the following locations shall be watertight and shall be provided with continuous waterstops.

a. For liquid-containing structures, provide in slabs below the liquid surface elevation, and in all perimeter walls to their full height.

b. For liquid-containing structures, provide in divider walls where it is possible for one side or "cell" to be out of service while the other remains liquid-containing.

c. Provide in other locations specifically indicated on the Drawings.

3-2. EXPANSION AND CONTRACTION JOINTS. Expansion joint filler shall be firmly bonded to the previously poured joint face with a suitable adhesive, and the new concrete shall be poured directly against the joint filler. Accessible edges of each expansion and contraction joint shall be sealed as specified in the caulking section.
3-3. **WATERSTOPS.**

3-3.01. **Placement.** Each waterstop shall be continuous throughout the length of the joint in which it is installed. Waterstops shall be clean, free from coatings, and shall be maintained in proper position until surrounding concrete has been deposited and compacted. Waterstop embedment shall be equal on both sides of the joint.

Expandable waterstops shall be located as nearly as possible to the center of the joint and shall not be installed when air temperature falls outside the manufacturer’s recommended range.

3-3.02. **Storage and Handling.** Expansion joint filler and elastomeric (PVC or TPV) waterstops shall be stored in a cool place protected from direct sunlight.

Metal waterstops shall be handled, transported, delivered, and stored in a manner which will prevent bends, dents, or corrosion.

3-3.03. **Splices.** Junctions between adjacent sections of metal waterstops shall be lapped 5 inches and securely bolted, screwed, or spot welded together.

Junctions between adjacent sections of elastomeric (PVC or TPV) waterstops shall be spliced in strict conformity with the recommendations of the manufacturer. Directional changes and intersections shall be factory fabricated by the waterstop manufacturer prior to delivery to the Site. Field splices will be acceptable only in straight sections.

Expandable waterstops shall be contact lapped a minimum distance of 8 inches. Voids shall be filled with sealant.

Where an expandable waterstop is used in combination with metal or PVC water stops, the expandable water stop shall be placed in contact and shall overlap a minimum distance of 12 inches. Voids shall be filled with sealant.

3-4. **PLACEMENT.** The limits of each concrete pour shall be determined by Contractor and shall be acceptable to Engineer.

3-5. **EMBEDMENTS.** Anchor bolts, castings, steel shapes, conduits, sleeves, masonry anchors, and other objects that are to be embedded in the concrete shall be accurately positioned in the forms and securely anchored.

Unless installed in pipe sleeves, anchor bolts shall have sufficient threads to permit a nut to be placed on the concrete side of the form or template. A second nut shall be placed on the other side of the form or template, and the two nuts shall be so adjusted that the bolt will be held rigidly in proper position.
3-6. **DUCT BANK JOINTS.** Not used.

3-7. **PLACEMENT AGAINST SUBGRADE.** Where concrete is placed against rock, all loose pieces of rock shall be removed and the exposed surface cleaned with a high-pressure water spray.

3-7.01. **Polyethylene Film.** Where concrete is placed against gravel or crushed rock which does not contain at least 25 percent material passing a No. 4 sieve, such surfaces shall be covered with polyethylene film. Joints in the film shall be lapped at least 6 inches and taped.

3-7.02. **Vapor Retarder.** Vapor retarder shall be installed at the locations indicated on the Drawings. Installation shall be in accordance with ASTM E1643 and the manufacturer’s recommendations. Joints in the retarder shall be sealed with waterproof sealing tape. Care shall be exercised to avoid tearing or puncturing the retarder. Any damage shall be promptly repaired, and the retarder shall be inspected for damage immediately before the concrete is placed.

3-8. **BEARING PADS.** Wherever a concrete beam is supported by a concrete bracket, a bearing pad shall be placed in the joint between the beam and the bracket.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers procurement of all cast-in-place concrete, including concrete materials, limiting requirements, mixture design, and performance requirements, and delivery to the Site through discharge at the end of the delivery truck chute.

Work beyond the end of the delivery truck chute is covered in the Concrete Forming, Concrete Joints and Accessories, Concrete Reinforcing, Concrete Placing, Concrete Finishing, and Concrete Curing sections.

1-2. GENERAL. All cast-in-place concrete shall conform to the limiting requirements of this specification including Table 1.

1-2.01. Concrete Classifications. Concrete classifications shall be defined and used as indicated for the following classes:

Concrete Classifications

<table>
<thead>
<tr>
<th>Class</th>
<th>Class Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Structural Concrete:</td>
</tr>
</tbody>
</table>

A1. Concrete for Liquid-Containing Structures. Concrete for liquid-containing environmental structures, liquid-containing tanks, interior suspended slabs in high humidity areas, headwalls, chemical storage or containment areas, below grade structures exposed to groundwater under normal conditions, and all other concrete not otherwise indicated.

A2. Small Aggregate Concrete: Congested Areas. Structural small aggregate concrete shall be used in all areas (including liquid-containing structures) where the clear distance between reinforcement, conduit, or embedded items is less than the largest dimension of coarse aggregate particles in the structural concrete.

A3. Concrete for Non-Liquid-Containing Structures. Concrete for footings, foundations, manholes, catch basins, pan-formed joists, and all other structural concrete other than for liquid-containing structures.
Class  Class Description

B.  **Exterior Flatwork Concrete.** Concrete for exterior slabs on grade, plant pavement, sidewalks, curbs and gutters, and small equipment pads.

C.  **Architectural Concrete.** Not used.

D.  **Miscellaneous Concrete:**

   D1.  **Ductbanks, Pipe Blocking, Concrete Fill, and Pipe Encasement Concrete.** Concrete used in ductbanks, pipe blocking, concrete fill and pipe encasements.

   D2.  **Underwater Concrete.** Not Used. Unless otherwise permitted by Engineer, concrete shall not be deposited underwater.

   D3.  **Mass Concrete.** Not used.

   D4.  **Pan Stairs Concrete.** Not used.

   D5.  **Wash Water Trough Concrete.** Not used.

   D6.  **Composite Topping Concrete.** Not used.

   D7.  **Lean Concrete.** Used as a fill material for over-excavations or for mud slabs below foundations. Controlled Low-Strength Material (CLSM) used as an easily removable fill material is covered in the Excavation and Fill for Structures section.

1-3.  **SUBMITTALS.** All data shall be submitted in accordance with the Submittals Procedures section, unless otherwise specified herein.

The required submittal data for each Class of concrete shall be as indicated in Tables 2A, 2B, and 2C.

1-3.01.  **Preliminary Review of Materials.** Reports covering the source and quality of concrete materials proposed for the work shall be submitted to Engineer for review within 30 days after the preconstruction conference.

A manufacturer's certificate of compliance, which includes copies of independent test results confirming compliance with specified requirements, shall be submitted for the following materials:

   Cement.

   Admixtures.
1-3.02. Proposed Mixture Proportions. Data indicating the proposed material quantities in each Class of concrete shall be submitted to Engineer for review within 30 days after the preconstruction conference.

1-3.03. Field Test Record Data. Concrete mixture field test record performance data shall be submitted to Engineer for review and acceptance. Field test record data shall be acceptable only for the Classes of concrete indicated as such in Table 2C.

1-3.04. Laboratory Trial Mixture Test Results. Laboratory trial mixture testing shall not begin until materials and proposed mixture proportions have been reviewed and are acceptable to Engineer. Trial mixture testing shall be performed for all Classes of concrete where field test record data is not acceptable as a means of qualifying the mixture.

1-4. STORAGE AND HANDLING. Cement, slag cement and fly ash shall be stored in suitable moistureproof enclosures. Cement, slag cement and fly ash which have become caked or lumpy shall not be used.

Aggregates shall be stored so that segregation and the inclusion of foreign materials are prevented. The bottom 6 inches of aggregate piles in contact with the ground shall not be used.

PART 2 - PRODUCTS

2-1. LIMITING REQUIREMENTS. Unless otherwise specified, each concrete mixture shall be designed and controlled, within the following limits, to provide a dense, durable concrete suitable for the expected service conditions.

Concrete materials shall be selected and concrete shall be proportioned, batched, mixed, and delivered in a manner that will minimize shrinkage and cracking as specified herein, and in accordance with Chapters 3 and 8 of ACI 224R. Concrete temperatures shall be controlled before and until delivery at the end of the delivery truck chute to minimize cracking. Any rise in concrete temperature caused by environmental conditions that will be conducive to excessive shrinkage shall be controlled.
For each class of concrete, each concrete mixture shall be designed and concrete shall be controlled within the limits in the specification and in Table 1.

2-1.01. **Cementitious Material Content Limits.** The minimum quantity of Portland cement in the concrete shall be as indicated in Table 1.

The cementitious material content shall not be increased beyond the Table 1 values more than necessary to achieve the required $f'_{\text{cr}}$.

Contractor may substitute fly ash for Portland cement within the percentage ranges indicated in Table 1, on the basis of 1.0 lbs of fly ash added for each lb of Portland cement reduction.

Contractor may substitute slag cement for Portland cement within the percentage ranges indicted in Table 1 on the basis of 1.0 lbs of slag cement added for each lb of Portland cement reduction.

Mixtures using slag cement in combination with fly ash will not be acceptable.

2-1.02. **Maximum Water-Cementitious Material Ratio.** The maximum water-cementitious material ratio shall be on a cement mass basis, or, if fly ash or slag cement is used, the combined mass of cement plus fly ash or slag cement shall be used to determine the water-cementitious materials ratio. Limiting maximum water-cementitious material ratios are indicated in Table 1.

2-1.03. **Aggregates.** Aggregates shall comply with ASTM C33 except as specified herein. Fine aggregate shall be clean natural sand. Artificial or manufactured sand shall not be used unless acceptable to Engineer. Coarse aggregate shall be crushed rock, washed gravel, or other inert granular material, meeting Class 4S requirements, except that clay and shale particles shall not exceed values indicated in Table 1.

Gradation of coarse aggregate shall conform to maximum nominal size grading requirements of ASTM C33. When a combination of two or more sizes is used, the combined gradation shall meet ASTM C33 requirements.

Aggregates used in concrete shall have a combined aggregate distribution similar to the aggregates used in the concrete trial mixtures. Reports of individual aggregates shall include sieve sizes 1-1/2 inch, 1 inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, and No. 50 in accordance with ASTM E11.

Specified sand equivalent for fine aggregate shall be not less than indicated in Table 1 for an average of 3 samples tested in accordance with ASTM D2419.
To comply with the specified concrete shrinkage test requirements, the clay and shale content of the aggregates may need to be reduced by washing the aggregate.

2-1.04. **Ratio of Fine to Total Aggregates.** The ratio of fine to total aggregates, based on solid volumes (not weights), shall be as follows:

<table>
<thead>
<tr>
<th>Maximum Nominal Coarse Aggregate Size</th>
<th>Minimum Ratio</th>
<th>Maximum Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8 inch</td>
<td>0.45</td>
<td>0.60</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>0.40</td>
<td>0.55</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>0.35</td>
<td>0.50</td>
</tr>
<tr>
<td>1 inch</td>
<td>0.30</td>
<td>0.46</td>
</tr>
<tr>
<td>1-1/2 inch</td>
<td>0.25</td>
<td>0.40</td>
</tr>
</tbody>
</table>

2-1.05. **Slump.** Concrete slump shall be kept as low as possible, consistent with proper handling and thorough consolidation. Prior to the addition of admixtures, slump shall be at least 2 inches and shall not exceed the maximum slump as indicated in Table 1.

When superplasticizer is dispensed at the ready-mix plant, the concrete mixture design shall be based on a maximum slump as indicated in Table 1. When superplasticizer is dispensed at the Site, the slump of the concrete delivered shall not exceed the maximum slump as indicated in Table 1 before superplasticizer is added.

2-1.06. **Initial Set.** The initial set, as determined by ASTM C403, shall be attained 5-1/2 hours ±1 hour after the water and cementitious materials are added to the aggregates for each concrete mixture. The quantity of retarding admixture shall be adjusted to compensate for variations in temperature and job conditions.

2-1.07. **Total Air Content.** The total volumetric air content of concrete after placement shall be as indicated in Table 1, and within ±1.5 percent. Air-entraining admixture may be omitted from concrete for interior slabs which are to be steel trowel finished.

2-1.08. **Admixtures.** Only approved or specified admixtures shall be used. Unless otherwise acceptable to Engineer, all admixtures shall be from one manufacturer and shall be compatible. Admixtures that are compatible with other
admixtures and concrete materials shall not have an adverse affect on the required properties of the concrete nor the specified limiting requirements. The admixture content, batching method, and time of introduction to the mixture shall comply with these specifications and with the manufacturer's recommendations for minimum shrinkage. The admixture manufacturer shall provide qualified field services as necessary, at no additional cost to Owner.

Admixtures used in the concrete shall be reviewed and accepted by Engineer prior to conducting the laboratory trial mixture testing and the shrinkage testing. No calcium chloride nor admixture containing chloride from sources other than residual impurities in admixture ingredients will be permitted.

Combination of admixtures which cause premature or local dehydration or post-compaction settlement of the concrete surface shall not be used. If any such undesirable characteristics are observed, the use of the mixture shall be discontinued and an alternate mixture design used.

All liquid-containing (Class A1) concrete, and small aggregate (Class A2) concrete that is placed in liquid-containing structures, shall include a high-range water reducing admixture (superplasticizer). Water-reducing admixtures are not required for Classes D1 and D7, but may be included at Contractor's option. For all other non-liquid-containing concrete, a water-reducing admixture shall be used.

Superplasticizer may be dispensed into the concrete at the plant or on the Site and shall be mixed in accordance with the admixture manufacturer's recommendations. Each superplasticizer dose, when dispensed at the Site, shall be easily verifiable and recorded on the delivery ticket. The superplasticizer for each load shall be accurately proportioned into a separate container prior to dispensing the admixture into the concrete. When truck-mounted dispensers are used, the system shall not be flushed or cleaned with water until after the entire load of concrete has been discharged. When permitted by Engineer, redosing of concrete with superplasticizer shall be done only once. Redosing procedures shall be as recommended by the admixture manufacturer.

A shrinkage reducing admixture may be added to Class A1 concrete. It shall replace an equal volume of mixing water or as otherwise recommended by the admixture manufacturer. The quantity of air entrainment admixture shall be adjusted as required by the admixture manufacturer to keep mixture air content within specified limits.

2-1.09. Fiber Concrete. Fiber concrete shall be used only where noted on the Drawings. Polypropylene micro fibers shall be added to the concrete materials at the time the materials are batched at the rate of 1.5 lbs/cu yd. Batching and mixing procedures shall be in accordance with the manufacturer's
recommendations. Fibers shall be randomly oriented and uniformly distributed throughout the concrete.

2-1.10. **Strength.** In addition to the other limiting requirements to achieve durability and minimize shrinkage, the minimum acceptable compressive strengths of concrete tested at the end of the delivery truck chute, as determined by ASTM C39, shall be as indicated in Table 1.

Adequate test cylinders taken at the point of placement shall also be made to verify that Contractor's concreting procedures comply with applicable industry standard procedures.

2-1.11. **Pumped Concrete.** Coarse aggregate size for pumped concrete mixtures shall be limited to a nominal maximum of 1-1/2 inch.

The slump of concrete that is discharged into a pump may exceed the specified maximum slump value by the amount of slump loss in the pumping system, up to a maximum of 1 inch. The slump loss shall be determined by tests made at each end of the pumping system, with the pump boom oriented in the expected worst-case position during placement.

2-1.12. **Water-Soluble Chloride.** Maximum water-soluble chloride ion concentrations in hardened concrete at an age of 28 days shall not exceed the limits expressed as a percentage of mass of cementitious materials as indicated in Table 1.

Test results shall be reported as the percentage of water-soluble chloride ions in the concrete and as a percentage of chloride ion relative to the mass of cementitious materials in the concrete.

Testing of the concrete components for water-soluble chloride ions may be done at the discretion of Contractor. Copies of the reports on such tests shall be furnished to Engineer.

The hardened concrete and each gradation of aggregate used in the concrete shall be tested each time a chloride ion test is conducted on a concrete mixture.

2-1.13. **Laboratory Shrinkage Limits.** Based on the modified ASTM C157 test procedures as specified herein, the shrinkage limits of concrete shall be the average drying shrinkage of each set of three test specimens cast in the laboratory from a trial mixture as measured at the 21 days drying age, and shall not exceed the values in Table 1.

2-1.14. **NSF 61 Compliance.** Not used.
2-1.15. Mineral Colored Concrete. Not used.

2-1.16. Cold Weather Concrete. Not used.

2-1.17. Hot Weather Concrete. Except as modified herein, hot weather concrete shall comply with ACI 305.1. At air temperatures of 90°F or above, concrete shall be kept as cool as possible before and during delivery. The temperature of the concrete at the time of delivery at the end of the delivery truck chute shall not exceed the values indicated in Table 1.

2-2. MATERIALS.

Cement          ASTM C 150, Type V or Type II/V. Low Alkali.
Fly Ash         ASTM C618, except that loss on ignition shall not exceed 4 percent. Class F or Class C are acceptable, but Class C shall also be qualified for moderate sulfate resistance as described in ASTM C618, Table 3, Procedure A. The test for sulfate resistance shall be in accordance with ASTM C1012.
Slag Cement     ASTM C989, Grade 100 or Grade 120.
Aggregates, Fine and Coarse As specified in Limiting Requirements paragraph.
Water           Potable. Water from concrete production operations shall not be used.
Admixtures
  Water Reducing/Normal Set      ASTM C494, Type A, except as otherwise specified herein.
  Water Reducing/Retarding      ASTM C494, Type D, except as otherwise specified herein.
  Air-Entraining                ASTM C260.
<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Range Water Reducing/Normal Set</td>
<td>ASTM C494, Type F, extended slump life type, except as otherwise specified herein.</td>
</tr>
<tr>
<td>High Range Water Reducing/Retarding</td>
<td>ASTM C494, Type G, extended slump life type, except as otherwise specified herein.</td>
</tr>
<tr>
<td>Shrinkage Reducing Admixture</td>
<td>GCP Applied Technologies (Grace) “Eclipse 4500”, Euclid “Eucon SRA”, or BASF “MasterLife SRA 035”.</td>
</tr>
<tr>
<td>Mineral Coloring</td>
<td>Nonfading mineral coloring unaffected by sunlight or free alkali; Davis Colors &quot;Mix-Ready&quot;, L.M. Scofield &quot;Chromix&quot;, or Euclid “Super Concentrated Mortar Color”.</td>
</tr>
<tr>
<td>Fibers</td>
<td>Collated, fibrillated, polypropylene fibers; Propex “Fibermesh”, Forta “Mighty-Mono”, or GCP Applied Technologies (Grace) “MicroFiber”.</td>
</tr>
</tbody>
</table>

2-3. **MIXTURE DESIGN AND TESTING.** As stipulated in the Quality Control section, all reports and tests required for preliminary review of materials and for laboratory trial mixtures shall be made by an independent testing laboratory at the expense of Contractor. Mixtures shall be adjusted in the field as necessary, within the limits specified, to meet the requirements of these specifications. If the source of any concrete materials is changed during the contract, concrete work shall pause until the new materials and the new mixture design are tested in accordance with the specified requirements.

2-3.01. **Preliminary Review of Materials.** The tests and reports required shall be as indicated in Table 2A. Review of these reports shall be for general acceptability only, and continued compliance with all contract provisions shall be required.

Aggregate reports shall be no more than 90 days old at time of submittal.

Alkali-aggregate reactivity potential shall be determined by one of the following procedures. A satisfactory service record evaluation as described in ASTM C33 will not be acceptable.

1. Test fine and coarse aggregates in accordance with ASTM C1260. Aggregates which are classified as innocuous may be used without further testing. Aggregates which are not innocuous shall be further
tested in accordance with ASTM C227 or C1105 (as appropriate), using a cement containing less than 0.6 percent alkalies.

2. Test fine and coarse aggregates in accordance with ASTM C1567, using a single aggregate with all cementitious materials selected for the Project. The fine and coarse aggregates shall not be combined and used in a single test. This test may only be used for mixtures that contain slag cement or fly ash, and those products shall not have an alkali content greater than 4.0 percent sodium oxide equivalent. Combinations of cementitious materials and aggregate which do not indicate a potential for alkali reactivity may be used without further testing. Mixture combinations which indicate a potential for alkali reactivity shall have the ingredients and/or proportions modified and then the test shall be repeated.

3. Test fine and coarse aggregates in accordance with ASTM C1293. Concrete mixtures containing only portland cement (without pozzolan or slag cement) shall be tested accordingly and have a measured expansion of 0.04 percent or less at one year duration. Concrete mixtures containing pozzolan or slag cement shall be tested with those ingredients in proportions matching that of the proposed mixture, and shall have a measured expansion of 0.04 percent or less at two years duration.

At the discretion of Engineer, testing in addition to that indicated herein or in Appendix X1 of ASTM C33 may be performed on potentially reactive aggregates. Nonreactive aggregates shall be imported if, in the opinion of Engineer, local aggregates exhibit unacceptable potential reactivity.

2-3.02. Proposed Mixture Proportions. Proposed proportions for each Class of concrete shall meet the limiting requirements indicated herein.

2-3.03. Mixture Testing. Test results on each Class of concrete shall be submitted for review and shall be acceptable to Engineer before concrete work is started. The reports shall include the information indicated in Table 2C.

2-3.03.01. Field Test Record Data. If indicated as acceptable in Table 2C, concrete mixtures may be qualified based upon field test record performance data in lieu of laboratory trial mixtures. Field test data records shall be from the production facility being used on the current Project and shall have been performed in the past 12 months. Field test records shall represent a single group of at least 10 consecutive strength tests for one mixture, using the same materials, under the same conditions, and encompassing a period of not less than 45 days.
2-3.03.02. **Laboratory Trial Mixture Testing.** Trial mixtures shall be tested in the laboratory for each size and combined gradation of aggregates and for each consistency as indicated and intended for use on the work and as specified. Concrete proportions shall be established based on laboratory trial mixtures that meet the following requirements:

a. The combination of materials shall be as proposed for use in the work.

b. Mixtures shall conform with the limiting requirements specified herein.

c. The required average compressive strength, $f_{cr}^{'}$, of the trial mixture shall exceed the specified minimum acceptable compressive strength, $f_{cr}^{'}$, as required in Table 1.

d. Trial mixtures of the proportions and consistencies specified for the work shall be prepared. When a three point curve is required by Table 2C, the three concrete trial mixtures shall reflect the cement content proposed for the Project and for the indicated concrete class at three water-cementitious material ratio contents at or lower than indicated in Table 1. The compressive strength of the cylinders made from the three trial mixtures shall produce a range of compressive strengths exceeding or encompassing the $f_{cr}^{'}$ required for the work.

e. For each proposed concrete mixture that is required to be tested as indicated in Table 2C, compressive strength test cylinders shall be made for each testing age. Each change in the water-cementitious materials ratio shall be considered a new concrete mixture. Each mixture shall be tested at the ages of 7 days and 28 days.

f. When a three point curve is required in Table 2C, the results of the cylinder tests for each water-cementitious materials ratio at each age shall be plotted as a curve showing the relationship between compressive strength (along y-axis) and the water-cementitious materials ratio (along x-axis). The water-cementitious materials ratio and the associated average compressive strength for the Project concrete mixture shall be selected from the 28 day curve. The maximum water-cementitious materials ratio specified in the limiting requirements shall still apply even if the curve indicates that the concrete strength would be adequate at a higher ratio. The cement content and mixture proportions to be used shall be such that the selected water-cementitious materials ratio will not be exceeded at specified maximum slump. These concrete mixture proportions shall be submitted for review in accordance with the Submittals Procedures section.

g. When a shrinkage reducing admixture is proposed, trial mixtures shall be prepared with and without the shrinkage reducing admixture.
2-3.03.03. **Testing Procedures.** Concrete mixture testing procedures shall be as specifier herein, and reports for these tests shall be prepared specifically for this Project.

Aggregates shall be sampled and tested in accordance with ASTM C33. The bulk specific gravity of each aggregate shall be determined in accordance with ASTM C127 and ASTM C128.

Slump shall be determined in accordance with ASTM C143. Unit weight (mass) shall be determined in accordance with ASTM C138. Total air content shall be determined in accordance with ASTM C231 and verified in accordance with ASTM C138. Concrete temperature shall be determined in accordance with ASTM C1064.

Initial set tests shall be made at ambient temperatures of 70°F and 90°F to determine compliance with the specified time for initial set. The test at 70°F shall be made using concrete containing the specified normal set/water-reducing admixture and, when required, air-entraining admixture. The test at 90°F shall be made using concrete containing the specified retarding/water-reducing admixture and, when required, air-entraining admixture. Initial set shall be determined in accordance with ASTM C403.

Concrete test specimens shall be made, cured, and stored in accordance with ASTM C192 and tested in accordance with ASTM C39.

Cylinders shall be 6 inches diameter by 12 inches high for concrete mixes using a maximum nominal aggregate size of 1 inch or larger. Cylinders may be either 6 inches diameter by 12 inches high, or 4 inches diameter by 8 inches high for concrete mixes using a maximum nominal aggregate size of less than 1 inch. The average compressive strength shall be determined from the results of at least three cylinders when using 4 inch diameter cylinders, and at least two cylinders when using 6 inch diameter cylinders. All tests for a particular class of concrete shall be performed using the same sized cylinders for the duration of the work.

Water-soluble chloride ion shall be determined in accordance with ASTM C1218.

A drying shrinkage test shall be conducted on the trial mixture with the maximum water-cementitious materials ratio used to qualify each proposed concrete mixture design using the concrete materials, including admixtures, that are proposed for the Project. Three test specimens shall be prepared for each test. Drying shrinkage specimens shall be 4 inch by 4 inch by 11 inch prisms with an effective gauge length of 10 inches, fabricated, cured, dried, and measured in accordance with ASTM C157 except with the following modifications:
Specimens shall be removed from the molds at an age of 23 hours ±1 hour after batching, shall be placed immediately in water at 73°F ±3°F for at least 30 minutes, and shall be measured within 30 minutes thereafter to determine original length and then submerged in lime-saturated water as specified in ASTM C157. Measurement to determine expansion expressed as a percentage of original length shall be taken at age 7 days. The length at 7 days shall be the base length for drying shrinkage calculations ("zero" days drying age). Specimens then shall be stored immediately in a humidity controlled room maintained at 73°F ±3°F and 50 percent ±4 percent relative humidity for the remainder of the test. Measurements to determine shrinkage expressed as a percentage of the base length shall be reported separately for 7, 14, and 21 days ±4 hours of drying from "zero" days after 7 days of moist curing for a total of 28 days from the date of casting.

Drying shrinkage deformation for each specimen shall be computed as the difference between the base length (at "zero" days drying age) and the length after drying at each test age. Results of the shrinkage test shall be reported to the nearest 0.001 percent. If drying shrinkage of any specimen deviates from the average for that test age by more than 0.004 percent, the results for that specimen shall be disregarded.

The average drying shrinkage of each set of 4 inch by 4 inch by 11 inch test specimens made in the laboratory from a trial mixture shall not exceed the values required in Table 1.

PART 3 – EXECUTION

3-1. Batching, mixing, and delivery. Concrete shall be furnished by an acceptable ready-mixed concrete supplier, and shall conform to ASTM C94 except as indicated otherwise in this specification.

3-1.01. Delivery Tickets. A delivery ticket shall be prepared for each load of ready-mixed concrete and a copy of the ticket shall be handed to Engineer by the truck operator at the time of delivery. Tickets shall indicate the name and location of Contractor, the project name, the mixture identification, the quantity of concrete delivered, the quantity of each material in the batch, the outdoor temperature in the shade, the time at which the cementitious materials were added, and the numerical sequence of the delivery.

3-1.02. Mixing Water. Mixing water shall not be added in transit. Any amount of water withheld from the truck mixer shall be clearly indicated on the delivery ticket. Water added at the site shall not exceed the amount withheld, and shall not be added without oversight by Owner’s on site inspector.
3-1.03. **Consistency.** The consistency of concrete shall be suitable for the placement conditions. Aggregates shall flow uniformly throughout the mass, and the concrete shall flow sluggishly when vibrated or spaded. The slump shall be kept uniform.

3-2. **CONTRACTOR'S ON GOING MATERIAL CONTROL TESTING.** The following tests and test reports are required during the progress of the work and shall be made at the expense of Contractor. The frequency specified herein for each field control test is approximate and subject to change as determined by Engineer.

3-2.01. **Aggregate Gradation.** Each 200 tons of fine aggregate and each 400 tons of coarse aggregate shall be sampled and tested in accordance with ASTM D75 and C136, for verification that the gradations continue to meet ASTM C33 requirements. If lesser quantities of aggregates are used, the sampling and testing shall occur at least once every 6 months.

3-2.02. **Sand Equivalent.** The sand equivalent test shall be conducted each time the sand gradation tests are conducted.

3-2.03. **Fly Ash.** Each 400 tons of fly ash shall be sampled and tested in accordance with ASTM C618 and C311. Contractor shall supply Engineer with certified copies of supplier's (source) test reports showing chemical composition and physical analysis for each shipment delivered to Contractor and certifying that the fly ash complies with the specifications. The certificate shall be signed by the fly ash supplier.

3-2.04. **Cement.** Each 1500 tons of cement shall be sampled and tested in accordance with ASTM C150. Contractor shall supply Engineer with certified copies of supplier's (source) test reports showing chemical composition and physical analysis, and certifying that the cement complies with ASTM C150 and these specifications. The certificate shall be signed by the cement manufacturer.

3-2.05. **Slag Cement.** Each 800 tons of slag cement shall be sampled and tested in accordance with ASTM C989. Contractor shall supply Engineer with certified copies of supplier’s (source) test reports showing chemical composition and physical analysis, and certifying that the slag cement complies with ASTM C989 and these specifications. The certificate shall be signed by the slag cement manufacturer.

3-3. **OWNER'S FIELD CONTROL TESTING.** Field control tests, including slump, air content, and making compression test cylinders, shall be performed by Engineer or Owner’s testing laboratory personnel, at the expense of Owner. Contractor shall provide access to all facilities and the services of one or more employees as necessary to assist with the field control testing.
The frequency specified herein for each field control test is approximate and subject to change as determined by Engineer.

Engineer may require field testing prior to the addition of superplasticizer at the Site to determine compliance with the specifications. Field testing after the addition of superplasticizer shall be conducted as specified and as needed to determine that the concrete is in compliance with the specifications. Air content tests shall be conducted whenever field tests are conducted.

3-3.01. **Slump.** A slump test shall be made for each 100 cubic yards of concrete. Slump shall be determined in accordance with ASTM C143.

3-3.02. **Air Content.** An air content test shall be made on concrete from one of the first three batches mixed each day and on concrete from each batch of concrete from which concrete compression test cylinders are made. Air content shall be determined in accordance with ASTM C231 and verified in accordance with ASTM C138.

3-3.03. **Unit Weight.** A unit weight test shall be made on concrete from each batch of concrete from which concrete compression test cylinders are made. Unit weight shall be determined in accordance with ASTM C138.

3-3.04. **Concrete Temperature.** A concrete temperature test shall be made on concrete from the first batch of concrete mixed each day and on concrete from each batch of concrete from which concrete compression test cylinders are made. During hot or cold weather concreting operations, temperature shall be checked not less than once per hour. Concrete temperature shall be determined in accordance with ASTM C1064.

3-3.05. **Water-Soluble Chloride Ion.** Water-soluble chloride ion testing shall be performed once for each 1,000 cubic yards of concrete in accordance with ASTM C1218.

3-3.06. **Compression Tests.** One set of concrete compression test cylinders shall be made not less than once each day concrete is placed, not less than once for each 100 cubic yards of each class of concrete, and not less than once for each 5000 square feet of surface area for slabs or walls. Half of the cylinders of each set shall be tested at an age of 7 days and the remaining cylinders shall be tested at an age of 28 days.

Test cylinders shall be made, cured, stored, and delivered to the laboratory in accordance with ASTM C31 and tested in accordance with ASTM C39.
Cylinders shall be 6 inches diameter by 12 inches high for concrete mixes using a maximum nominal aggregate size of 1 inch or larger. Cylinders may be either 6 inches diameter by 12 inches high, or 4 inches diameter by 8 inches high for concrete mixes using a maximum nominal aggregate size of less than 1 inch. The average compressive strength shall be determined from the results of at least three cylinders when using 4 inch diameter cylinders, and at least two cylinders when using 6 inch diameter cylinders. All tests for a particular mixture class shall be performed using the same sized cylinders for the duration of the work and shall match the cylinder size used for the trial mixtures.

Each set of compression test cylinders shall be marked or tagged with the date and time of day the cylinders were made, the location in the work where the concrete represented by the cylinders was placed, the number of the delivery truck or batch, the air content, the slump, the unit weight, and the concrete temperature.

3-3.07. Shrinkage Tests. Concrete shrinkage tests shall be performed once for each 1,000 cubic yards of concrete with controlled shrinkage that is placed and shall be made on concrete from a batch of concrete from which concrete compression test cylinders are made. Shrinkage testing shall be conducted as specified for the preliminary trial mixtures.

The average drying shrinkage of each set of test specimens cast in the field from concrete delivered to the Site and sampled at the end of the delivery truck chute, as measured at the 21 days drying age, shall not exceed the values indicated in Table 1.

3-3.08. Test Reports. Five copies of each test report shall be prepared and distributed by the testing laboratory to the Owner, Resident Project Representative (two copies), Engineer, and Contractor, in accordance with the Quality Control section.

3-4. EVALUATION AND ACCEPTANCE OF CONCRETE. Concrete will be evaluated for compliance with all requirements of the specifications. Concrete strength will be only one of the criteria used for evaluation and acceptance of the concrete. The results of all tests performed on the concrete and other data and information concerning the procedures for handling, placing, and curing concrete will be used to evaluate the concrete for compliance with the specified requirements.

Compression tests will be evaluated in accordance with ACI 318 and as specified herein. A strength test shall be the average of the compressive strengths of two 6 inch diameter cylinders or three 4 inch diameter cylinders, made from the same concrete sample tested at 28 days.
3-4.01. **Compression Test Evaluation.** Compressive strength test results will be evaluated for compliance with the specified strength requirements. The strength level of the concrete will be considered satisfactory when the averages of all sets of three consecutive strength tests equal or exceed the specified compressive strength, $f'_c$, and no individual strength test result falls below the specified compressive strength by more than 500 psi.

3-4.02. **Inspection of Concrete Supplier.** Both scheduled and unscheduled visits by inspectors on days of concrete pours shall be accommodated. Inspectors shall be allowed access to delivery tickets and mixture proportions.
### TABLE 1 – LIMITING REQUIREMENTS

<table>
<thead>
<tr>
<th>Concrete Class</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>B</th>
<th>C</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
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<th>D5</th>
<th>D6</th>
<th>D7</th>
</tr>
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<tr>
<td>1. Minimum Cement Content, lbs/cubic yard; based on maximum slump and maximum water-cementitious material ratio.</td>
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</tr>
<tr>
<td>Maximum Nominal Aggregate Size, ASTM C33 aggregate</td>
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<td>---</td>
<td>489</td>
<td>---</td>
<td>440</td>
<td>464</td>
<td>---</td>
<td>---</td>
<td>600*</td>
<td>**</td>
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<td>---</td>
<td>---</td>
<td>380</td>
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<td>Size No. 467 (1-1/2&quot;)</td>
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<td></td>
<td>---</td>
<td>489</td>
<td>464</td>
<td>---</td>
<td>---</td>
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<td>**</td>
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<td>489</td>
<td>514</td>
<td>460</td>
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<td>480</td>
<td>514</td>
<td>526</td>
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<td>640*</td>
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<td>526</td>
<td>555</td>
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<td>555</td>
<td>440</td>
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<td>Size No. 8 (3/8&quot;)</td>
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<td>520</td>
<td>555</td>
<td>564</td>
<td>520</td>
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<td>**</td>
<td>636</td>
<td>601</td>
<td>564</td>
<td>460</td>
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<td>Fine Aggregate, (Sand)</td>
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<td>---</td>
<td>750</td>
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<td>2. Compressive Strength, minimum; psi</td>
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<tr>
<td>Field, 7 days; $f_{cu}$</td>
<td>3375</td>
<td>3375</td>
<td>3375</td>
<td>3000</td>
<td>3000</td>
<td>3000</td>
<td>3000</td>
<td>2250</td>
<td>3000</td>
<td>**</td>
<td>3000</td>
<td>3000</td>
<td>3000</td>
<td>1500</td>
</tr>
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<td>Field, 28 days; $f'_{cu}$</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
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<td>3000</td>
<td>4000</td>
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<td>2000</td>
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<td>Laboratory, 28 days; $f'_{cr}$</td>
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<td>5700</td>
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<td>5200</td>
<td>5200</td>
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<td>3. Maximum water-cementitious material ratio</td>
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<td>0.65</td>
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<td>4. Maximum nominal coarse aggregate size, inches</td>
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<td>1</td>
<td>1</td>
<td>1-1/2</td>
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<td>3/8</td>
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<td>3/4</td>
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<td>5. Maximum slump, inches</td>
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<td></td>
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<tr>
<td>Slump before superplasticizer added</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>4</td>
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<td>5</td>
<td>6</td>
<td>**</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Slump after adding superplasticizer</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
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<td>8</td>
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</table>
### TABLE 1 – LIMITING REQUIREMENTS

<table>
<thead>
<tr>
<th>Concrete Class</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
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<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
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</thead>
<tbody>
<tr>
<td>6. Total air content, percent, (± 1.5 %)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>8. Slag cement replacement, percent range</td>
<td>25-50</td>
<td>25-50</td>
<td>25-50</td>
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<td>25-50</td>
<td>25-30</td>
<td>0</td>
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<td>**</td>
<td>0</td>
<td>0</td>
<td>25-50</td>
<td>25-50</td>
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</tbody>
</table>

**NOTES:**

* "D2" (Underwater concrete) - Limit aggregate to 3/4" for reinforced concrete, up to 1-1/2" for unreinforced concrete.
** "D3" (Mass Concrete) limiting requirements shall be as indicated in the Mass Concrete section.
ª "D5" Wash water trough top edge water-cementitious ratio, 100 percent sand passing No. 8 sieve.
<table>
<thead>
<tr>
<th>Concrete Class</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>B</th>
<th>C</th>
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<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
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</thead>
<tbody>
<tr>
<td><strong>TABLE 2A – SUBMITTAL REQUIREMENTS (PRELIMINARY REVIEW OF MATERIALS)</strong></td>
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<tr>
<td>1 Aggregate reports (ASTM C33)</td>
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<tr>
<td>Fine aggregate</td>
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<td>Source and type</td>
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<td>Gradation</td>
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<td>X</td>
<td>X</td>
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<td>Deleterious materials</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Fineness modulus</td>
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<td>X</td>
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<td>**</td>
<td>X</td>
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<tr>
<td>Alkali-aggregate reactivity</td>
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<td>X</td>
<td>X</td>
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<td>X</td>
<td>**</td>
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<td>X</td>
<td>X</td>
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<td>Sand equivalent</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<tr>
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### TABLE 2B – SUBMITTAL REQUIREMENTS (PROPOSED MIXTURE PROPORTIONS)

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<tr>
<th>Concrete Class</th>
<th>A1</th>
<th>A2</th>
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<th>A4</th>
<th>A5</th>
<th>B</th>
<th>C</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
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<tr>
<td>5</td>
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### TABLE 2C – SUBMITTAL REQUIREMENTS (MIXTURE TESTING)

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<th>A1</th>
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<th>A5</th>
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<th>C</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
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<td>Type of testing</td>
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<td>Test Reports Required</td>
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<td>Confirmation of materials tested</td>
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<td>Cement brand, type, composition, quantity</td>
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<td>**</td>
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<td>X</td>
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<td>Three point curves</td>
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<td>X</td>
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<td>Water-soluble chloride ion</td>
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<td>X</td>
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<td>**</td>
<td>---</td>
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<td>Drying shrinkage</td>
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<td>---</td>
<td>X</td>
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<td>---</td>
<td>X</td>
<td>**</td>
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### TABLE 2C – SUBMITTAL REQUIREMENTS (MIXTURE TESTING)

<table>
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<th>Concrete Class</th>
<th>A1</th>
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<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>B</th>
<th>C</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
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<tr>
<td>NSF 61 compliance evaluations</td>
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</tbody>
</table>

**NOTE:**

“D3” (Mass Concrete) submittal requirements shall be as indicated in the Mass Concrete section.

End of Section
PART 1 – GENERAL

1-1. **SCOPE.** This section covers placing, finishing, and curing of cast-in-place concrete.

1-2. **GENERAL.** All cast-in-place concrete shall be properly cured as indicated on the Drawings and as specified herein.

1-3. **SUBMITTALS.**

1-3.01. **Drawings and Data.** All submittals of test data, manufacturers' certificates of compliance, reports, catalog data sheets and other data shall be in accordance with the Submittals Procedures section.

1-3.02. **Manufacturer's Certificate of Compliance.** A manufacturer's certificate of compliance, which includes the name of the project and, when requested, copies of independent test results confirming compliance with specified requirements, shall be submitted to Engineer for the following materials:

- Membrane curing compound.
- Epoxy Bonding Agent.

PART 2 - PRODUCTS

2-1. **LIMITING REQUIREMENTS.** Concrete shall be cured in a manner that will minimize shrinkage and cracking as specified herein, and in accordance with Chapters 3 and 8 of ACI 224R. Concrete temperatures shall be controlled both before and after placement to minimize cracking. Any rise in concrete temperature caused by environmental conditions that will be conducive to excessive shrinkage shall be controlled with blankets or other acceptable means of insulation.
2-2. **MATERIALS.**

<table>
<thead>
<tr>
<th>Concrete Surface Coloring/Hardener</th>
<th>Dry-shake colored hardener for concrete flatwork; Davis Colors &quot;Color-Shake&quot;, L.M. Scofield &quot;Lithchrome&quot;, Master Builders &quot;Colorcron&quot;, Euclid “Surflex”, or Dayton Superior &quot;Quartz Tuff.&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Cure Finishing Aid</td>
<td>Burke &quot;Finishing Aid Concentrate&quot;, Euclid &quot;Eucobar&quot;, L&amp;M Chemical &quot;E-Con&quot;, Master Builders &quot;Confilm&quot;, or Sika &quot;Sikafilm&quot;.</td>
</tr>
<tr>
<td>Nonslip Aggregate</td>
<td>Aluminum oxide aggregate; L&amp;M Chemical &quot;Grip It&quot; BASF &quot;MasterTop 120SR&quot;, or Dayton Superior “Emery Non-Slip”.</td>
</tr>
<tr>
<td>Epoxy Bonding Agent</td>
<td>ASTM C881, Type V, moisture insensitive, 100 percent solids; Master Builders &quot;Concrete Paste LPL&quot;, Euclid &quot;Euco #352 or #452&quot; oder Prime Resins “Prime Bond”.</td>
</tr>
<tr>
<td>Membrane Curing Compound/Sealer</td>
<td>ASTM C1315, Type I, Class A, minimum 25 percent solids, acrylic, non-yellowing, unit moisture loss 0.40 kg/m² maximum in 72 hours. Product shall not exceed VOC limits established by the federal, state, or local regulatory agency having jurisdiction over the project site; L&amp;M Chemical &quot;Lumiseal Plus&quot;, Sonneborn &quot;Kure-N-Seal 30&quot;, or Euclid Chemical &quot;Super Diamond Clear&quot;.</td>
</tr>
<tr>
<td>Evaporation Reducer</td>
<td>Dayton Superior &quot;AquaFilm Concentrate J74&quot;, Euclid &quot;Eucobar&quot;, L&amp;M Chemical &quot;E-Con&quot;, BASF &quot;MasterKure ER50&quot;, or Sika &quot;SikaFilm&quot;.</td>
</tr>
</tbody>
</table>

**PART 3 - EXECUTION**

3-1. **GENERAL.**

3-1.01. **RECEIVING.** Contractor shall check each delivery ticket to verify the concrete class delivered to the jobsite is in compliance with the concrete
requested and is suitable for Contractor’s handling, placing, finishing, and curing procedures. Engineer shall collect the delivery tickets from the truck operator.

3-2. **PLACEMENT.** The limits of each concrete pour shall be determined by Contractor and shall be acceptable to Engineer. All concrete within the predetermined limits shall be placed in one continuous operation.

Before concrete is placed, forms, reinforcement, water stops, anchor bolts, and embedments shall be rigidly secured in proper position; all dirt, mud, water, and debris shall be removed from the space to be occupied by concrete; all surfaces encrusted with dried concrete from previous placements shall be cleaned; and the entire installation shall be acceptable to Engineer. Remove all frost, ice, and snow from within the formwork before concrete is placed.

Contractor shall inform Engineer at least 24 hours in advance of the times and places at which he intends to place concrete.

3-2.01. **Bonding to Hardened Concrete.** The surface of hardened concrete upon which fresh concrete is to be placed shall be rough, clean, sound, and damp. Before placement of plastic concrete, the hardened surface shall be cleaned of all laitance and foreign substances (including curing compound), washed with clean water, wetted thoroughly, and the surface made free of standing water. Surface profile of the hardened concrete after surface preparation shall be as required for good bond.

Coarse aggregate shall be omitted from the first batch or batches of concrete placed on hardened concrete in wall or column forms. The mortar puddle, Class A4 concrete, shall cover the hardened concrete by at least 2 inches at every point.

3-2.02. **Conveying Concrete.** Methods of conveying concrete to the point of final deposit shall prevent segregation or loss of ingredients. After placement in the forms, concrete shall not be moved laterally more than 5 feet. Concrete’s free fall should not exceed 4 feet.

3-2.03. **Pumping Concrete.** The slump of concrete, with or without a superplasticizer, that is discharged into the pump may exceed the specified maximum slump value by the amount of slump loss in the pumping system, up to a maximum of 1 inch. The slump loss shall be determined by tests made at each end of the pumping system. If tests indicate a slump loss greater than 1 inch in the pumping system, Contractor shall modify the pumping system as required to reduce the slump loss to 1 inch or less.

3-2.04. **Placing Concrete.** For proper compaction, concrete shall be placed in approximately horizontal layers not to exceed 24 inches. Each layer of concrete
shall be plastic when covered with the following layer, and the rate of vertical rise of the concrete in the forms shall be not less than 24 inches per hour. Vertical construction joints shall be provided as necessary to comply with these requirements.

Concrete shall be placed and compacted in wall or column forms before any reinforcement is placed in the system to be supported by such walls or columns. The height of any portion of a wall or column placed monolithically with a floor or roof slab shall not exceed 6 feet. Concrete in walls or columns shall settle at least 2 hours before concrete is placed in the structural systems to be supported by such walls or columns.

Concrete shall be thoroughly settled before top finishing. All laitance, debris, and surplus water shall be removed from concrete surfaces at tops of forms by screeding, scraping, or other effective means. Wherever the top of a wall will be exposed to weathering, the forms shall be overfilled and after the concrete has settled, the excess shall be screeded off.

Concrete for piers or caissons shall be carefully deposited to avoid contact with forms, reinforcement, and earth sides until completion of the drop. Necessary precautions shall be taken during concrete placement to prevent earth or other material from falling into excavations and to avoid dislocation of reinforcement. Concrete shall be placed continuously to the top of each pier or caisson at a rate of not less than 2 feet of vertical rise per hour. Forms above grade shall be of cylindrical steel or fiber acceptable to Engineer.

3-2.05. Compaction. During and immediately after placement, wet concrete shall be thoroughly compacted and worked around all reinforcement and embedments and into the corners of the forms. Mechanical vibrators shall maintain at least 14,000 cycles per minute when immersed in the concrete. The number and type of vibrators shall be acceptable to Engineer. The use of "jitterbug" tampers to compact concrete flatwork will not be permitted.

3-2.06. Cold Weather Concreting. Except as modified herein, cold weather concreting shall comply with ACI 306.1.

The concrete surface shall be maintained at a temperature of at least 50°F for 5 days or 70°F for 3 days, after placement. Concrete temperature shall be recorded at least six times for each 24 hour period. Concrete and adjacent form surfaces shall be kept continuously moist. Sudden cooling of concrete shall not be permitted.

3-2.07. Hot Weather Concreting. Except as modified herein, hot weather concreting shall comply with ACI 305.1.
At air temperatures of 90°F or above, concrete shall be kept as cool as practicable during curing.

Plastic shrinkage cracking due to rapid evaporation of moisture shall be prevented.

3-2.08. **Placement Sequence.** To minimize the effect of shrinkage in producing cracks, concrete shall be placed as follows:

a. **Bottom Slab.** Each bottom slab shall be divided into sections by the construction joints indicated on the drawings and, when not indicated on the drawings, into approximately square sections not greater than 60 feet in their longest dimension. Bottom slabs with radial and circumferential reinforcement patterns may be divided into pie-shaped segments with the longest dimension not greater than 60 feet. A section near the center of each structure shall be placed first. Sections shall be placed alternately, first on one side and then on the other side of previously placed sections. Placement shall be scheduled so that two adjacent sides of each section are free, except at closures.

b. **Walls.** Walls shall be divided into sections by the construction joints indicated on the drawings and, when not indicated on the drawings, into sections not greater than 60 feet in length. A section near the center of each wall shall be placed first. Sections shall be placed alternately, first on one side and then on the other side of the previously placed section. Placement shall be scheduled so that one end of each section is free, except at corner closures.

c. **Top Slab.** Each top slab shall be placed in the manner described for the bottom slab.

No two abutting sections shall be placed prior to a minimum curing period of 7 days and 14 days curing for the 2 adjacent wall panels at corner sections of vertical walls, unless otherwise authorized by Engineer.

3-2.09. **Protection.** Loads, including but not limited to earth loads, loads exerted from shoring or bracing, wind loads, hydraulic loads, equipment or vehicle loads or loads from stacked materials shall not be permitted until concrete has obtained its specified 28-day strength.

Contractor shall protect all concrete against damage until final acceptance from the DISTRICT. New concrete shall be protected from deleterious effects from weather and construction activities during its minimum curing period.
3-2.10. **Duct Banks.** Duct bank concrete shall be compacted by rodding or spading only. Mechanical vibrators shall not be used. Concrete shall be worked around reinforcement and embedments and into the corners of the forms.

3-2.11. **Underwater Concrete.** Underwater (tremie) concrete, if used, shall be deposited underwater within the construction limits indicated on the drawings. Concrete shall not be deposited underwater without the concurrence of Engineer. Underwater concrete shall be placed in accordance with ACI 304R through tremies having hoppers at the upper end.

The water shall be quiescent when concrete is deposited. Velocity of flow within the space where the concrete is placed shall not exceed 2 feet per minute in any direction. After concrete is placed, the water level in the space shall be kept static until the concrete has hardened.

3-3. **FINISHING UNFORMED SURFACES.** Buried and permanently submerged concrete blocking and encasement will require no finishing except as necessary to obtain the required surface elevations or contours. The unformed surfaces of all other concrete shall be screeded and given an initial float finish followed by additional floating, and troweling where required.

3-3.01. **Screeding.** Screeding shall produce a concrete surface conforming to the proper elevation and contour, with all aggregates completely embedded in mortar.

3-3.02. **Application of Evaporation Reducer.** Concrete flatwork subject to rapid evaporation due to hot weather, drying winds, and sunlight shall be protected with a pre-cure finishing aid. The finishing aid shall form a monomolecular film on the surface of fresh, plastic concrete to retard evaporation.

Immediately following screeding, pre-cure finishing aid shall be sprayed over the entire surface of fresh, plastic concrete flatwork at a rate of not less than 200 square feet per gallon, in accordance with the manufacturer's recommendations. The spray equipment shall have sufficient capacity to continuously spray finishing aid at approximately 40 psi with a suitable nozzle as recommended by the manufacturer.

The sprayable solution shall be prepared as recommended by the manufacturer.

Under severe drying conditions, additional applications of finishing aid may be required following each floating or troweling, except the last finishing operation.

3-3.03. **Floating.** Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate which is disturbed by the float or which causes a surface irregularity
shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance, with no unnecessary working of the surface.

Initial floating shall be followed by a second floating at the time of initial set. The second floating shall produce a finish of uniform texture and color, and unless additional finishing is specifically required, shall produce the completed finish for unformed surfaces.

Floating shall be done with hand floats or suitable mechanical compactor-floats.

3-3.04. Finishing Surfaces for Bonding. All surfaces to be covered with concrete or topping shall be float finished. All laitance, surface mortar, and unsound material shall be removed by brushing or air blasting at the time of initial set. Surfaces shall be rough, clean, and sound. Floors and other flat surfaces to receive composite topping (Class D6) shall be given a broom finish or raked finish with at least a 1/4 inch profile.

3-3.05. Troweling. Interior floor surfaces which will be exposed after construction is completed; surfaces to be covered with resilient floor coverings, thinset terrazzo, or seamless floor covering; exposed top surfaces of equipment bases and interior curbs; and other surfaces designated on the drawings shall be steel trowel finished. Surfaces to be covered with elastomeric deck covering shall be lightly troweled but not burnished. Trowel finishing will not be required for floors which are normally submerged. Troweling shall be performed after the second floating when the surface has hardened sufficiently to prevent an excess of fines being drawn to the surface. Troweling shall produce a dense, smooth, uniform surface free from blemishes and trowel marks.

3-3.06. Edging. Unless specified to be beveled, exposed edges of floated or troweled surfaces shall be edged with a tool having at least a 1/8 inch corner radius.

3-3.07. Broom Finish. Where required, concrete surfaces shall be given a light broom finish to produce a nonslip surface. Brooming shall be done after the second floating and at right angles to the normal direction of traffic.

Broom finish shall be provided at the following locations:

a. exterior docks and slabs
b. exterior stairs

3-3.08. Nonslip Aggregate Finish. Tread surfaces of exterior stairs shall be surfaced with nonslip aluminum oxide aggregate. Aggregate shall be uniformly distributed during steel troweling at the rate of 1/4 lb per square foot, in
accordance with the manufacturer's recommendations and as acceptable to Engineer.

3-3.09. **Pavement Finishing.** The surface of pavements shall not vary more than 1/8 inch under a 10 foot straightedge placed parallel to the center line.

Following placement and consolidation, and the disappearance of bleed water, the concrete surface shall be drag finished, using a seamless strip of damp burlap over the full width of the surface. The burlap drag shall consist of sufficient layers of burlap and shall have sufficient length in contact with the concrete to slightly groove the surface. The drag shall be moved forward with a minimum bow of the lead edge. The drag shall be kept damp, clean, and free of particles of hardened concrete. When acceptable to Engineer, carpet, artificial turf, or cotton fabric may also be used.

3-3.10. **Curb and Gutter Finishing.** Curb and gutter shall be finished to the shape indicated on the drawings. After the forms have been removed, all exposed edges shall be rounded, using an edging tool with at least a 1/8 inch corner radius. Exposed surfaces shall be float finished and given a light broom finish applied at right angles to the curb at the time of initial set, using a horsehair type broom.

3-3.11. **Sidewalk Finishing.** Concrete surfaces shall be screeded to the proper elevation and contour. All aggregates shall be completely embedded in mortar. Screeded surfaces shall be given an initial float finish as soon as the concrete has stiffened sufficiently for proper working. Any piece of coarse aggregate which is disturbed by the float or which causes a surface irregularity shall be removed and replaced with mortar. Initial floating shall produce a surface of uniform texture and appearance, with no unnecessary working of the surface. Initial floating shall be followed by a second floating at the time of initial set. Floated surfaces shall be given a light broom finish, using a horsehair broom, to provide a nonslip surface. Brooming shall be done at right angles to the length of the walk.

Sidewalks shall be edged using a 3 or 4 inch wide edging tool with a 1/8 inch corner radius. Edger lap marks at corners of each slab shall be carefully removed. False joints shall be provided at right angles to the length of the walk, using a grooving tool with 1/8 inch radius. The finished edge on each side of the joint shall be the same width as the edging tool used. False joints shall divide each sidewalk into square sections.

The finished surface of all sidewalks shall be neat in appearance, shall be sloped to drain, and shall not pond water.
3-4. **CONCRETE SURFACE COLORING/HARDENER.** Where concrete surface coloring/hardener is required, a dry-shake coloring material shall be worked into the freshly screeded concrete surface.

3-4.01. **Duct Bank Finishing.** After screeding and before final floating, a red concrete surface coloring shall be dusted onto the fresh concrete surface at the rate recommended by the manufacturer.

3-4.02. **Floor Finishing.** Where concrete surface coloring/hardener is required on the Drawings, the coloring material shall be applied at the rate of 50 lbs per 100 square feet in strict accordance with the manufacturer’s recommendations. The color of the concrete surface shall be as required on the Drawings.

Concrete floors with surface coloring shall be protected from damage until acceptance by Engineer. Areas which are subject to traffic or over which equipment or materials are to be moved shall be covered with hardboard or plywood. Just before final inspection, the colored floors shall be thoroughly cleaned and then waxed with colored wax furnished by the manufacturer of the coloring material.

3-5. **FLOOR SEALER.** Not used.

3-6. **FINISHING FORMED SURFACES.** Formed concrete surfaces shall meet all criteria of the relevant formed concrete surface category (CSC), as defined in ACI 347.3R, except as indicated otherwise herein. Surfaces shall be assigned to CSC’s as indicated.

<table>
<thead>
<tr>
<th>Formed Concrete Surface Category</th>
<th>Applicable Surfaces</th>
<th>Mockup Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC1</td>
<td>Formed concrete surfaces that will be in permanent contact with earth backfill.</td>
<td>No</td>
</tr>
<tr>
<td>CSC2</td>
<td>All other formed concrete surfaces not designated otherwise.</td>
<td>No</td>
</tr>
<tr>
<td>CSC3</td>
<td>None.</td>
<td>Yes</td>
</tr>
<tr>
<td>CSC4</td>
<td>None.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3-6.01. **Tie Holes.** All tie holes in formed surfaces, regardless of the relevant CSC, shall be cleaned, wetted, and filled with patching mortar. The patches shall be finished flush and cured and shall match the texture and color of the adjacent concrete.

3-6.02. **Mockups.** Mockups shall be used to validate the means and methods to be used by Contractor, and to provide Owner a sample of the specified concrete.
surface. The use of a reference area within an existing structure shall not be acceptable as a mockup.

Mockups shall incorporate the structure geometries; reinforcing bar size, spacing, arrangement, and cover; inserts; the approved concrete mixture; sample tie hole patching, and other likely required repair procedures. Contractor shall confirm in writing that the mockup quality represents work than can be accomplished in the actual structure.

3-6.03. **Grout Cleaning.** The surfaces noted on the Drawings shall be finished by grout cleaning.

Grout-cleaned finish shall conform to Paragraph 5.3.3.4.b of ACI 301. Grout cleaning shall not result in an overall plastering of the concrete surfaces, but shall produce a smooth, uniform surface free of marks, voids, surface glaze, and cement dust.

3-7. **TOLERANCES.** Tolerances for cast-in-place concrete work shall be as stipulated in ACI 117, unless otherwise indicated.

3-8. **CLEANING EMBEDMENTS.** After placement of concrete, surfaces of embedments not in contact with concrete shall be cleaned of concrete spatter and other foreign substances.

3-9. **CURING.** Concrete shall be protected from loss of moisture for at least 7 days after placement unless indicated otherwise. Curing of concrete shall be done by methods which will keep the concrete surfaces adequately wet for the specified curing period.

3-9.01. **Water Curing.** Water curing shall be performed for concrete in liquid-containing structures and for all concrete containing slag cement. Other forms of curing will not be acceptable in these applications. Water curing shall be in accordance with ACI 308.1 except as modified herein.

Water saturation of concrete surfaces shall begin as soon as possible after initial set. The rate of water application shall be regulated to provide complete surface coverage with a minimum of runoff. The application of water to walls may be interrupted for grout cleaning only over the areas being cleaned at the time, and the concrete surface shall not be permitted to become dry during such interruption.

Water curing shall continue for 14 days for concrete containing slag cement, and for 7 days for other types of concrete. However, when concrete is being protected from low temperatures, the duration of water curing may be shortened to 1 day less than the duration of cold weather protection.
When forms are removed before the specified curing duration is completed, measures shall be taken to immediately continue water curing and to provide adequate thermal protection for the concrete.

3-9.02. Membrane Curing. Unless otherwise specified, membrane curing compound may be used instead of water curing on concrete in non-liquid-containing structures which will not be stained or etched, covered with chemical resistant linings, covered with additional concrete, or indicated in the Architectural drawings to be covered with a finish flooring material.

Membrane curing compound shall be evenly sprayed at a coverage rate of not more than 300 square feet per gallon. The spray equipment shall have sufficient capacity to continuously spray curing compound at approximately 40 psi with a suitable nozzle as recommended by the manufacturer. Unformed surfaces shall be covered with the first coat of curing compound within 30 minutes after final finishing. A second coat of curing compound shall be applied when the first coat has become tacky to the touch and shall be applied at right angles to the first coat.

Concrete surfaces shall be covered with white polyethylene sheeting immediately after the curing compound has become dry to the touch. White polyethylene sheeting shall completely cover the surfaces and shall overlap the edges for proper sealing and anchorage. Joints between sheets shall be sealed. All tears, holes, and other damage shall be promptly repaired. Covering shall be anchored continuously at edges, and shall be anchored as necessary to prevent billowing on the surface.

Curing compound shall be suitably protected against abrasion during the curing period.

3-9.03. Film Curing. Unless otherwise specified, film curing with white polyethylene sheeting may be used instead of water curing on concrete in nonliquid-containing structures which will be covered later with mortar or additional concrete, or which will otherwise not be exposed to view.

Film curing shall begin as soon as possible after initial set of the concrete. The concrete surfaces shall be completely covered with polyethylene sheeting. Sheetling shall overlap the edges of the concrete for proper sealing and anchorage, and joints between sheets shall be sealed. All tears, holes, and other damage shall be promptly repaired. Covering shall be anchored continuously at edges and as necessary to prevent billowing on the surface.

End of Section
PART 1 - GENERAL

1-1. **SCOPE.** This section covers procurement and installation of grout. Unless otherwise specified, only nonshrink grout shall be furnished.

Epoxy grouting of anchor bolts, threaded rod anchors, and reinforcing bars is covered in the anchorage in concrete and masonry section. Grouting of masonry is covered in the building masonry section.

1-2. **SUBMITTALS.** A letter of certification indicating the types of grout to be supplied and the intended use of each type shall be submitted in accordance with the Submittals Procedures section.

1-3. **DELIVERY, STORAGE, AND HANDLING.** Materials shall be handled, transported, and delivered in a manner which will prevent damage of any kind. Materials shall be protected from moisture.

PART 2 - PRODUCTS

2-1. **MATERIALS.**

- **Nonshrink Grout for Equipment and pump base installation**
  - Precision cementitious grout with demonstrated non-shrinking properties, minimum 28 day compressive strength of 9000 psi; L&M "Crystex", BASF "Masterflow 928", Sika "SikaGrout 328", or Dayton Superior "Sure-Grip High Performance Grout".

- **Water**
  - Clean and free from deleterious substances.

2-2. **CEMENTITIOUS GROUT.** Cementitious grout shall be furnished factory premixed so that only water is added at the jobsite.

2-3. **EPOXY GROUT.** Epoxy grout shall be used in lieu of cementitious grout when required by the equipment manufacturer for performance or warranty requirements. Epoxy grout products and installation procedures shall be submitted to Engineer for approval.
PART 3 - EXECUTION

3-1. PREPARATION. The concrete foundation to receive nonshrink grout shall be saturated with water for at least 12 hours preceding grouting unless additional time is required by the grout manufacturer.

3-2. INSTALLATION.

3-2.01. Mixing. Grout shall be mixed in a mechanical mixer. No more water shall be used than is necessary to produce a flowable grout.

3-2.02. Placement. Unless otherwise specified or indicated on the Drawings, grout under baseplates shall be 1-1/2 inches thick. Grout shall be placed in strict accordance with the directions of the manufacturer so that all spaces and cavities below the baseplates are completely filled without voids. Forms shall be provided where structural components of baseplates will not confine the grout.

3-2.03. Edge Finishing. In all locations where the edge of the grout will be exposed to view, the grout shall be finished smooth after it has reached its initial set. Except where shown to be finished on a slope, the edges of grout shall be cut off flush at the baseplate.

3-2.04. Curing. Nonshrink grout shall be protected against rapid loss of moisture by covering with wet cloths or polyethylene sheets. After edge finishing is completed, the grout shall be wet cured for at least 3 days and then an acceptable membrane curing compound shall be applied.

End of Section
PART 1 - GENERAL

1-1. **THE REQUIREMENT.** This section specifies requirements for developing and preparing mix designs, testing and verifying mixes, and batching, transporting, and placing low density cellular concrete (LDCC), as specified behind the liner installed in the host pipe.

A. Related work specified elsewhere:
   1. Section 02636 Fiberglass Reinforced Polymer Mortar Pipe.
   2. Section 02637 High Density Polyethylene Pipe.
   3. Section 02638 Pipeline Cleaning Prior To Rehabilitation.

1-2. **REFERENCE SPECIFICATIONS, CODES, AND STANDARDS.**

A. Reference Standards:
   1. American Concrete Institute (ACI): ACI 214R, Evaluation of Strength Test Results of Concrete.
      d. ASTM C403, Standard Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance.
      e. ASTM C494, Standard Specification for Chemical Admixtures for Concrete.
      g. ASTM C567 REVA, Standard Test Method for Determining Density of Structural Lightweight Concrete.
      h. ASTM C618, Standard Specification forCoal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
i. ASTM C796, Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam.


1-3. SYSTEM DESCRIPTION.

A. Design Criteria:

1. Application:
   a. Cellular Concrete Grout: fill completely around the liner pipe installed in the host pipe.
   b. Shall be suitable for the presence of ground water above the host pipe.

2. Materials:
   a. Cellular Concrete:
      1) Cement content: Not less than 300 lb/cy.
      2) Fly ash: Not greater than 15 percent of cement by weight.
      3) Water Content: No more than 55 percent.
      4) Density: Not less than 42 lb/cubic feet.
      5) Minimum compressive strength:
         a) 28 days: 120 psi.

B. Tolerances:

1. Minimum annular clearances between host pipe and liner pipe: 1 inch.

2. Depth of corrosion in the host pipe is variable.

C. Options:

1. No greater than 15% of the specified cement content by weight may be replaced by an equivalent amount of pozzolan in cellular concrete mixes.

1-4. CONTRACTOR SUBMITTALS.

A. General: Make submittals in accordance with Section 01300.

B. Submit a grouting Plan to include Working Drawings and Methods Statements:

2. Details for transporting, placing, and consolidating cellular concrete. Integrate with and describe the sequencing of this work with the installation of pipe. Augment with:
   a. Lift drawings showing details of delivery pipes, slicklines, injection ports, bulkheads, and other materials. Show details of bulkhead design.
   b. Calculations to demonstrate flotation and deformation of the final lining will not occur. Provide calculation for each lift planned to place grout.
   c. Descriptions of labor, equipment and supplies required to perform the work.
   d. Cross-sections and profiles showing the arrangement of transportation, handling, and placing equipment including passing clearances.
   e. Details of pumping pressures and rates, placement sequences and volumes, lift thicknesses, including the theoretical quantity for each placement.

C. Mix Design: Submit mix design requirements and trial mix tests, with initial set time, compressive strength, working time before 15 percent change in viscosity, and density tests.

D. Quality Control:
   1. Qualifications:
      a. Proposed specialty firm for batching and pumping cellular concrete.
      b. Individual providing engineering field services on behalf of foaming agent material manufacturer.
      c. Individuals in responsible charge for developing mix designs and overseeing placement of cellular concrete.
      d. Field sampling and testing personnel, including qualifications of employer.
   2. Certifications:
      a. Certificates of compliance for Materials incorporated into the Work.
b. Calibration certificates for gauges, scales, and meters in accordance with ANSI B40.1.

c. Written certification from the pipe manufacturer that the pipe is capable of handling the proposed pumping and hydrostatic pressures.

d. Written certification from the manufacturer of the foaming agent material manufacturer that:

1) Fly ash proposed for use is compatible with the proposed foaming agent.

2) Proposed admixtures are compatible with the proposed foaming agent.

3) Proposed mix designs in conjunction with batching, transporting, and placing means and methods are compatible with the foaming agent.

4) Acceptability of the method whereby the foaming agent is introduced to the batching system.

5) The concreting supervisor is knowledgeable in the formulation and adjustment of mix designs.

3. Quality Control Plans:

a. Procedures for producing cellular concrete, including procedures for verifying mix ingredient quality and performing sampling, testing, and record keeping.

b. Methods for controlling critical mix parameters, such cellular concrete density.

c. Methods for assuring that the annular spaces between the liner pipe and host pipe are filled.

d. Methods for assuring that injection pressures do not damage adjacent work.

4. Recordkeeping: Daily records submitted no later than the end of each working day:

a. Scale weights for batched loads.

b. Mix design tickets.

c. Delivery tickets.

d. Daily reports and records of cellular concrete placement, including:

1) Number of classification of men and equipment.

2) Beginning and ending stations or elevations of placements, beginning and ending time for the pour, and volume.
3) Test information, including time, location, and results of test.

4) Notation of any downtime or interruption to production, including length of time and reason.

1-5. QUALITY ASSURANCE.

A. Qualifications:

1. Cellular Concrete Specialty Contractor: Minimum of 10 years of recent, successful experience in batching and placing cellular concrete for at least three host pipe projects of the general type, size, and diameter as required for this project.

2. Concreting Supervisor: Experienced in similar host pipe conditions and knowledgeable in the formulation and adjustment of mix designs.

3. Field Sampling and Testing Personnel: Qualified employees of an ACI-certified testing laboratory.

B. Acceptance Criteria:

1. Cellular Concrete:
   b. Density: Within 5% of the design value.

C. Testing:

1. General:
   a. Test cellular concrete compressive strength in accordance with ASTM C495 except:
      1) Cast cylinders using styrofoam molds; do not use plastic molds.
      2) Do not oven cure test specimens.
      3) Cap specimens with plaster of paris; do not use sulfur caps.
   b. Test cellular concrete wet densities in accordance with ASTM C567.
   c. Test cellular concrete air content in accordance with ASTM C796.

1) Pre-Production Testing:
   a) Take 1 set comprising four cylinders for each proposed mix.
   b) Perform compressive strength tests on one set of samples at 56 days.
2. Production Testing:
   a. At batch plant: Refer to Part 2 herein.
   b. At placement location: Refer to Part 3 herein.

1-6. SEQUENCING AND SCHEDULING. Provide access at all time to the Owner and its representatives to view and inspect the work specified herein.

PART 2 - PRODUCTS

2-1. MATERIALS.

A. Cellular Concrete:

1. Foaming Agent:
   a. Conforming to ASTM C869 when tested in accordance with ASTM C796.
   b. Capable of generating foam, which maintains stability until the cement sets to form a self-supporting matrix comprising closed cells and low water absorptive characteristics.
   c. Comprising ConDeck Corporation (Albuquerque, NM); Mearlcrete Geofoam Liquid Concentrate (the Mearlcrete Corporation, Roselle Park, New Jersey); Rheocell 15 (Master Builders Inc., Cleveland, OH); WF 304 Foam Concentrate (Cellufoam Concrete Systems, Scarborough, Ontario); MaxFlow Foaming Agent Concentrate (Maxflow Environmental Corp., Black Mountain, North Carolina); or approved equal.

2. Admixtures:
   a. Do not use admixtures containing chlorides, that promote corrosion, or that have not been certified for use with foaming agent by foaming agent manufacturer.
   b. Retarder/Water Reducer: Conforming to ASTM C494, Type D.
   c. Plasticizer/Water Reducer: Conforming to ASTM C494, Type A.

3. Cement: Conforming to ASTM C150, Type V.

4. Fly Ash: Conforming to ASTM C618, Class F, except that fly ash with carbon content greater than 6 percent may be used when approved by the foaming agent manufacturer.

5. Fine Aggregate: Conforming to ASTM C33.

2-2. **EQUIPMENT.**

A. Cellular Concrete:

1. General:
   
   a. Furnish equipment of sufficient size to batch and pump the required volume of low-density cellular concrete grout over the distance required and through injection ports at a uniform flow rate and under the required constant pressure in an underground environment.

   b. Configure equipment to flush system with intake valves closed, with pump running at full speed.

   c. Provide a system capable of generating a non-foamed slurry unit weight within ± 5 percent of the design unit weight.

   d. Maintain equipment in good operating condition and provide an adequate inventory of spare parts and backup equipment on site to assure that the equipment is available at all times.

2. Batching:

   a. Batch slurry mechanically in a manner ensuring consistency of the mix.

   b. Provide graphic or digital printout record of batch scale readings, accurate to one pound of dry mix ingredients before delivery to mixer.

3. Foam Generator:

   a. Generate foam by combining controlled quantities of air, water, and foaming agent under pressure in accordance with the foaming agent manufacturer’s recommendations.

   b. Maintain the temperature of water used in generating the foam below 80°F, or as recommended by the foaming agent manufacturer.

   c. Provide timer controls to repetitively discharge a pre-selected quantity, or to continuously discharge at a fixed rate.

   d. Discharge foam into the mixer and blend with the cement slurry.

4. Mixing:

   a. Configure mixer to be compatible with the pump to assure continuous and uniform flow at the point of placement.

   b. Provide a mixer capable of providing a super-wetted, homogenized mix.
c. Equip mixer with a water meter with an accuracy of ± 1 gallon for measuring the amount of mixing water to be added to the dry mix ingredients.

5. Pumping:
   a. Provide equipment capable of pumping the amount of low-density cellular concrete to be conveyed without pulsation or segregation.
   b. Operate pump to uniformly convey a continuous stream of low-density cellular concrete, without air pockets.
   c. Equip with pressure limit device to limit pumping pressure as required to prevent damage to carrier pipe, communication conduits, and precast segments.

6. Piping, Injection Hoses, Ports, Valves, and Connections:
   a. Convey cellular concrete to the point of placement in steel piping or rubber hoses.
   b. Provide piping, injection hoses, valves and connections of no less than 2 inch I.D.
   c. Furnish a system of valves in the line at or near the point of injection to facilitate collecting samples.
   d. Incorporate suitable stop valves at injection points for use in venting air or maintaining pressure, as required.

7. Pressure Gauges:
   a. Displaying up to 150% of the maximum allowable pressure, and accurate to within 0.5% over the full range of the gauge.
   b. Certified and calibrated in accordance with ANSI B40.1, Grade 2A.
   c. Oil-filled type gauges attached to a saddle-type diaphragm seal.

2-3. SOURCE QUALITY CONTROL. Provide delivery and measurement of materials from batching equipment to within the accuracies specified in ASTM C94. Test scales periodically in a manner and at intervals set forth in the approved Quality Control Plan.

   A. Sample and test fly ash in accordance with ASTM C311 once daily.
   
   B. Test and calibrate equipment to generate foam for cellular concrete each day for density and volume output.
   
   C. Sample and test wet density of cellular concrete prior to introduction of the foaming agent and noting the time and temperature.

       1. Every 30 minutes.
2. After a change in the mix batched.
3. Whenever compression test cylinders are made.

D. Provide mix design tickets for cellular concrete grout used each day, identifying the mix design criteria.

E. Provide delivery tickets for each load of grout concrete in accordance with ASTM C94.

PART 3 - EXECUTION

3-1. GENERAL. Establish the limits of each grouting placement based on size and capacity of batching and placing equipment, and mix parameters such as initial set time.

Limit lift heights to avoid pipe flotation and to maintain cellular concrete parameters within specified limits.

Arrange and route utilities to provide ready and available services during grout placement.

Area shall be thoroughly cleaned after the completion of the grouting operations. No grout will be permitted in the liner pipe after completion of the grouting operation.

3-2. PREPARATION. Verify that locations where grout is to be placed are clean and free of standing or running water.

Where used, seal or otherwise protect sheeting, panning, and drainage systems from infiltration by grout.

Verify that the liner pipe has been installed as specified.

A. Bulkheads:
   1. Erect full-height vertical bulkheads snug between host pipe support system and pipe no closer than 12 inches from the leading edge of the pipe.
   2. Provide:
      a. An opening in the crown in addition to other required vent outlets.
      b. An opening for the host pipe inverts drain to facilitate draining water away from the work during grouting operations.
3-3. **PLACEMENT.** Where water inflows or zones of water seepage exceed 2 gpm, erect panning to divert groundwater inflows away from grout placement.

Do not place grout when temperatures are lower than 32 degrees Fahrenheit or when freezing conditions are expected in less than 24 hours, unless approved by the grout manufacturer.

A. Cellular Concrete:
   1. General: Methods employed shall completely fill the annular space behind the pipe with cellular concrete.
   2. Lift placement requirements:
      a. Use multiple lifts as required to avoid pipe flotation and damage to the pipe.
      b. Inject cellular concrete on either side of the pipe simultaneously.
      c. Complete each lift for a particular section of host pipe being grouted prior to beginning:
         1) The next lift in that length of host pipe being grouted.
         2) The first lift of a succeeding length of host pipe being grouted.

3-4. **FIELD QUALITY CONTROL.**

A. General:
   1. Collect samples of fresh cellular concrete at the injection point or discharge point, as the case may be.
   2. Measure and record the volume of grout placed. Compare actual volume placed for each length of host pipe being grouted with the theoretical volume for that length of host pipe being grouted. Use grout hole connections in the pipe to monitor the grout placement operations.

B. Compression Test:
   1. Take two sets of two cylinders for every 200 cy batched, but no less than two sets per day.
   2. Test two cylinders at 28 days. Test the additional two cylinders taken at 56 days.

C. Heat of Hydration Monitoring: Monitor the temperature rise during curing of grout materials to confirm that the specified criteria have been achieved. Perform this monitoring after placement of each lift of grout by measuring the temperature of steel lining at the following time intervals:
1. Immediately after placement.
2. 30 Minutes after placement.
3. Subsequently at 1 hr, 2 hr, and 4 hrs.

D. Wet Density Test – Sample at the injection point:
1. Every 30 minutes.
2. After a change in the mix batched.
3. Whenever compression test cylinders are made.

End of Section
DIVISION 13 – Special Construction
PART 1 - GENERAL

1-1. THIS SECTION INCLUDES.

A. The WORK of this Section includes providing a complete cathodic protection (CP) system for the nine 36-inch diameter polyurethane coated steel manhole pipes.

B. Electrical isolation of the structures from adjacent metallic structures, steel reinforced concrete structures, casings, structures of dissimilar metal or dissimilar coatings, conduits, and all other metallic components that may impact the operation of the CP system.

C. Electrical bonding of all non-insulated, non-welded pipe joints and mechanical joints.

D. Provision of any easements, permits, trenching, conduits, and other items as required. Not all required items are shown on the Drawings.

E. Installation of galvanic anodes, insulating joints, test stations, other components associated with the CP system, and all other work described herein and on the Drawings.

F. Testing of CP system during installation.

G. Cleanup and restoration of work site.

H. Final System Checkout: Testing of CP system after installation and backfill.

1-2. REQUIREMENTS.

A. If the products installed as part of this Section are found to be defective or damaged or if the WORK of this Section is not in conformance with these Specifications, then the products and WORK shall be corrected at the Contractor’s expense.

B. Any retesting required due to inadequate installation or defective materials shall be paid for by the Contractor at no additional cost to the owner.

C. The WORK also requires that one Supplier or Subcontractor accept responsibility for the WORK, as indicated, but without altering or modifying the Contractor's responsibilities under the Contract Documents.
D. The WORK also requires coordination of assembly, installation, and testing between the pipeline contractor and any CP material supplier or subcontractor.

E. All electrical WORK shall be in accordance with NEC and local requirements.

1-3. RELATED SECTIONS.

A. The WORK of the following Sections applies to the WORK of this Section. Other Sections of the Specifications, not referenced below, shall also apply to the extent required for proper performance of this WORK.

1. Site Safety and Regulatory Requirements
2. Excavation, Trenching, Backfilling, and Compacting
3. Piping
4. Cast-In-Place Concrete
5. Protective Coatings

1-4. REFERENCED SPECIFICATIONS, CODES AND STANDARDS.

A. The WORK of this Section shall comply with the current editions of the codes and standards referenced in this specification, including the following:

1. AASHTO American Association of State Highway and Transportation Officials
   a. H20 Specification for Highway Bridges
2. ASTM ASTM International
   a. B3 Standard Specification for Soft or Annealed Copper Wire
   b. B8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
   d. B187 Standard Specification for Copper, Bus Bar, Rod, and Shapes and General Purpose Rod, Bar, and Shapes
   e. B843 Standard Specification for Magnesium Alloy Anodes for Cathodic Protection
f. C94 Standard Specification for Ready-Mixed Concrete

g. D1000 Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

h. D1248 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

i. D2220 Standard Specification for Poly(Vinyl Chloride) Insulation for Wire and Cable, 75°C Operation

j. D3005 Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape

k. D4388 Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes

l. G97 Standard Test Method for Laboratory Evaluation of Magnesium Sacrificial Anode Test Specimens for Underground Applications

3. AWWA American Water Works Association

a. C217 Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines

4. NACE International, the Corrosion Society

a. RP0375 Field-Applied Underground Wax Coating Systems for Underground Pipelines: Application, Performance, and Quality Control

b. SP0169 Control of External Corrosion on Underground or Submerged Metallic Piping Systems

c. SP0286 Electrical Insulation of Cathodically Protected Pipelines

d. TM0497 Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Piping Systems

5. NFPA National Fire Protection Association

a. NFPA 70 National Electric Code (NEC)

6. NEMA National Electrical Manufacturers Association

a. TC2 Electrical Polyvinyl Chloride (PVC) Tubing and Conduit
b. TC3 PVC Fittings for Use with Rigid PVC Conduit and Tubing

B. Whenever the Drawings or these Specifications require a higher degree of workmanship or better quality of material than indicated in the above codes and standards, these Drawings and Specifications shall prevail.

1-5. PERMITS AND JOB ACCESS.

A. Prior to the start of construction, the Contractor shall apply to the required authorities for permits required for installation of the CP system.

B. The Contractor shall contact Underground Service Alert prior to commencing construction to locate existing utilities in the area of construction. Existing utilities include, but are not limited to, water lines, gas lines, telephone, street lights, sewer and storm drains and overhead and underground electric utilities.

C. If traffic control is necessary, it shall satisfy the requirements of the governing locality.

1-6. QUALITY ASSURANCE.

A. Installation of the CP equipment shall be performed by individuals having at least five years of experience in the installation of the CP equipment described herein.

B. All testing required to be performed by a “Corrosion Technician” shall be performed by a NACE certified Corrosion Technician under the supervision of a Corrosion Engineer. A Corrosion Technician is a NACE CP2 (CP Technician), CP3 (CP Technologist), or CP4 (CP Specialist). A Corrosion Engineer is a Registered Professional Corrosion Engineer or a NACE CP4 (CP Specialist).

1-7. SUBMITTALS.

A. The following shall be submitted to the Engineer prior to any equipment installation.

1. Catalog cuts, bulletins, brochures, or data sheets for all materials specified herein.

2. Statement that the equipment and materials proposed meet the Specifications and the intent of the Specifications.

3. Statement of installation experience required.

4. Schedule, including the expected start date and planned completion date.
5. Copy of surface disturbance permits, if permit(s) are required by local jurisdiction.

B. The following shall be submitted to the Engineer after completion of the WORK.

1. Wire connection testing.
2. Insulating joint testing, before and after backfill.
4. Record Drawings shall be submitted to and approved by the Engineer before the WORK is considered complete.

C. The following shall be included in the Owner’s Manual:

1. Operations and maintenance (O&M) manual with instructions for CP system and components. O&M manual may include CP measurements at recommended frequencies, and testing documentation guidelines.
2. List of spare parts recommended for two years of successful operation.

1-8. INTERFERENCE AND EXACT LOCATIONS.

A. The locations of CP equipment, test stations, devices, outlets, and appurtenances, as indicated are approximate only. Exact locations shall be determined by the Contractor in the field subject to the approval of the Engineer.

B. The Contractor shall field verify all data and final locations of work done under other Sections of the Specifications required for placing of the electrical work.

C. In case of interference with other work, foreign pipeline, or erroneous locations with respect to equipment or structures, the Contractor shall furnish all labor and materials necessary to complete the WORK in an acceptable manner to the Owner. Deviations from the Drawings and Specifications shall be submitted to the Owner for approval.

PART 2 - PRODUCTS

2-1. GENERAL.

A. All materials installed must be new. All equipment and materials supplied shall be similar to that which has been in satisfactory service for at least 5 years.
2-2. **GALVANIC ANODES.**

A. Standard potential H-1 magnesium anodes: Cast magnesium anodes shall conform to ASTM B843 Type AZ63. Anodes shall have an open circuit potential of -1.50 volts or more electronegative and a current efficiency of at least 48% when tested in accordance with ASTM G97. Anodes shall have the following size, form, and shape. Anodes shall be manufactured by Farwest, Corrpro, Mesa, Matcor, or equivalent.

<table>
<thead>
<tr>
<th>Ingot</th>
<th>Packaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lb)</td>
<td>Width (inch)</td>
</tr>
<tr>
<td>60</td>
<td>4 to 5</td>
</tr>
</tbody>
</table>

B. Galvanic anodes shall be pre-packaged in a cloth bag containing backfill of the following composition: 75% gypsum, 20% bentonite, and 5% sodium sulfate. The anodes shall be of the size indicated on the Drawings and placed where indicated on the Drawings.

C. Anode lead wire:

1. The wire attached to the anodes shall be of the size and type indicated on the Drawings. The anode lead wire shall conform to the specifications given for “Wires” in this specification.

2. Connection of wire to the anodes shall have a pulling strength that exceeds the wire’s tensile strength.

3. Anode lead wires shall be of one continuous length, without splices, unless otherwise indicated on the Drawings, from the anode connection to the test station.

2-3. **CALCINED COKE BREEZE.**

A. Backfill material for impressed current anodes shall be calcined coke breeze.

B. Calcined coke breeze shall have a resistivity of 25 ohm-cm or less when tested with an applied pressure of 2 psi and a bulk density of 64 to 74 pounds per cubic foot. The particle size shall be between 200 mesh and 18 mesh and shall be dust free. The minimum calcination temperature of base materials shall be 1250 °C.

C. Calcined coke breeze shall have the following chemical properties:

1. Fixed carbon 98% minimum
2. Ash 0.6% maximum
3. Volatile matter 1.0% maximum
4. Moisture 1.0% maximum

D. Calcined coke breeze shall be Loresco SC-3, Asbury 251, or approved equivalent when installed by pumping down the hole. If installed via the freefall method, calcined coke breeze shall be Loresco RS-3, Ashbury 218-L, or equivalent.

2-4. READY-MIXED CONCRETE.

A. Ready-mixed concrete shall be in accordance with ASTM C94, permit requirements, and the Specification section for cast-in-place concrete.

2-5. REINFORCING STEEL.

A. Reinforcing steel shall be in accordance with ASTM A615, permit requirements, and the Specification section for reinforcing steel.

2-6. FLUSH-MOUNTED TEST STATION.

A. Flush-mounted test station boxes shall be traffic boxes rated to withstand AASHTO H20 traffic loading.

B. The traffic boxes shall be G05 Utility Boxes, as manufactured by Christy Concrete Products, Inc.; No. 3RT Utility Box, as manufactured by Brooks Products; or an approved equivalent.

C. Traffic box covers for test stations shall be cast iron with welded bead legend and labeled “CP TEST” or “ANODE,” as required.

2-7. TERMINAL BOARDS.

A. Terminal boards shall be made of 1/4-inch thick phenolic plastic and sized as indicated on the Drawings.

B. Connection hardware shall be brass or bronze. All connections shall be double nutted bolts with serrated lock washers.

C. Copper bus bar shall be 1/8-inch thick and sized to fit. The copper bus bar shall be per ASTM B187 with 98% conductivity.
2-8. **MECHANICAL LUGS.**

A. Mechanical lugs shall be brass or copper with a brass, copper, or stainless steel set screw. Tin plating on the lugs is optional. Aluminum lugs shall not be permitted. Zinc-plated steel set screws shall not be permitted. The lug shall be listed per UL 467, suitable for direct burial, and appropriately sized for the incoming wires. The lug shall be ILSCO Type XT-6DB, Burndy GKA8C, or an approved equivalent.

2-9. **SHUNTS.**

A. Shunts shall be the selected by the size indicated on the Drawings.

B. 0.01-ohm, 6-amp shunts shall be manganin wire type, as indicated. Shunts shall be Type RS, as manufactured by Holloway, or equivalent.

2-10. **CAUTION TAPE.**

A. The caution tape shall be an inert plastic film designed for prolonged underground use. The caution tape shall be a minimum of 3 inches wide and a minimum of 4 mils thick.

B. The caution tape shall be continuously printed over the entire length with the wording "CAUTION: CATHODIC PROTECTION CABLE BURIED BELOW."

C. The wording shall be printed using bold black letters. The color of the tape shall be red.

2-11. **WIRES.**

A. Conductors shall consist of stranded copper of the gauge indicated on the Drawings. Wire sizes shall be based on American Wire Gauge (AWG). Copper wire shall be in conformance with ASTM B3 and ASTM B8.

B. Insulation Type and Colors: As shown on the Drawings.

1. High molecular weight polyethylene (HMWPE) wires shall be rated for 600 volts and shall conform to ASTM D1248, Type 1, Class C, Grade 5.

2-12. **WIRE IDENTIFICATION TAGS.**

A. Wire identification tags shall be the wrap-around type with a high resistance to oils, solvents, and mild acids. Wrap-around markers shall fully encircle the wire with imprinted alpha-numeric characters for pipe identification. The letters and numbers height shall be 3/16 inch at minimum.
2-13. EXOTHERMIC WELDS.

A. Exothermic welds shall be in accordance with the manufacturer's recommendations. Exothermic welds shall be Cadweld manufactured by Erico, Thermoweld manufactured by Burndy, or an approved equivalent.

B. Prevent molten weld metal from leaking out of the mold, where necessary, by using Duxseal packing manufactured by Johns-Manville, Thermoweld packing material manufactured by Burndy, Cadweld T403 Mold Sealer manufactured by Erico, or an approved equivalent.

C. The shape and charge of the exothermic weld shall be chosen based on the following parameters:

   1. Pipe material
   2. Pipe size
   3. Wire size and requirement for sleeves
   4. Number of wires to be welded
   5. Orientation of weld (vertical or horizontal)

2-14. EXOTHERMIC WELD COATING.

A. After exothermic welding, repair coatings and linings in accordance with the coating and lining manufacturer’s recommendation.

B. For bare steel and dielectrically coated steel pipe, weld caps with integrated primer shall be used to cover the exothermic weld connecting the wire to the pipe. The weld cap shall be a 10-mil thick durable plastic sheet that has a dome filled with a moldable compound to assure complete encapsulation of the exothermic weld and a layer of elastomeric adhesive with integrated primer. The adhesive and primer shall be compatible with the pipe material and pipe coating material. Adhesion to steel shall be at least 10 lb/in per ASTM D1000. Weld cap with integrated primer shall be Handy Cap IP manufactured by Royston or equivalent for wire size up to 8 AWG and Handy Cap XL IP manufactured by Royston or equivalent for wire size up to 2 AWG.

2-15. DIELECTRIC INSULATING FLANGE KITS.

A. Insulating flange kits shall include full-faced gaskets, insulating sleeves and washers, and 316 stainless steel bolts, nuts, and washers. The complete assembly shall have a pressure rating equal to or greater than the flanges between which it is installed. Sleeves, gaskets, and insulating washers shall have a minimum dielectric constant of 300 volts per mil. Stainless steel washers shall fit well within the bolt facing on the flange. Insulating washers shall fit within the bolt facing the flange over the outside diameter of the sleeve.
1. Insulating gasket shall be full-faced, Type E, and 1/8-inch thick. Acceptable gasket materials include nitrile faced phenolic, G-10, or a material with equivalent or increased performance. Acceptable seal materials include EPDM, PTFE, or a material with equivalent or increased performance.

2. Insulating sleeves shall be 1/32-inch thick and equal the number of bolts on the flange. Acceptable materials include Mylar, G-10, or a material with equivalent or increased performance.

3. Insulating washers shall be 1/8-inch thick and equal to twice the number of bolts on the flange. Acceptable materials include G-10 or a material with equivalent or increased performance.

B. Dielectric insulating flange kits shall be manufactured by Advance Products & Systems Inc., GPT Industries, or an approved equivalent.

2-16. PETROLATUM WAX TAPE.

A. Petrolatum wax tape shall meet or exceed the requirements of AWWA C217 and shall consist of three parts: Surface primer, wax tape, and outer covering. All three parts shall be the product of a single manufacturer.

B. The primer shall be a blend of petrolatums, plasticizers, and corrosion inhibitors having a paste-like consistency. Primer shall be Wax-Tape Primer manufactured by Trenton, Denso Paste manufactured by Denso, or approved equivalent.

C. The wax tape shall be synthetic-fiber felt, 45 to 90 mils thick, saturated with a blend of micro-crystalline wax, petrolatums, plasticizers, and corrosion inhibitors that is capable of easy conformability over irregular surfaces. Wax tape shall be #1 Wax-Tape manufactured by Trenton, Denso Tape manufactured by Denso, or approved equivalent.

D. The outer covering shall be a plastic wrap consisting of one 150-gauge sheet or three 50-gauge sheets wound together as a single sheet, clear polyvinylidene chloride, shrink wrap that is flexible enough to conform to irregular surfaces. Outer wrapping shall be Poly-Ply by Trenton, Poly-Wrap by Denso, or approved equivalent.

2-17. COUPON.

A. The coupon shall be the same material type as the pipe and have an area of 10 cm².

B. The coupon shall have two #12 AWG stranded copper wire with HMWPE insulation (green). All wires shall be long enough to extend to the test station without splicing.
C. Coupons shall be manufactured by MC Miller or an approved equivalent.

PART 3 - EXECUTION

3-1. MATERIAL AND EQUIPMENT STORAGE.

   A. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements. If warehouse storage cannot be provided, materials and equipment shall be stacked well above ground level and protected from the elements with plastic sheeting or another method, as appropriate.

3-2. EXCAVATION AND BACKFILL.

   A. Buried wires shall have a minimum cover of 24 inches.

   B. Caution tape shall be installed above buried wire. Caution tape shall be installed a minimum of 6 inches above underground wires and conduits.

   C. Wire identification tags shall be placed on the wires prior to placing wire in conduit or backfilling.

3-3. SURFACE GROUND BED FOR GALVANIC ANODES.

   A. Prepackaged anodes shall be installed at the locations indicated on the Drawings.

   B. Plastic or paper wrapping shall be removed from the anode prior to lowering the anode into the hole. Anodes shall not be suspended by the lead wires. Damage to the canvas bag, anode-to-wire connection, copper wire, or wire insulation before or during installation will require replacement of the entire anode assembly. Anodes shall be inspected and approved prior to backfilling.

   C. Anodes shall be backfilled with native soil. Backfilling with native soil shall proceed in 6-inch lifts, compacting the soil around the anode during each lift, until the backfill has reached grade. Upon completion of compaction of backfill to the top of the anode, and prior to filling the hole and compacting the backfill to the surface, a minimum of 10 gallons of fresh water shall be poured into the hole to saturate the prepackaged anode backfill and surrounding soil.

   D. Anode lead wires shall be routed and terminated on the panel board as shown in the Drawings.
3-4. **TEST STATIONS.**

A. Test stations shall be installed at the approximate locations shown on the Drawings. The Contractor shall field verify all final locations, subject to acceptance by the Engineer. Test stations shall be located within the pipeline easement. Test stations shall be located in areas not subject to vehicular traffic, such as sidewalks, unless otherwise approved by the Engineer.

B. For flush-mounted test stations, place the bottom of the test box on native soil. Do not place rock, gravel, sand, or debris in the box. Install 4,000 psi concrete collar with reinforcement after placement of the test box to finished grade. Provide sufficient sloping in the concrete pad or surrounding pavement to provide drainage away from the test box.

C. Connect wires to the terminal board as shown on the Drawings. Each wire shall be identified with a permanent wire identifier within 4 inches of the termination. After installation, all wire connections in the test station shall be tested by the Contractor to ensure they meet the requirements herein.

D. The Contractor shall provide global positioning system (GPS) coordinates for each test station location with a minimum accuracy of 1 meter or 3 feet. The Contractor shall submit the GPS coordinates of the test stations to the Engineer after installation.

3-5. **WIRES.**

A. Buried wires shall be laid straight without kinks. Each wire run shall be continuous in length and free of joints or splices, unless otherwise indicated. Care shall be taken during installation to avoid punctures, cuts, or other damage to the wire insulation. Damage to insulation shall require replacement of the entire length of wire at the Contractor’s expense.

B. At least 12 inches of slack (coiled) shall be left for each wire at each flush-to-grade test station. Wire slack shall be sufficient to allow removal of wire extension for testing.

C. Wire shall not be bent into a radius of less than eight times the overall wire diameter.

D. The wire conduits must be of sufficient diameter to accommodate the wires. This shall be determined by the number and size of wires in accordance with the applicable codes and standards.
3-6. **WIRE IDENTIFICATION TAGS.**

   A. All wires shall be coded with wire identification tags within 4 inches of the wire end indicating diameter and type of pipe.

   B. Wire identification tags shall be placed on all wires prior to backfill and installation of test stations.

3-7. **EXOTHERMIC WELD CONNECTIONS.**

   A. Exothermic weld connections shall be installed in the manner and at the locations indicated. Exothermic welds shall be spaced at least 6 inches apart from other exothermic welds, fittings, and circumferential welds.

   B. Coating materials shall be removed from the surface over an area of sufficient size to make the connection and as indicated on the Drawings. The surface shall be cleaned to bare metal per SSPC SP11 prior to welding the conductor. The use of resin impregnated grinding wheels will not be allowed.

   C. Only enough insulation shall be removed such that the copper conductor can be placed in the welding mold. If the wire conductor diameter is not the same as the opening in the mold, then a copper adapter sleeve shall be fitted over the conductor.

   D. The Contractor shall be responsible for testing all test lead and bond wire welds. The Engineer, at his or her discretion, shall witness these tests. After the weld has cooled, all slag shall be removed and the metallurgical bond shall be tested for adherence by the Contractor. A 22-ounce hammer shall be used for adherence testing by striking a blow to the weld. Care shall be taken to avoid hitting the wires. All defective welds shall be removed and replaced in a new location at least 6 inches away from the original weld location.

   E. All exposed surfaces of the copper and steel shall be covered with insulating materials.

      1. For dielectrically coated pipes, a plastic weld cap with integrated primer shall cover the exothermic weld and surrounding area. All surfaces must be clean, dry, and free of oil, dirt, loose particles, and all other foreign materials prior to application of the weld cap.
F. The Contractor shall inspect both the interior and exterior of the pipe to confirm that all coatings and linings removed or damaged as a result of the welding have been repaired. The Contractor shall furnish all materials, clean surfaces, and repair protective coatings and linings damaged as a result of the welding. Repair of any coating or lining damaged during welding shall be performed in accordance with coating or lining manufacturer's recommendations.

G. After backfilling pipe, all test lead pairs shall be tested for broken welds using a standard ohmmeter. The resistance shall not exceed 150% of the theoretical wire resistance, as determined from published wire data.

3-8. DIELECTRIC INSULATING FLANGE KITS.

A. All insulating components of the insulating flanged gasket set shall be cleaned of dirt, grease, oil, and other foreign materials immediately prior to assembly. If moisture, soil, or other foreign matter contacts any portion of these surfaces, disassemble the entire joint and clean with a suitable solvent. Dry the entire joint. Once completely dry, reassemble the joint.

B. Care shall be taken to prevent any excessive bending or flexing of the gasket. Creased or damaged gaskets shall be rejected and removed from the job site.

C. Bolt holes in mating flanges shall be properly aligned at the time bolts and insulating sleeves are inserted to prevent damage to the insulation. Follow the manufacturer's recommended bolt tightening sequence. Center the bolt insulating sleeves within the insulation washers so that the insulating sleeve is not compressed and damaged.

D. After flanged bolts have been tightened, each insulating washer shall be inspected for cracks or other damage. All damaged washers shall be replaced.

E. When the flange is determined to be properly functioning to the full satisfaction of the Owner, approval will be granted to proceed with installation. Do not proceed with coating, lining, or backfilling the insulating joint prior to gaining approval to proceed. If the coating or lining is applied prior to gaining approval to proceed, the coating or lining shall be completely removed to the satisfaction of the Owner at the Contractor's expense. If the insulating joint is backfilled prior to gaining approval from the Owner, the Contractor shall completely excavate the insulating joint at the Contractor's expense.
F. After testing and acceptance by the Owner, coat the interior insulating flange a minimum of two pipe diameters beyond the gasket with high-solids epoxy to a 10 mil (minimum) dry film thickness. Follow the manufacturer’s surface preparation and application procedures.

G. After testing and acceptance by the Owner, coat the exterior insulating flange and a minimum of two pipe diameters beyond the gasket with the wax tape system specified herein.

3-9. PETROLATUM WAX TAPE.

A. Petrolatum wax tape systems shall be applied on insulating joints and non-cathodically protected metallic appurtenances and fittings, regardless of whether they are bare or factory coated, as indicated in the Drawings. Extend the petrolatum wax tape coating system over any adjacent pipe coating by a minimum of two pipe diameters. Petrolatum wax tape systems shall be applied in accordance with NACE RP0375, AWWA C217, these Specifications, and the Manufacturer’s recommendations.

B. Surfaces shall be cleaned of all dirt, grease, oil and other foreign materials immediately prior to coating. Loose rust, loose paint and other foreign matter shall be removed in accordance with SSPC SP2 or SP3.

C. A prime coating shall be applied in a uniform coating over the entire surface to be wrapped. A liberal coating shall be applied to threads, cavities, shoulders, pits, and other irregularities.

D. Petrolatum wax tape shall be applied immediately after applying the primer using a 1-inch overlap. A spiral wrap shall be used and slight tension shall be applied to ensure that there are no air pockets or voids. For bolts, nuts, and other irregular shapes, cut strips of wax tape and apply them by gloved hand so that there are no voids or spaces under the tape. Apply a sufficient amount of tape to completely encapsulate all exposed steel surfaces. After applying the tape, the applicator shall firmly press and smooth out all lap seams and crevice areas. The tape shall be in tight intimate contact with all surfaces. The minimum wax tape thickness shall be 70 mils over smooth surfaces and 140 mils over sharp and irregular surfaces, or more as required to fill all voids.

E. Apply two layers of outer covering over the wax tape coating by tightly wrapping it around the pipe such that it adheres and conforms to the wax tape. Secure the outer covering to the pipe with adhesive tape.

3-10. COUPONS.

A. Coupons shall be installed as shown on the Drawings.
B. Coupon lead wire shall be terminated on the panel board as shown on the Drawings.

3-11. WIRE CONNECTIONS.

A. After installation, all wire connections shall be tested to ensure electrical continuity at the test station locations by the Contractor to ensure that they meet the requirements and intent of the Contract Documents.

3-12. RESTORATION SERVICES.

A. Compaction of backfill for anodes and trenches shall match the existing conditions and shall be in conformance with the EARTH MOVING Section (31 20 00).

B. RESTORATION OF SOD: Restore unpaved surfaces disturbed during the installation of anodes and wires to their original elevation and condition. Preserve sod and topsoil carefully and replace after the backfilling is completed. Replace sod that is damaged using sod of quality equal to that removed. Where the surface is disturbed in a newly seeded area, re-seed the area with the same quality and formula of seed as that used in the original seeding.

C. RESTORATION OF PAVEMENT: Patch pavement, sidewalks, curbs, and gutters where existing surfaces are removed for construction in conformance with the ASPHALT PAVING Section (32 12 16) and the CAST-IN-PLACE CONCRETE Section (03 30 00).

3-13. ISOLATION TESTING ON INSULATING JOINTS.

A. Insulating joints shall be installed to effectively isolate metallic piping from foreign metallic structures. The Contractor shall test the performance of these insulating joints before and after backfill.

B. Before backfill, the Contractor shall test the insulating joint using a Gas Electronics Model No. 601 Insulation Checker or an approved equivalent. If the testing results indicate less than 100% insulation, then the insulating joints shall be repaired and retested at the Contractor’s expense.
C. After backfill, testing shall be performed by measurement of native pipe-to-soil potentials at both sides of the insulating joint. If the difference in native pipe-to-soil potentials on both sides of the insulating joint is within ±100 mV, then additional testing shall be performed, as follows. Temporary CP current shall be circulated on one side of the insulating joint. “On” and “Instant Off” pipe-to-soil potentials shall be measured on the other side of the insulating joint. If the “Instant Off” potential is more negative than the native potential, the insulating joint shall be considered deficient and shall be repaired and retested at the Contractor’s expense.

3-14. FINAL SYSTEM CHECKOUT.

A. Upon completion of the installation, the Contractor shall provide testing of the completed system by a Corrosion Technician, and the data shall be reviewed by a Corrosion Engineer to ensure conformance with the Contract Documents, NACE SP0169, and NACE SP0286.

B. The testing described herein shall be in addition to and not substitution for any required testing of individual items at the manufacturer’s plant and during installation.

C. Testing shall be performed at all test leads of all test stations, and locations of exposed pipe as soon as possible after installation of the CP system.

D. Testing shall include the following and shall be conducted in accordance with NACE TM0497:

1. Measure and record native pipe-to-soil, and anode-to-soil potentials at all test locations. Contractor shall submit data to Engineer a minimum of 48 hours before energizing the cathodic protection system.

2. Verify electrical isolation at all insulating joints per NACE SP0286. Contractor shall submit data to Engineer a minimum of 48 hours before energizing the cathodic protection system.

3. Measure and record the “On” and “Instant Off” structure-to-soil potentials at each location after the structure has been given adequate time to polarize.

4. Measure and record the current output of each anode when the CP system is initially turned on and again after it has been given adequate time to polarize.

E. Test results shall be analyzed to determine compliance with NACE SP0169.
F. Test results shall be analyzed to determine if stray current interference is present. Stray current interference is defined as a ±50 mV shift in a pipeline’s pipe-to-soil potential that is caused by a foreign current source. Stray current interference shall be tested on the project pipeline and foreign pipelines that have a reasonable chance of being affected by stray currents.

G. The Contractor shall provide a written report, prepared by the Corrosion Engineer, documenting the results of the testing 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.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers the installation of new valves and actuators purchased by Contractor as part of this Work under the valve specifications. The equipment to be furnished by others for installation by Contractor is identified in the Drawings.

Cleaning, disinfection, pressure and leakage testing, insulation, and pipe supports are covered in other sections.

The following specification sections are applicable to valves to be installed:

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>Plug Valves</td>
</tr>
<tr>
<td>Air Release Valves</td>
</tr>
<tr>
<td>Vacuum Valves</td>
</tr>
</tbody>
</table>

1-2. GENERAL. Equipment installed under this section shall be erected and placed in proper operating condition in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.

Any valves and actuators that are identified as being provided by others will be furnished complete for installation by Contractor. Technical specifications under which the equipment will be purchased are available.

1-2.01. Coordination. When manufacturer's field services or installation check services are provided by the valve manufacturer, Contractor shall coordinate the services with the valve manufacturer. Contractor shall give Engineer written notice at least 30 days prior to the need for manufacturer's field services.

Submittals for equipment that will be furnished by others under each procurement contract will be furnished to Contractor upon completion of review by Engineer. Contractor shall review equipment submittals and coordinate with the requirements of the Work and the Contract Documents. Contractor accepts sole responsibility for determining and verifying all quantities, dimensions, and field construction criteria.

Flanged, push-on, and grooved connections to valves including the bolts, nuts, and gaskets are covered in the appropriate pipe specification section. Valve ends shall match piping.
PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3-1. INSPECTION. All valves and accessories shall be inspected for damage and cleanliness before being installed. Any material damaged or contaminated in handling on the job shall not be used unless it is repaired and re-cleaned to the original requirements by Contractor. Such material shall be segregated from the clean material and shall be inspected and approved by Owner or his representative before its use.

3-2. INSTALLATION.

3-2.01. General. Valves shall be installed with sufficient clearance for proper operation of any external mechanisms, and with sufficient clearance to dismantle the valve for in-place maintenance. Installation shall be in accordance with the valve manufacturer’s recommendations.

Unless otherwise indicated on the Drawings or specified, all valves installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above the finish floor shall be installed with their operating stems vertical. Valves installed in horizontal runs of piping having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above the finish floor shall be installed with their operating stems horizontal. If adjacent piping prohibits this, the stems and operating handwheel shall be installed above the valve horizontal centerline as close to horizontal as possible. Valves installed in vertical runs of pipe shall have their operating stems oriented to facilitate the most practicable operation, as reviewed by Engineer.

3-2.02. Installation Checks. When specified in the valve sections, the valve manufacturer will provide installation checks. For installation checks, the manufacturer’s field representative will inspect the valve installation immediately following installation by Contractor. The manufacturer's representatives will revisit the site as often as necessary to ensure installation satisfactory to Owner.

Contractor shall perform no work related to the installation or operation of materials or equipment furnished by others without direct observation and guidance of the field representative, unless Engineer and manufacturer furnishing such materials concur otherwise.

3-2.03. AWWA Butterfly Valves. Not used.
3-2.04. **Check Valves.** Not used.

3-2.05. **Plug Valves.**

3-2.05.01. **Eccentric Plug Valves.** Eccentric plug valves shall be installed with the shaft horizontal and the plug in the upper half of the valve body. Valves in horizontal wastewater, sludge, or scum lines shall be installed with the seat on the upstream end. Valves in all vertical piping shall be installed with the seat at the upper end of the valve.

3-2.06. **Air Release Valves.** The exhaust from each valve shall be piped to a suitable point acceptable to Engineer. Air release valve exhaust piping shall terminate at least 6 inches above the floor.

3-2.07. **Vacuum Valves.** The inlet area to the vacuum valves shall be clear of all other interferences to allow rapid uninhibited entrance of large quantities of air into the valve. The area shall be clear of any material which may be pulled into the vacuum valve during operation.

3-2.08. **Valve Boxes.** Valve boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought flush with the finished grade. After each valve box is placed in proper position, earth fill shall be placed and thoroughly tamped around the box.

3-3. **VALVE ACTUATORS.** Valve actuators and accessories shall be factory mounted on the valve, calibrated, and tested by the valve or actuator manufacturer. The Contractor and valve supplier shall coordinate the location of the valve within the enclosing structure to allow operations and maintenance safe access and operation of the valve lever or hand wheel. Prior to construction of the enclosure structure, the Contractor shall submit the proposed location of the operator for review and approval by the Engineer and for coordination with the enclosing structure design.

3-4. **FIELD QUALITY CONTROL.**

3-4.01. **Field Testing.** After installation, all valves shall be tested in accordance with the Pipeline Pressure and Leakage Testing section.

3-4.01.01. **Pressure Tests.** Pressure testing shall be in accordance with the Pipeline Pressure and Leakage Testing section.

3-4.01.02. **Leakage Tests.** All valves shall be free from leaks. Each leak that is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of Contractor. This requirement applies whether pressure testing is required or not.
3-5. **ADJUSTING.** After installation, the opening and closing time shall be adjusted as needed for each pneumatic, hydraulic and electric actuated valve.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers the installation of piping and accessories as indicated on the Drawings for the following piping sections:

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
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<tbody>
<tr>
<td>15062</td>
<td>Steel Pipe</td>
</tr>
</tbody>
</table>

Contractor shall furnish all necessary jointing materials, coatings, and accessories that are specified herein.

Pipe supports and anchors shall be furnished by Contractor, and are covered in the Pipe Supports section. Pipe trenching and backfilling are covered in the Trenching and Backfilling section.

1-2. GENERAL.

1-2.01. Coordination. Materials installed under this section shall be installed in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the manufacturer, unless exceptions are noted by Engineer.

1-3. SUBMITTALS.

1-3.01. Drawings and Data. Complete specifications, data, and catalog cuts or drawings shall be submitted in accordance with the Submittals section. Items requiring submittals shall include, but not be limited to, the following:

- Watertight/dust tight pipe sleeves.
- Materials as specified herein.

1-3.02. Welder Certification. Prior to the start of the work, Contractor shall submit a list of the welders he proposes using and the type of welding for which each has been qualified. Copy of certification and identification stamp shall be submitted for each welder. Qualification tests may be waived if evidence of prior qualification is deemed suitable by Engineer.

1-3.03. Spool Drawings. Not used.
1-4. QUALITY ASSURANCE.

1-4.01. Welding and Brazing Qualifications. All welding and brazing procedures and operators shall be qualified by an independent testing laboratory in accordance with the applicable provisions of Section IX of the ASME Code. All procedure and operator qualifications shall be submitted to the Engineer for review. Accurate records of operator and procedure qualifications shall be maintained by Contractor and made available to Engineer upon request. Each weld shall be marked with a symbol that identifies the person who made the weld.

1-4.02. Tolerances. These tolerances apply to in-line items and connections for other lines.

The general dimension, such as face-to-face, face or end-to-end, face- or end-to-center, and center-to-center shall be 1/8 inch.

The inclination of flange face from true in any direction shall not exceed 3/64 inch per foot.

Rotation of flange bolt holes shall not exceed 1/16 inch.

1-5. DELIVERY, STORAGE, AND HANDLING. Shipping shall be in accordance with the Shipping section. Handling and storage shall be in accordance with the Delivery, Handling and Storage Requirements section. All materials shall be stored in a sheltered location above the ground, separated by type, and shall be supported to prevent sagging or bending.

1-5.01. Coated Pipe. Handling methods and equipment used shall prevent damage to the protective coating and shall include the use of end hooks, padded calipers, and nylon or similar fabric slings with spreader bars. Bare cables, chains, or metal bars shall not be used. Coated pipe shall be stored off the ground on wide, padded skids. Plastic-coated pipe shall be covered or otherwise protected from exposure to sunlight.

PART 2 - PRODUCTS

2-1. SERVICE CONDITIONS. Pipe, tubing, and fittings covered herein shall be installed in the services indicated in the various pipe sections.
## 2-2. MATERIALS.

### Threaded Fittings
- **Anti-Seize Thread Lubricant**: Jet-Lube "Nikal", John Crane "Thred Gard Nickel", Never-Seez "Pure Nickel Special", or Permatex "Nickel Anti-Seize".
- **Teflon Thread Sealer**: Paste type; Hercules "Real-tuff", John Crane "JC-30", or Permatex "Thread Sealant with Teflon".
- **Teflon Thread Tape**: Hercules "Tape Dope" or John Crane "Thread-Tape".

### Insulating Fittings
- **Flanged**: Epco "Dielectric Flange Unions" or Central Plastics "Insulating Flange Unions".
- **Watertight/Dusttight Pipe Sleeves**: O-Z Electrical Manufacturing "Thruwall" and "Floor Seals", or Thunderline "Link-Seals"; with modular rubber sealing elements, nonmetallic pressure plates, and galvanized bolts.
- **Pipe Sleeve Sealant**: Polysulfide or urethane, as specified in the Caulking section or as indicated on the Drawings.

### Protective Coatings
- **Tape Wrap**: ANSI/AWWA C209, except single ply tape thickness shall not be less than 30 mils; Protecto Wrap "200" or Tapecoat "CT".
- **Primer**: As recommended by the tape manufacturer.
- **Coal Tar Epoxy**: High-build coal tar epoxy; Amercoat "Amercoat 78HB Coal Tar Epoxy", Carboline "Bitumastic 300 M", Tnemec "46H-413 Hi-Build Tneme-Tar", or Sherwin-Williams "Hi-Mil Sher-Tar Epoxy".
PART 3 - EXECUTION

3-1. **INSPECTION.** All piping components shall be inspected for damage and cleanliness before being installed. Any material damaged or contaminated in handling on the job shall not be used unless it is repaired and recleaned to the original requirements by Contractor. Such material shall be segregated from the clean material and shall be inspected and approved by Owner or his representative before its use.

3-2. **PREPARATION.**

3-2.01. **Field Measurement.** Pipe shall be cut to measurements taken at the site, not from the Drawings. All necessary provisions shall be made in laying out piping to allow for expansion and contraction. Piping shall not obstruct openings or passageways. Pipes shall be held free of contact with building construction to avoid transmission of noise resulting from expansion.

3-3. **INSTALLATION.**

3-3.01. **General.** All instruments and specialty items shall be installed according to the manufacturer’s instructions and with sufficient clearance and access for ease of operation and maintenance.

Flat faced wrenches and vises shall be used for copper tubing systems. Pipe wrenches and vises with toothed jaws will damage copper materials and shall not be used. Bends in soft temper tubing shall be shaped with bending tools.

3-3.02. **Pipe Sleeves.** Piping passing through concrete or masonry shall be installed through sleeves that have been installed before the concrete is placed or when masonry is laid. Pipe sleeves installed through floors with a special finish, such as ceramic or vinyl composition tile, shall be flush with the finished floor surface and shall be provided with nickel or chromium plated floor plates. Unless otherwise indicated on the Drawings, in all other locations where pipes pass through floors, pipe sleeves shall project not less than 1 inch nor more than 2 inches above the floor surface, with the projections uniform within each area. In the case of insulated pipes, the insulation shall extend through pipe sleeves. Where the Drawings indicate future installation of pipe, sleeves fitted with suitable plastic caps or plugs shall be provided.

Holes drilled with a suitable rotary drill will be considered instead of sleeves for piping which passes through interior walls and through floors with a special finish.

Unless otherwise indicated on the Drawings, all pipes passing through walls or slabs which have one side in contact with earth or exposed to the weather shall be sealed watertight with special rubber-gasketed sleeve and joint assemblies, or with sleeves and modular rubber sealing elements.
3-3.03. **Pipe Joints.** Pipe joints shall be carefully and neatly made in accordance with the indicated requirements.

3-3.03.01. **Threaded.** Pipe threads shall conform to ANSI/ASME B1.20.1, NPT, and shall be fully and cleanly cut with sharp dies. Not more than three threads at each pipe connection shall remain exposed after installation. Ends of pipe shall be reamed after threading and before assembly to remove all burrs. Unless otherwise indicated, threaded joints shall be made up with teflon thread tape, thread sealer, or a suitable joint compound.

3-3.03.02. **Epoxy and Adhesive Bonded.** Epoxy and adhesive bonded joints shall only be used for FRP pipe. All joint preparation, cutting, and jointing procedures shall comply with the pipe manufacturer's recommendations. Adhesive shall be mixed and applied in accordance with the manufacturer's recommendations. After joining, either the pipe or the fitting shall be rotated approximately one-half turn to uniformly distribute adhesive. A slight fillet of adhesive at the bond line is desirable, but all excess adhesive shall be wiped off immediately. Newly assembled joints shall be suitably blocked or restrained to prevent movement during the curing period recommended by the manufacturer.

3-3.03.03. **Flanged.** Flange bolts shall be tightened sufficiently to slightly compress the gasket and effect a seal, but shall not be torqued less than the minimum value required by the gasket manufacturer. Flange bolts shall not be so tight as to fracture or distort the flanges. A plain washer shall be installed under the head and nut of bolts connecting plastic pipe flanges. Anti-seize thread lubricant shall be applied to the threaded portion of all stainless steel bolts during assembly.

Flange bolt holes shall be oriented as follows, unless otherwise indicated on the spool drawings:

- **Vertical flange face:** Bolt holes to straddle the vertical centerlines.
- **Horizontal flange face:** Bolt holes to straddle plant north-south centerlines.

Pipe sealants, thread compounds, or other coatings shall not be applied to flange gaskets unless recommended by the gasket manufacturer for the specified service and approved by Engineer.

Welds at orifice flanges shall have internal surfaces ground smooth to the pipe wall.

Slip-on flanges shall be welded inside and outside. There shall be a distance of approximately 1/16 to 1/8 inch between the edge of the fillet weld and the face of
the flange. The seal weld shall be applied so that the flange face shall be free of weld spatter and does not require refacing.

Flat-faced flanges shall be used when mating to Class 125 flanges. Full-face gaskets shall be used with flat-faced flanges and ring gaskets shall be used with raised faced flanges. Weld neck flanges shall be used with butt-weld fittings. The bore of weld neck flanges shall match the pipe wall thickness.

Insulating joints connecting submerged (buried) piping to exposed piping shall be installed above the maximum water surface elevation and before the first pipe support not having coated anchor bolts or adhesive-bonded concrete anchors. All submerged (buried) metallic piping shall be isolated from the concrete reinforcement. Insulating flanges shall be tested for electrical isolation after installation and bolt-up but prior to introduction of conducting fluid.

3-3.03.04. **Welded.** Welding shall conform to the specifications and recommendations contained in the "Code for Pressure Piping", ANSI B31.1.

Weld cross-sections shall be equal to or greater than the pipe wall thickness. Welds shall be smooth and continuous and shall have interior projections no greater than 1/16 inch. Backing strips or rings shall not be used except with specific prior review by Engineer as to use, material, and design. Root gap inserts that are completely melted and consumed in the weld bead are acceptable only when reviewed in advance by Engineer.

Carbon steel welding shall be made by the shielded metal arc process.

3-3.03.05. **Grooved Couplings.** Grooves for grooved couplings shall be cut with a specially designed grooving tool. Grooves cut in steel pipe shall conform to flexible grooving dimensions, as set forth in AWWA C606, and shall be clean and sharp without burrs or check marks.

3-3.03.06. **Push-on.** Gasket installation and other jointing procedures shall be in accordance with the recommendations of the manufacturer. Each spigot end shall be suitably beveled to facilitate assembly. All joint surfaces shall be lubricated with a heavy vegetable soap solution immediately before the joint is completed. Lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean.

3-3.03.07. **Other Pipe Joints.** Coupled joints in tempered glass pipe, plastic joints in vitrified clay pipe, and other proprietary type joints shall be made in accordance with the manufacturer’s recommendations and to the satisfaction of Engineer.
3-3.04. **Pipe.** Pipe shall be installed as specified, as indicated on the Drawings, or, in the absence of detail piping arrangement, in a manner acceptable to Engineer.

Piping shall be installed without springing or forcing the pipe in a manner which would induce stresses in the pipe, valves, or connecting equipment.

In all piping, insulating fittings shall be provided to prevent contact of dissimilar metals, including but not limited to, contact of copper, brass, or bronze pipe, tubing, fittings, valves, or appurtenances, or stainless steel pipe, tubing, fittings, valves, or appurtenances with iron or steel pipe, fittings, valves, or appurtenances. Insulating fittings shall also be provided to prevent contact of copper, brass, or bronze pipe, tubing, fittings, valves or appurtenances with stainless steel pipe, tubing, fittings, valves, or appurtenances.

Branch connections in horizontal runs of steam, air, and gas piping shall be made from the top of the pipe.

Drains required for operation are shown on the Drawings. However, vents at all high points and drains at all low points in the piping that are required for complete draining for pressure test may not be shown on these Drawings. Contractor shall add such items as found to be necessary during detail piping design and/or piping installation.

3-3.05. **Valves.** Isolation valves provided with equipment and instruments shall be located in a manner which will allow ease of access and removal of the items to be isolated. Prior to soldering or brazing valves, Teflon and elastomer seats and seals shall be removed to prevent damage.

3-4. **PIPING ASSEMBLY.**

3-4.01. **General.** Contractor shall only use labor that has been qualified by training and experience to capably perform the specified activities required to accomplish the work in a satisfactory manner.

Any deviations from the Specifications or piping locations shown on the Drawings require prior review and approval by Engineer.

3-4.02. **Buttwelded Piping.** The specification and qualification of weld joints and welders for buttwelded piping shall be in accordance with ASME Boiler Pressure Vessel Code, Section IX, Welding and Brazing. Weld procedure specifications (WPS) and procedure qualification reports (PQR) shall be submitted to Engineer for review and validation of joint design, efficiencies and strength before installation begins.
Nondestructive examination (NDE) shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination. The minimum level of NDE shall be as follows:

1. 100 percent visual examination of welds by a qualified examiner (per ASME B31.1), and
2. Radiographic testing (RT) of 10 percent random sampling of welds.

If the Contractor wants to use alternative techniques or intends to apply alternative methods considered equivalent to those indicated herein, a proposal on such techniques or methods shall be submitted in writing to Engineer for review and approval at least 14 days before intended date of use.

Welding shall not begin until weld joint and welder qualification submittals have been reviewed and approved. NDE shall be performed before the pressure and leakage testing of the piping. Weld acceptance standards shall be in accordance with ASME B31.1, Chapter VI. If a weld fails the NDE, it shall be repaired and the test repeated at no additional cost to the Owner.

3-5. PROTECTIVE COATING. Standard weight steel pipe in buried locations will have exterior surfaces protected with a shop applied plastic coating.

Where specified in the Steel Pipe Section, extra strong steel pipe in buried locations will have exterior surfaces protected with a shop applied plastic coating or a shop applied tape wrap. Where not specified to be shop coated or wrapped in the Steel Pipe Section, a tape wrap shall be field applied. The exterior surfaces of all fittings, couplings, specials, and other portions of buried piping not protected with plastic coating shall be tape-wrapped in the field.

All surfaces to be tape-wrapped shall be thoroughly cleaned and primed in accordance with the tape manufacturer’s recommendations immediately before wrapping. The tape shall be applied by two-ply (half-lap) wrapping or as needed to provide a total installed tape thickness of at least 60 mils. Joints in plastic-coated pipe shall be cleaned, primed, and tape-wrapped after installation.

Joints in galvanized steel piping in underground locations shall be field painted with two coats of coal tar epoxy coating.

3-5.01. Inspection. All shop-applied plastic coatings and tape wrap on pipe or fittings shall be inspected for holidays and other defects after receipt of the pipe or fitting on the job and immediately before installation. All field-applied tape wrap on pipe, joints, fittings, and valves shall be inspected for holidays and other defects following completion of wrapping. Inspection of plastic coatings after installation of the pipe or fitting in the trench shall be made where, in the opinion
of Engineer, the coating may have been damaged during installation. Holidays and defects disclosed by inspection shall be repaired in accordance with the recommendations of the coating or tape wrap manufacturer, as applicable.

The inspection shall be made using an electrical holiday detector. The detector and inspection procedures shall conform to the requirements of Section 4.4 of ANSI/AWWA C209.

3-6. PRESSURE AND LEAKAGE TESTING. All specified tests shall be made by and at the expense of Contractor in the presence, and to the satisfaction of Engineer. The Contractor shall perform all pressure and leakage testing in accordance with the Pipeline Pressure and Leakage Testing section.

Leakage may be determined by loss-of-pressure, soap solution, chemical indicator, or other positive and accurate method acceptable to Engineer. All fixtures, devices, or accessories which are to be connected to the lines and which would be damaged if subjected to the specified test pressure shall be disconnected and the ends of the branch lines plugged or capped as needed during the testing.

After completion of the specified pressure tests, all anhydrous ammonia, chlorine and sulfur dioxide gas piping shall be tested for leakage using the appropriate gas chemical at operating pressures. Piping shall be thoroughly cleaned and dried before admitting gas chemical into the system. Gas chemical shall be slowly admitted to the piping system.

Unless otherwise required by the applicable codes, drainage and venting systems shall be water tested. For water testing, the drainage and venting system shall be filled with water to the level of the highest vent stack. For air testing, the system shall be charged with air to a minimum pressure of 5 psig. Openings shall be plugged as necessary for either type of test. To be considered free of leaks, the system shall hold the water or air for 30 minutes without any drop in the water level or air pressure.

All necessary testing equipment and materials, including tools, appliances and devices, shall be furnished and all tests shall be made by and at the expense of Contractor. Contractor shall give Engineer 5 working days advanced notice of scheduled testing.

All joints in piping shall be tight and free of leaks. All joints which are found to leak, by observation or during any specified test, shall be repaired, and the tests repeated.
3-7. **CLEANING.** The interior of all pipe, valves, and fittings shall be smooth, clean, and free of blisters, loose mill scale, sand, dirt, and other foreign matter when installed. Before being placed in service, the interior of all lines shall be thoroughly cleaned, to the satisfaction of Engineer.

3-8. **ACCEPTANCE.** Owner reserves the right to have any section of the piping system which he suspects may be faulty cut out of the system by Contractor for inspection and testing. Should the joint prove to be sound, Owner will reimburse Contractor on a time-and-material basis as specified in the Contract. Should the joint prove to be faulty, the destructive test will continue joint by joint in all directions until sound joints are found. Costs for replacement of faulty work and/or materials shall be the responsibility of Contractor.

End of Section
PART 1 - GENERAL

1-1. SCOPE. This section covers the furnishing and installation of steel pipe.

Steel pipe shall be furnished and installed complete with all fittings, specials, adapters, closure pieces, blowoffs, outlets, caps and plugs, temporary bulkheads, access manholes, jointing materials, pipe hangers and supports, anchors, blocking, encasements, cathodic protection, appurtenances, and accessories specified and indicated on the Drawings, and as required for proper installation and functioning of the piping.

Steel pipe smaller than 6 inches in diameter, light wall steel pipe, miscellaneous small piping, pipe hangers and supports, concurrent cathodic protection, pressure and leakage tests, and cleaning are covered in other sections.

The size, service, and location of steel pipelines are shown in the Drawings.

Steel piping shall be furnished and installed complete with all straight pipe, fittings, specials, closure pieces, caps and plugs, temporary bulkheads, jointing materials, appurtenances, and accessories indicated on the drawings, and as required for proper installation and functioning of the piping. Piping furnished hereunder shall be complete with all jointing materials required for installation of any valves and equipment, including any valves and equipment furnished by others for installation under this Contract.

1-2. GOVERNING STANDARDS. Except as modified or supplemented herein, all steel pipe, fittings, and specials shall conform to the applicable requirements of the following standards:

<table>
<thead>
<tr>
<th>ANSI/AWWA Standards</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>C200</td>
<td>Steel Water Pipe - 6 Inches and Larger</td>
</tr>
<tr>
<td>C203</td>
<td>Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied</td>
</tr>
<tr>
<td>C205</td>
<td>Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 Inch and Larger - Shop Applied</td>
</tr>
<tr>
<td>C206</td>
<td>Field Welding of Steel Water Pipe</td>
</tr>
</tbody>
</table>
C207 Steel Pipe Flanges for Waterworks Service – Sizes 4 Inches. through 144 Inches
C208 Dimensions for Fabricated Steel Water Pipe Fittings
C209 Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines
C210 Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines
C214 Tape Coating Systems for the Exterior of Steel Water Pipelines
C216 Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines
C602 Cement Mortar Lining of Water Pipelines in Place – 4 Inches and Larger
C606 Grooved and Shouldered Joints
M11 Steel Pipe – A Guide for Design and Installation

ANSI/ASME Standards
B1.1 Unified Inch Screw Threads (UN and UNR Thread Form)
B16.1 Pipe Flanges and Flange Fittings
B16.47 Large Diameter Steel Flanges NPS 26 through NPS 60
B18.2.1 Square and Hex Bolts and Screws (Inch Series)
B18.2.2 Square and Hex Nuts (Inch Series)
B36.10 Welded and Seamless Wrought Steel Pipe

1-3. QUALIFICATIONS. Pipe manufacturer shall be ISO-9001 or SPFA certified with 5 years’ experience in the manufacture of steel pipe, fittings, coatings, and linings specified. All pipe, fittings, specials, coatings, linings, and appurtenances
shall be fabricated at one (or more if have multiple plants) company facility for quality control purposes.

1-4. **SUBMITTALS.** Drawings, details, specifications, installation schedules, welding procedures and welder qualifications, and other data showing complete details of the fabrication, construction, weld locations, joint details and certification, and installation of pipe, fittings, specials, and connections, together with complete data covering all materials proposed for use, shall be submitted in accordance with the Submittals section. The drawings and data shall include, but shall not be limited to, the following:

   a. **Certifications and Affidavits of Compliance:** Contractor shall submit all certifications and affidavits of compliance. Performing and paying for sampling and testing as necessary shall be the Contractor's responsibility. The following certifications and affidavits of compliance are required for all pipe and other products or materials furnished, as specified in ANSI/AWWA C200 and herein.

      (1) **Mill Certificates.** Material lists and steel reinforcement schedules which describe all materials to be utilized. Metallurgical test reports for steel proposed for use on the project. Chemical and physical test reports from each heat of steel that indicate the steel conforms to the Contract Documents. Records shall indicate heat of steel for each pipe joint listed in the pipe laying schedule.

      (2) **List cross-referencing pipe mark numbers with pipe sequence numbers, heat numbers, and can numbers.**

      (3) **Results of production weld tests.**

      (4) **Sand, cement and mortar tests.**

      (5) **Rubber gasket tests and gaskets certification by pipe manufacturer, including a written statement from the gasket material manufacturer, certifying that the gasket materials are compatible with the joints specified and are recommended for the specified field test pressure and service conditions.**

      (6) **All materials in contact with treated or potable water are ANSI/NSF 61 approved.**

      (7) **Certification of the proof-of-design tests for rubber gasketed bell and spigot joints (stab joints), or field experience documentation, as specified.** (9) **Pipe temperature complies with Contract Documents prior to placing backfill material and prior to and during welding.**

      (8) **All welds were performed in conformance with these Contract Documents.**

      (9) **Affidavit of compliance for each ANSI/AWWA standard covering materials and work furnished for the project.**
(10) Certification of pipe manufacturer’s minimum experience requirements. Certification to be submitted prior to award of contract if required in the bidding documents or requested by Engineer.

b. Shop Drawings: The Contractor shall submit Shop Drawings of piping in accordance with the requirements of ANSI/AWWA C200 and the following supplemental requirements:

(1) Certified dimensional drawings of all pipe, fittings, specials, and appurtenances. The ASTM designation for the material from which each class of pipe is fabricated.

(2) Production schedule for manufacturing/fabricating pipe for the work as part of Contractor’s Progress Schedule. Steel pipe production schedule shall be included in all versions of the Contractor’s Progress Schedule beginning with the first Progress Scheduled submittal.

(3) Joint and pipe wall construction details which indicate the type and thickness of cylinder; the position, type, size and area of wire or other reinforcement; coatings and linings including holdbacks; manufacturing tolerances; maximum angular joint deflection limitations; and all other pertinent information required for the manufacture and installation of the product. Joint details and design criteria shall be submitted for all welded joint types, including beveled ends for alignment conformance and any deep butt strap joints required for control of temperature stresses.

(4) Pipe design criteria sufficient to ascertain conformance of pipe and fittings with the Contract Documents. Pipe design criteria shall include, but shall not be limited to, minimum pipe diameter, minimum pipe wall thickness, pressures, external loads, yield strength, allowable fiber stress, longitudinal stress for restraint, temperature changes, lining and coating materials, and other factors used for pipe design.

(5) Table(s) showing E’, K, soil weight, deflection lag factor, external loads, and percent deflection from minimum to maximum cover depth shown in the Steel Pipe Schedule in one foot increments covering each size and class of pipe. Two tables shall be submitted for each size and class of pipe, one with live load and the design deflection lag factor specified herein and one without live load and a deflection lag factor of 1.0.

(6) Ground Elevation and Utility Locations:

(a) Prior to preparation of the pipe laying schedule, Contractor shall verify the existing ground elevations and the location and depth of all underground utilities using centerline stakes set by
the Contractor at no more than 100 feet intervals. Contractor shall carefully locate and excavate utility, survey, document and submit this information to the Engineer.

(b) Engineer will review this information and if necessary make adjustment to the pipeline profile. Any Drawings that are modified by the Engineer shall be reissued to the Contractor.

(7) Pipe Laying Schedule Information:

(a) Pipe laying schedule and marking diagrams compatible with the requirements of AWWA Manual 11 (M11) which indicate the specific number of each pipe, fitting, and special and the location and direction of each pipe fitting, and special in the completed pipeline. In addition, the pipe laying schedule shall include: the station and centerline or invert elevation coordinated with the Drawings to which the bell end of each pipe will be laid; all elements of curves and bends, both in horizontal and vertical alignment; and the limits within each reach of restrained and/or welded joints or of concrete encasement. The location of all mitered pipe sections, beveled ends for alignment conformance, and any deep butt strap joints for temperature stress control shall be clearly indicated on the diagrams.

The pipe laying schedule shall have a sequence of laying and an explanation of all abbreviations used in the schedule. For long, straight pipe runs, the pipe laying schedule shall list the pipeline station and either the pipe centerline or invert elevation coordinated with the Drawings at least every 100 feet.

(b) Details and locations of closures and cutoffs for length adjustment, temporary access manholes, vents and weld lead pass holes as specified or indicated on the Drawings, and as required for construction convenience.

(c) The method that the Contractor proposes to use for measuring deflection of pipe joints.

(d) Annotated laying schedule showing all changes made during the progress of the Work.

(8) Welding Information: Submit the following prior to performing any welding work:

(a) Full and complete information regarding location, type, size and extent of all welds with reference called out for Welding Procedure Specifications (WPS) numbers shall be shown on the Shop Drawings. The Shop Drawings shall distinguish between shop and field welds. Shop Drawings shall indicate
welding symbols for the details of the welded joints, and the preparation of parent metal required to make them. Joints or groups of joints in which welding sequence or technique are especially important shall be carefully controlled to minimize shrinkage stresses and distortion.

(b) Written welding procedures for shop and field welds (including Welding Procedure Specifications (WPS's) and Procedure Qualification Records (PQR's). All WPS used to fabricate and install pipe shall be qualified by testing in accordance with ANSI/AWWA C200 and ANSI/AWWA C206 as applicable.

(c) Written nondestructive testing (NDT) procedure specifications and NDT personnel qualifications.

(d) Current welder performance qualifications (WPQ'S) shall be submitted for each welder prior to performing any work either in the shop or field. Qualification testing shall be in accordance with ASME Section IX or AWS B2.1 and as defined in Section 4 of ANSI/AWWA C206 or ANSI/AWWA C200, as applicable.

(e) Credentials of the Contractor's certified welding inspectors (CWI's) and quality control specialists for review prior to starting any welding in the shop or field. The credentials shall include, but not be limited to, American Welding Society QC-1 Certification. Other NDT quality control personnel shall be certified as required by AWS D1.1 and in accordance with written practice ASNT SNT-TC-1A.

(f) All NDT data for each shop-welded and field-welded joint. This data shall include all testing on each weld joint, including re-examination of repaired welds, using visual, radiographic, magnetic particle, dye penetrant examination, ultrasonic or air test examination methods specified. Test data shall be reviewed and signed by the welding inspector(s).

(g) Welder logs for field and shop welding. Logs shall list all welders to be used for the work, the welding process, position, welder stamp number, certification date and certification status for each welder.

(h) A welding map showing the sequence of welds for all field welds.

(i) A written weld repair procedure for each type of shop and field weld proposed for use on the project.

(j) A written rod control procedure for shop and field operations demonstrating how the Contractor intends to maintain rods in good condition throughout the work. The rod control
procedure shall also demonstrate how the Contractor intends to ensure that the proper rods are used for each weld.

(9) Control of Temperature Stresses for Welded Joints:

(a) Plan and installation instructions to avoid the accumulation of expansion and contraction to minimize temperature stresses in the pipe wall during installation and when the pipeline is in service. The plan and installation instructions shall include the sequencing of events during and after installation, including backfilling and welding, use of a lengthened bell, and other methods to control temperature stresses in the pipeline.

(b) Plan for monitoring pipeline temperatures.

(10) Detail drawings indicating the type, number and other pertinent details of slings, strutting, and other methods proposed for pipe support and handling during manufacturing, transport, and installation. The recommended methods of handling and placement of the pipe shall be submitted as a record copy prior to transporting any pipe to the Site. All pipe handling equipment and methods shall be acceptable to the Engineer.

(11) For record copy, detailed drawings indicating loading and shipping procedures that are designed to minimize damage to coating.

(12) Pipe manufacturer's written Quality Assurance/Control Program.

(13) Field Service.

(a) Certification of pipe manufacturer's field services, including a copy of the initial services, and all subsequent inspection reports.

(b) Field service representative resume.


1-4.02. Pre-Submittal Meeting. Prior to the initial pipe submittal, a pre-submittal meeting shall be held at a mutually agreed time and place. The meeting shall be attended by:

Representatives of Owner.
Contractor and Contractor's superintendent.
Contractor’s pipe manufacturer’s design engineer.
Representatives of Engineer.
Contractor shall bring to the meeting a preliminary schedule for the following:
Field verification report and findings.
Pipe installation sequencing.
Pipe fabrication and delivery.
Pipe shop drawing and data submittals as set forth in the Submittals Procedures section.

The purpose of the meeting is to review the preliminary schedules and submittal data requirements, to discuss the fabrication and delivery schedules, to review development of the pipe manufacturer’s pipe laying schedule, to establish the timing and coordination if the Owner performs inspection at the fabrication facilities, and to establish procedure and coordinate efforts associated with the pipe submittals.

1-5. SPARE MATERIALS. Not used.

1-6. SHIPPING, HANDLING, AND STORAGE. Shipping shall be in accordance with the Shipping section. Handling and storage shall be in accordance with the Delivery, Handling and Storage section, and as specified herein.

Pipe, fittings, and accessories shall be handled and stored as recommended by the pipe manufacturer and shall be handled in a manner that will ensure installation in sound, undamaged condition. Equipment, tools, and methods used in handling and installing pipe and fittings shall not damage the pipe and fittings. Forks and other lifting devices shall have broad, well-padded contact surfaces.

Contractor-furnished pipe and fittings in which the lining has been damaged shall be replaced by and at the expense of Contractor. With the concurrence of Engineer, small and readily accessible damaged areas may be repaired as recommended by the pipe manufacturer.

For pipes shipped factory lined and coated, Contractor shall repair any damage to pipe coatings and linings before the pipe is installed.

1-6.01. Stulling. Adequate stulling shall be designed and provided by the pipe manufacturer on all specials, fittings, and straight pipe so as to avoid damage to the pipe during handling, storage, hauling, and installation. The stulling shall be tight fitting to prevent pipe deflection and to maintain roundness of +/- 1.0 percent. Stulling shall not damage the lining. The stulling shall be placed as soon as practicable after the pipe lining is applied and shall remain in place while the pipe is loaded, transported, unloaded, and installed at the site.
PART 2 - PRODUCTS

2-1. BASIS OF DESIGN. Steel pipe, fittings, and specials shall be fabricated type for pipe 14 inches and larger, and may be either fabricated or mill type for pipe 12 inches and smaller. All items shall be the sizes, dimensions, and shapes indicated on the Drawings or specified herein.

The specified size of fabricated pipe, fittings, and specials shall be the nominal inside diameter, in inches, where 12 inches and smaller, and the actual inside diameter of pipe lining, where 14 inches and larger. Where stab joint pipe is permitted and two or more wall thicknesses are required for pipe of the same size, pipe size may be adjusted slightly to allow the different classes of pipe to be stabbed together.

The specified size of mill pipe, fittings, and specials shall be the nominal pipe size as set forth in ANSI/ASME B36.10.

Pipe ellipticity (out-of-roundness) shall not exceed one percent.

Steel cylinder thickness for pipe is shown in the Pipeline Schedule. The thickness shown in the Pipeline Schedule is the minimum wall thickness for the steel cylinder; thickness may be increased by the Contractor. Pipe wall thickness shown in Pipeline Schedule is based on a working stress of 16,500 psi in the steel cylinder. Pipe furnished with the indicated steel cylinder thickness shall have a minimum design stress of 16,500 psi.

In addition to the pipe markings required by ANSI/AWWA C200, each pipe section, fitting, and special shall be clearly marked to indicate the service, the wall thickness, and the minimum yield strength of the pipe material.
2-1.01. **Pipe Wall Thickness.** Pipe shall be designed for all conditions indicated in the Pipeline Schedule and on the drawings.

The wall thickness for internal pressure due to hoop stress shall be determined by the following formula.

\[ t = \frac{(PD)}{(2s)} \]

where

- \( t \) = the pipe wall thickness in inches.
- \( s \) = the allowable fiber stress in psi, shall not exceed 50 percent of the minimum yield strength of the steel plate at working pressure or 75 percent of the minimum yield strength at the larger of field test pressure or working pressure plus surge pressure. The yield strength used in the calculation for cement mortar coated pipe shall not exceed 36,000 psi. The yield strength used in the calculation for cement mortar lined pipe shall not exceed 45,000 psi.
- \( P \) = the pipe working pressure or the larger of field test pressure or working pressure plus surge pressure in psi. Maximum yield strength shall be limited to 42,000 psi.
- \( D \) = the pipe outside diameter, in inches, of straight pipe sections or the larger outside diameter of tapered sections.

Unless otherwise indicated, the working pressure and the working pressure plus surge pressure shall be as indicated in the Pipeline Schedule.

The pipe wall thickness shall be in accordance with ANSI/AWWA M11, except that all pipe shall have a wall thickness of at least 1/4 inch and a diameter to wall thickness ratio not to exceed 200 unless otherwise indicated in the Pipeline Schedule.

Pipe wall thickness shall be constant for the entire length of pipe for each pipe class, location, or service indicated in the Pipeline Schedule unless otherwise indicated on the drawings or specified.

The pipe shall be designed to withstand full internal vacuum (0 psia) under the buried conditions and for external loading under the flood conditions at ground surface or as otherwise indicated on the Drawings, when empty.

2-1.02. **Fitting Dimensions.** The dimensions of steel pipe fittings shall be as indicated on Figures 1-15062(A) and 1-15062(B) at the end of this section and shall be designed by the pipe manufacturer. Any fittings used for buried vertical bends and buried eccentric reducers shall be restrained.
2-1.03. Reinforcement of Fittings and Specials. Whether or not shown on the drawings, all bends, fittings, branch connections, reducers, and special sections shall be reinforced, or the pipe wall thickness shall be increased, so that the combined stresses due to internal pressure (circumferential and longitudinal) and bending will not exceed the allowable stresses specified in the Pipe Wall Thickness paragraph. Where external piping reinforcement interferes with other construction the pipe wall thickness shall be increased and external reinforcement eliminated as necessary for acceptable clearances.

Where suspended, the design of reinforcement or wall thickness shall also take into consideration the weight of the piping and appurtenances full of water. Where buried, the design of reinforcement or wall thickness shall also take into consideration the external load.

Wall thicknesses of reducing sections shall be not less than the required thicknesses for the larger ends.

2-1.04. Joints. Acceptable joints of the type indicated on the Drawings and as specified herein shall be provided for all pipe installations in the locations indicated or accepted by Engineer. To facilitate installation, additional field-welded or mechanically coupled joints may be provided, but shall be kept to a minimum, and their locations shall be acceptable to Engineer. Field-welded joints shall not be used in pipe smaller than 30 inches, except in locations where the interior coating can be satisfactorily repaired and inspected.

Buried pipelines shall have either stab (rubber-gasketed bell and spigot) or lap-welded joints unless otherwise specified or indicated on the drawings. Restrained joints shall be lap-welded unless otherwise specified or indicated on the drawings.

Each joint, including restrained joints, shall be checked by Contractor as recommended by the pipe manufacturer to verify that the joint and the restraints are installed properly. The pipe manufacturer shall furnish a metal gauge or other tools as required to measure joints.

2-2. MATERIALS.

Pipe, Fittings, and Specials ANSI/AWWA C200. All steel shall be fully killed, with a maximum carbon content of 0.25 percent, made to a fine austenitic grain size practice, and manufactured from continuous cast steel.
Flanged Joints

Flanges

ANSI/AWWA C207, slip-on, except where otherwise specified or indicated on the drawings.

Dimensions and Drilling

Blind Flanges

ANSI/AWWA C207, as indicated on the drawings.

Gaskets – All Joint Types

Synthetic rubber unless otherwise specified; natural rubber will not be acceptable. All gaskets shall be furnished by the pipe manufacturer, unless another manufacturer’s product is specified. Pipe manufacturer shall submit certificates of gasket suitability, certifying that the gasket materials are compatible with the joints specified and are recommended for the specified field test pressure and service conditions. Gaskets for treated or potable water service shall also be certified for chlorinated and chloraminated potable water.

Gas and oil-resistant gaskets shall be made of Nitrile (NBR [Acrylonitrile Butadiene]) rubber unless a different gasket material is recommended by the pipe manufacturer and accepted by the Engineer. The name of the material shall be permanently marked or molded on the gasket. Gaskets shall also be certified as suitable where soils may be contaminated with gas and oil products.

Joint Lubricant

Vegetable-based lubricant recommended by the pipe manufacturer. Petroleum or animal-based lubricants will not be acceptable. Lubricants that will be in contact with treated or potable water shall be certified as being in compliance with ANSI/NSF 61.
### Joint Diapers

**Diapers**
Non-woven polypropylene fabric, lined with polyethylene foam, minimum weight 3 oz. per square yard. “Typar” as recommended by pipe manufacturer for the joint furnished.

**Liner**
100 percent closed cell polyethylene foam, 1.9 to 2.1 pounds per cubic foot density, Dow Chemical Company “Ethafoam 221”, minimum thickness of ¼ inch and full width of diaper.

**Steel Straps**
Class 1, Type 1, hot-rolled or heat treated cold rolled, Fed Spec QQ-S-781H, 0.020” thick, waxed or painted and waxed.

**Seal Clips**
Push or overlap type, providing single notch-joint on ½ inch or 5/8 inch wide seals; double notch joint on on ¾ inch wide seals.

### Flanged Joints

**Flanges**
ANSI/AWWA C207, slip-on, except where otherwise specified or indicated on the Drawings.

**Dimensions and Drilling**
ANSI/AWWA C207, Class [D] [E] [F] except as otherwise indicated on the Drawings or specified.

**Blind Flanges**
ANSI/AWWA C207, Class [D] [E] [F] except as otherwise indicated on the Drawings or specified.

**Gaskets**
ANSI/AWWA C207. Pipe manufacturer shall submit certification of gaskets furnished as indicated above under Gaskets – All Joint Types.

### Insulated Flanges

**Flanges**
As specified herein, except bolt holes shall be enlarged as needed to accept bolt insulating sleeves.

**Insulation Kits**
As manufactured by Advanced Products or Pipeline Seal and Insulator, Inc.
<table>
<thead>
<tr>
<th>Insulating Gaskets</th>
<th>Type E, G10, 1/8 inch thick, with EPDM sealing element unless otherwise required by pipe manufacturer and acceptable by Engineer. Pipe manufacturer shall submit certification of gaskets furnished as indicated above under Gaskets – All Joint Types.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt Insulating Sleeves</td>
<td>G-10, 1/32 inch thick.</td>
</tr>
<tr>
<td>Insulating Washers</td>
<td>G-10, 1/8 inch thick, two for each flange bolt.</td>
</tr>
<tr>
<td>Backing Washers</td>
<td>Steel, 1/8 inch thick, two for each flange bolt.</td>
</tr>
<tr>
<td>Flange Bolting Material</td>
<td>ANSI/AWWA C207, unless otherwise required by the pipe manufacturer including higher strength and accepted by the Engineer.</td>
</tr>
<tr>
<td>Type</td>
<td>Bolt and nut; bolt-stud and two nuts permitted for 1 inch and larger.</td>
</tr>
<tr>
<td>Bolts and Bolt-Studs Length</td>
<td>As required for ends to project 1/4 to 1 inch beyond outer face of nut.</td>
</tr>
<tr>
<td>Ends</td>
<td>Chamfered or rounded.</td>
</tr>
<tr>
<td>Threading</td>
<td>ANSI/ASME B1.1, coarse thread series, Class 2A fit. Bolt-studs may be threaded full length.</td>
</tr>
<tr>
<td>Bolt Head Dimensions</td>
<td>ANSI/ASME B18.2.1; regular pattern for square, heavy pattern for hexagonal.</td>
</tr>
<tr>
<td>Nuts</td>
<td>Hexagonal.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>ANSI/ASME B18.2.2, heavy, semi-finished pattern.</td>
</tr>
<tr>
<td>Threading</td>
<td>ANSI/ASME B1.1, coarse thread series, Class 2B fit.</td>
</tr>
<tr>
<td>Stab Joints</td>
<td>Bell-and-spigot, with rubber gasket as sole element depended upon for water tightness.</td>
</tr>
</tbody>
</table>
Bells and Spigots  Rolled groove, Carnegie shape, or fabricated type, as permitted.

Rubber Gaskets  Continuous O-ring; ANSI/AWWA C200, Section 4.13, except basic polymer shall be synthetic rubber. Natural rubber will not be acceptable. Pipe manufacturer shall submit certification of gaskets furnished as indicated above under Gaskets – All Joint Types.

Restrained Joints

Welded  ANSI/AWWA C200 and C206.
Lugs or Collars  ASTM A283, Grade B or C; or ASTM A36.
Tie Bolts  ASTM A193, Grade B7.
Threading  ANSI/ASME B1.1, Class 2A fit, coarse thread series for 7/8 inch and smaller, and 8-thread series for 1 inch and larger.
Ends  Chamfered or rounded.
Nuts  Hexagonal, ASTM A194, Grade 2H or better.
Threading  As specified for tie bolts, except Class 2B fit.
Dimensions  ANSI/ASME B18.2.2, heavy semifinished pattern.

Flat Washers  Hardened steel, ASTM A325.

Small Branch Connections

Pipe Nipples  Seamless black steel pipe, ASTM A53, standard weight (Schedule 40).

Welding Fittings

Threaded Outlets  Bonney Forge "Thredolets" or Flowserv/Vogt "Weld Couplets".
Welded Outlets  Bonney Forge "Weldolets" or Flowserv/Vogt "Weld Couplets".

Coatings and Linings  All materials in contact with treated or potable water shall be certified as being in compliance with ANSI/NSF 61.
Tape Coating | ANSI/AWWA C209 and C214 or C216, with ultraviolet light stabilizers, manufactured by PolyKen. see separate Polyethylene Tape Coating specification section.
---|---
Cement Mortar | ANSI/AWWA C205 and C602.
Cement | ASTM C150, Type II.
Sand | ANSI/AWWA C205, Section 4.2.3, except sand for field-applied lining shall pass a No. 16 sieve.
Epoxy Bonding Agent | ASTM C881, Type II, moisture insensitive and suitable for service conditions.
Latex Admixture | Euclid "Flex-Con" or Sika "SikaLatex".
Universal Primer | Pipe manufacturer's standard.
Medium Consistency Coal Tar | Carboline "Bitumastic 50" or Tnemec "46-465 H.B. Tnemecol".
Watertight/Dusttight Pipe Sleeves | "PSI Thunderline/Link-Seal", insulating type with modular rubber sealing elements, nonmetallic pressure plates, and stainless steel bolts and nuts.
Anchor Bolts | ASTM A307.
Joint Grout and Diapers | ANSI/AWWA C205.
Corrosion Protection | ANSI/AWWA C216, cross-linked polyethylene sheeting precoated with adhesive; minimum 80 mils; type and recovery as recommended by Shrink Sleeve manufacturer; Canusa-CPS or Berry Plastics Water Wrap.
Underlying Sleeve | Heavy cross-linked polyethylene backing; Canusa-CPS I2/PE Backing.
Wax Tape and Primer | ANSI/AWWA C217. Cold-applied petroleum wax primer and cold-applied petroleum wax tape; Trenton Wax-Tape and Primer.
Medium Consistency Coal Tar | Carboline "Bitumastic 50" or Tnemec "46-465 H.B. Tnemecol".
2-3. **ENDS OF SECTIONS.**

2-3.01. **For Field Welding.** Ends of pipe, fittings, and specials for joints butt-welded in the field shall have the ends beveled for butt welding in accordance with the governing standards.

Ends of pipe, fittings, and specials for field-welded lap joints shall have both the bell and the spigot expanded by pressing, if necessary, (not rolling) to obtain the required shape and welding tolerances.

2-3.02. **For Fitting with Flanges.** Ends to be fitted with slip-on flanges shall be prepared to accommodate the flanges in accordance with the governing standards.

2-3.03. **For Stab Joints.** Stab joints shall be designed so that the gasket will maintain a watertight joint under all conditions of service, including expansion, contraction, and earth settlement. The gasket shall not support the entire weight of the pipe. Spigot ends shall have a groove to retain the gasket. Pipe ends shall be self-centering without the aid of the gasket.

2-3.04. **For Mechanical Couplings.** Not used.

2-3.05. **For Grooved Couplings.** Not used.

2-3.06. **For Flanged Coupling Adapters.** Not used.

2-3.07. **For Connection to Dissimilar Pipe Materials.** Steel pipe connections to buried or submerged concrete pipe or cast or ductile iron pipe shall be made with insulated flanges.

2-4. **SEAMS.** Except for seamless mill-type pipe, all piping shall be made from steel plates rolled into cylinders or sections thereof with the longitudinal seams butt-welded, or shall be spirally formed and butt-welded. There shall be not more than two longitudinal seams. Girth seams shall be butt-welded and shall be spaced not closer than 10 feet apart except in specials and fittings.

2-5. **PIPE LENGTHS.** Straight pipe section lengths shall be pipe manufacturer's standard lengths, unless otherwise indicated on the Drawings.

All pipe to be connected with mechanical couplings shall be fabricated so that the space between pipe ends within the couplings will not exceed the amount recommended by the coupling manufacturer, but shall be at least 1/2 inch.

2-6. **SMALL BRANCH CONNECTIONS.** Branch connections 2-1/2 inches and smaller shall be made with welding fittings with threaded outlets. Where the
exact outlet size desired is in doubt, but is known to be less than 1 inch, a 1 inch outlet shall be provided and reducing bushings used as needed.

Branch connections sized 3 through 12 inches shall be made with pipe nipples or with welding fittings with welded outlets. Pipe nipples and welding fittings shall be welded to the pipe shell and reinforced as needed to meet design and testing requirements.

Small branch connections shall be so located that they will not interfere with joints, supports, or other details, and shall be provided with caps or plugs to protect the threads during shipping and handling.

2-7. **ACCESS MANHOLES.** The type of access manholes shall be indicated on the Drawings.

An access manhole marker post shall be furnished and installed adjacent to each buried access manhole as indicated on the Drawings.

2-8. **DRAINS AND VENTS.** Pipe used for drain and vent piping shall be ASTM A53, standard weight, black steel pipe. Drain valves shall be hose valves. Vent valves shall be resilient seat globe valves. Drain and vent valves shall comply with the requirements of the valves section.

2-9. **FLANGED JOINTS.** Flange faces of flanged joints shall be normal to the pipe axis. Angular deflection (layback) of the flange faces shall not exceed the allowable set forth in ANSI/AWWA C207. All flanges shall be refaced after welding to the pipe, if necessary to prevent distortion of connecting valve bodies from excessive flange bolt tightening and to prevent leakage at the joint.

Pipe lengths and dimensions and drillings of flanges shall be coordinated with the lengths and flanges for valves, pumps, and other equipment to be installed in the piping. All mating flanges shall have the same diameter and drilling and shall be suitable for the pressures to which they will be subjected.

Flanges shall be of the slip-on type, except that welding-neck or slip-on flanges welded to short lengths of pipe shall be used where installation of flanges in the field is permitted or required.

For welding neck flanges, the pipe shall be concentrically reduced as necessary for proper alignment of the pipe wall with the welding neck flange for butt welding. The interior of the weld joint and flange shall be cement lined in the shop as specified in ANSI/AWWA C205.

2-10. **STAB JOINTS.** Rubber-gasketed bell-and-spigot (stab type) steel pipe shall be furnished where indicated or specified.
2-10.01. **Proof of Design.** Proof of Design will be required for each stab joint configuration of each diameter of pipe to be supplied. The tests do not have to be made on pipe joints manufactured specifically for this project. The manufacturer shall have qualified the joint by having performed the specified factory tests and shall submit certified reports covering the results of the tests. Certified reports covering tests on other pipe joints of the same size and design produced by the same manufacturer from materials of equivalent type and quality may be accepted as adequate proof of design. Any new proof-of-design testing to meet the requirements for this project shall be independently verified and the Owner shall be given the opportunity to witness the testing. As an alternative to the Proof of Design Testing, the Proof of Design Requirements can be met by the manufacturer meeting the field experience requirements as described herein.

Test results for a larger diameter joint may be used to allow the use of a smaller diameter joint, provided the two joints are identical in all other aspects.

The joint shall be tested at a pressure not less than 2 times the working pressure or 1-1/2 times the test pressure of the pipeline, whichever is greater. In addition to samples tested in the undeflected condition, at least one sample of each size and type shall be tested to the angle recommended as maximum by the manufacturer.

2-10.02. **Field Experience.** As an alternative to the Proof-of-Design testing for stab joints, field experience requirements shall be met for each joint configuration of each diameter of pipe to be supplied. The field experience shall reflect a working pressure, test pressure, and transient pressure not less than that of the pipeline(s) specified hereunder. Field experience requirements shall include:

a. Documentation of one or more pipelines with a combined service history of a minimum of ten years. No documented pipeline shall have less than five years of service. No documented pipeline shall have had a joint failure during the documented service period.

b. For each documented pipeline, the following information shall be submitted: Owner; pipeline identification; diameter; type of service; external load; internal working, test, and transient pressure; and Owner contact information. Dimensioned joint details including description of all joint and gasket materials, shall also be submitted.

c. The manufacturer shall furnish an affidavit of compliance stating that the field experience requirements have been met as described herein, and the manufacturer shall include documentation verifying the field experience requirements outlined in Items a and b above.

2-11. **MECHANICAL COUPLINGS.** Not used.
2-12. **GROOVED COUPLINGS.** Not used.

2-13. **FLANGED COUPLING ADAPTERS.** Not used.

2-14. **DISMANTLING JOINTS.** Not used.

2-15. **RESTRAINED JOINTS.** Restrained joints shall be flanged, welded, flanged coupling adapters with anchor studs, split ring fixed type couplings, rigid groove couplings, or harnessed, as specified or as indicated on the Drawings.

Where indicated on the Drawings, mechanically coupled or stab type joints shall be restrained with harness bolts and lugs or collars. Joint harnesses shall conform to the details indicated on the Drawings. Lugs or collars shall be shop welded to the pipe and coated as specified for the adjacent pipe.

Split ring style couplings used for restraint shall be shoulder style. Grooved couplings used for restraint shall be rigid type.

Any fittings used for buried vertical bends and eccentric reducers shall be restrained.

2-16. **PROTECTIVE COATINGS AND LININGS.** All steel pipe, fittings, specials, wall fittings, and accessories shall be lined, coated, or wrapped as specified herein.

2-16.01. **Type of Coating and Lining for Pipe Installed on OCSD and SCE Property.** Surface preparation shall be in accordance with the coating or lining manufacturer's instructions. Types of protective coating and lining shall be as follows for pipe installed on OCSD property:

<table>
<thead>
<tr>
<th>Exterior Surfaces in Contact with</th>
<th>Lined and Coated Polyurethane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potable Water or Submerged in Water</td>
<td>System 114.</td>
</tr>
<tr>
<td>Treatment Process Waters</td>
<td></td>
</tr>
</tbody>
</table>

All steel pipe installed on OCSD property shall be lined and coated with a Polyurethane System 114 unless noted otherwise on design drawings.

System 114 - Polyurethane, Steel:

100% solids, two-component elastomeric urethane coating material shall protect the steel from damage when exposed to the following chemicals in wastewater: H2SO4, 20% conc; NAOH, 5% conc; NH4OH, 5% conc; HNO3, 1% conc; Detergent (linear alkyl benzyl sulfonate or LAS), 0.1% conc; Bacteriological, and BOD not less than 700 ppm. The elastomeric urethane shall withstand exposure to sunlight and atmospheric conditions.
1. Sancon epoxy primer and Sancon 100 topcoat as manufactured by Sancon Engineering, Endura-Flex EF-1988 or Polyclad 708 (primer not required) as manufactured by Global Eco Technologies, Inc, Tnemec Elasto Shield Series 406 or approved equal.

2. Total DFT = 60 to 80 mils for steel components in immersed service.

2-16.02. Modifications to the Governing Standards.

2-16.02.01. Coal Tar Enamel Coating. Except as modified or supplemented herein, all materials and their application shall be in accordance with ANSI/AWWA C203. The appendix to ANSI/AWWA C203 shall apply.

Exterior surfaces of all steel pipe, fittings, and specials which are to be installed underground or which are to be encased in concrete shall be blast cleaned, primed, and coated in the shop with hot-applied coal tar enamel followed by a single layer of outer wrap consisting of glass-fiber felt, polyethylene-kraft paper, or polyethylene-elastomer laminate. The outer wrap shall be coated with shop-applied whitewash or a single layer of kraft paper.

The application of coal tar enamel coating materials, including the preparation of surfaces; priming; and lining and coating of the pipe, fittings, and specials, shall be done in the shop by an established pipe lining and coating company acceptable to the manufacturer of the coal tar enamel materials and to Engineer. Exterior coating shall not be applied until after the specified interior cement mortar lining (if required) has been applied and cured. Repairs of any damage to the shop coating and the field coating of ends where coatings have been held back shall be done by experienced and qualified personnel.

The pipe lining and coating company shall submit an affidavit of compliance indicating that all instructions and requirements of the coating materials manufacturer will be followed and that the company is acceptable to the materials manufacturer.

2-16.02.02. Cement Mortar Lining. Cement mortar lining for all pipe shall be shop applied unless noted otherwise and as modified herein, shop-applied mortar linings shall comply with ANSI/AWWA C205.

Specials. Wire fabric reinforcement shall be used in the lining of fittings, transitions, and specials in accordance with ANSI/AWWA C205.

Adjacent to Valves. If the specified nominal pipe size is the actual outside diameter, cement mortar lining installed in steel pipe adjacent to butterfly valves shall be tapered so that the lining material will not interfere with the valve disc during valve operation.
2-16.02.03. **Tape Coating.** Except as modified or supplemented herein, tape coating shall be shop applied and comply with ANSI/AWWA C214 for straight pipe sections, and ANSI/AWWA C209 for fittings and specials. The tape coating system shall consist of a primer layer, an inner layer of tape for corrosion protection, and two outer layers of tape for mechanical protection. The total thickness of the tape coating system shall be at least 80 mils. The outer layer of tape shall be white with ultraviolet light stabilizers.

2-17. **MARKING.** In addition to the pipe markings required by ANSI/AWWA C200, each pipe section, fitting, and special shall be clearly marked to indicate the service, the wall thickness, and the minimum yield strength of the pipe material. Pipe piece identification shall be shown on both the inside and outside of each pipe section, fitting, and special.

2-18. **SHOP INSPECTION AND TESTING.** Except as otherwise indicated or acceptable to Engineer, all materials and work shall be inspected and tested by the pipe manufacturer in accordance with ANSI/AWWA C200. All costs in connection with such inspection and testing shall be borne by Contractor.

Copies of all test reports shall be submitted in accordance with the Submittals Procedures section.

Owner reserves the right to sample and test any pipe after delivery and to reject all pipe represented by any sample which fails to comply with the specified requirements.

Steel greater than or equal to 1/4 inch thickness used in production manufacturing of pipe and specials shall be tested for notch toughness using Charpy V-Notch tests in accordance with ASTM A370 – Test Methods and Definitions for Mechanical Testing of Steel Products. The test acceptance for full size specimens (0.394 in. by 0.394 in. size) shall be 25 foot-pounds at a test temperature of 32 degrees F; tests shall include three impact specimens and shall be conducted in the direction transverse to the final direction of rolling. When full-size specimens are not obtainable, the minimum required Charpy value is permitted to be reduced by multiplying the ratio of the (actual width along the notch / 0.394 in.) x 25 ft-lbs. For sub size specimens the test temperature shall be reduced as follows: Width along the notch > 0.296 in. (no reduction required); 0.295 in. (3/4 size bar): 5 degrees F reduction; 0.236 in.: 15 degrees F reduction. Straight line interpolation for intermediate values shall be used. Tests shall be conducted in accordance with ASTM A20 for two coils of each heat. Only welding consumables that are classified by the applicable AWS filler metal standard (e.g. A5.1, A5.17, A5.18, A5.20) with Charpy impact test requirements at a temperature 32 degrees F or lower are permitted.
2-18.01. **Owner’s Inspection at the Shop.** If Owner elects to inspect any work or materials, as permitted under Section 5.1 of ANSI/AWWA C200, all costs in connection with the services of Owner’s inspector will be paid for by Owner.

A fabrication schedule shall be submitted to Owner at least 30 days prior to fabrication activities. Each time the schedule is changed, the Contractor shall revise and resubmit the schedule. The Contractor shall notify the Engineer at least 5 days prior to any change in the revised and current schedule. If the Owner's representatives make an inspection and the manufacturer is not performing the work as indicated in the revised and current schedule for that date, the expense shall be the sole responsibility of the Contractor.

Additional weld test specimens shall be furnished to Owner's inspector for testing by an independent testing laboratory whenever, in the judgment of Owner's inspector, a satisfactory weld is not being made. Test specimens shall also be furnished when Owner's inspector desires. The entire cost of obtaining, inspecting, and testing of such additional specimen plates, welds, or materials will be borne by Owner. If any specimen is found not to conform to the specified requirements, the materials represented by the specimen will be rejected. The expense of all subsequent tests due to failure of original specimens to comply with the specifications shall be the responsibility of Contractor.

In addition to making or witnessing specified tests and submitting any required reports to Engineer and Owner, Owner's inspector will submit written reports to Contractor concerning all materials rejected, noting the reason for each rejection.

Inspection by Owner's inspector, or Owner's option not to provide inspections, shall not relieve Contractor of his responsibility to provide materials and to perform the work in accordance with the Contract Documents.

The Owner reserves the right to sample and test any pipe after delivery and to reject all pipe represented by any sample which fails to meet with the specified requirements.

2-18.02. **Welding Procedures, Welder Qualifications, and Testing.** All welding procedures, welders, welding operators, and tackers shall be qualified in accordance with ASME Section IX, AWS D1.1, or AWS B2.1 as defined in ANSI/AWWA C200. All qualifications shall be in accordance with the position in which the welding is to be accomplished.

All shop welds shall be visually inspected by a Certified Welding Inspector (CWI). All shop welds shall be visually inspected in accordance with the requirements of AWS D1.1, Table 6.1, Visual Inspection Acceptance Criteria table for statically loaded nontubular connections. All shop butt welds on steel pipe and fittings, except cylinders that are hydrostatically tested, shall be ultrasonically or radiographically tested by qualified and certified personnel. Shop ultrasonic weld
tests and evaluation shall be in accordance with Section 9 of API 5L or ASME Section VIII, Division 1, Part UW-53. Radiographic weld tests and evaluation shall be in accordance with ASME Section VIII, Division I, Part UW-51. All other shop welds shall be either liquid penetrant examined in accordance with ASTM E 165, or magnetic particle examined in accordance with ASTM E 709. Acceptance criteria shall be in accordance with ASME Code, Section VIII, Division I, Appendix 6 for magnetic particle examination and Appendix 8 for liquid penetrant examination.

Personnel performing visual inspection of welds shall be qualified and currently certified as Certified Welding Inspectors (CWI) in accordance with AWS QC1, Standard for Qualification and Certification of Welding Inspectors. Personnel performing ultrasonic and radiographic tests shall be qualified and certified in accordance with written practice ASNT SNT-TC-1A.

Nondestructive examination procedures shall be submitted in accordance with the Submittals Procedures section at the time welding procedures are submitted. Records of inspection, nondestructive examination, and material certification shall be submitted to Engineer.

The welder and welding operator qualification records shall be available at the shop facility or Site and shall be made available for review when requested.

All costs for inspection and testing of shop welds shall be paid by Contractor.

2-19. STEEL LINING. Steel liner sections shall be manufactured in conformance to and as specified herein and design drawings requirements. Place grout holes in the steel liner section as shown on the contract drawings.

Steel grout rings shall be manufactured and coordinated to allow contractor to evenly and equally grout steel pipe segments accordingly.

PART 3 - EXECUTION

3-1. INSPECTION. Pipe and fittings shall be carefully examined for cracks and other defects immediately before installation. Pipe ends shall be examined with particular care. All defective pipe and fittings shall be removed from the Site.

All shop-applied exterior tape or other dielectric coatings on pipe, fittings, or specials shall be electrically inspected for holidays and other defects, and repaired if necessary. All electrical inspection shall be made in accordance with the standard to which the coating was applied.
Inspection and repair of linings and coatings shall be performed by and at the expense of Contractor, after receipt of the pipe, fittings, or specials on the Site and before installation. Electrical inspection of exterior tape or other dielectric coatings after installation of the pipe, fitting, or special in the trench shall be made where, in the opinion of Engineer, the coating may have been damaged by handling during installation.

3-1.01. **Confined Space Entry Supervision.** Contractor shall provide above ground confined space entry supervision whenever Engineer is required to enter the pipe to verify Contractor’s deflection measurements, inspect joints, or any other time the Engineer is required to enter the pipe.

3-2. **PROTECTION AND CLEANING.** The interior of all pipe and fittings shall be thoroughly cleaned of all foreign material prior to installation and shall be kept clean until the work has been accepted. Before jointing, all joint contact surfaces shall be wiped clean.

Precautions shall be taken to prevent foreign material from entering the pipe during installation and until the work has been accepted.

Whenever pipe laying is stopped, the open end of the pipe shall be closed to prevent entry of dirt, mud, rodents, and other material. All water in the trench shall be removed prior to removing the closure.

3-3. **ALIGNMENT AND GRADE.** Buried pipe shall be laid to the lines and grades as specified and indicated on the Drawings. Pipelines or runs intended to be straight shall be laid straight. Curves in stab joint pipe may be formed by opening the joint. Maximum joint openings and deflections shall be as recommended by the pipe manufacturer. For welded lap joints, deflections up to 4-1/2 degrees may be made by shop-mitering the bell end of one pipe. For welded butt joints, deflections up to 22-1/2 degrees may be made by shop-mitering the ends of two adjacent sections of pipe by equal amounts. Deflections greater than 22-1/2 degrees shall be made by use of fabricated bends.

Where deflections would exceed the pipe manufacturer's recommendations, either shorter pipe sections or fittings shall be installed where needed to conform to the alignment or grade indicated on the Drawings and as acceptable to the Engineer.

High points which allow air to collect in pipelines will not be permitted unless an air release valve is indicated on the Drawings at that location.

Unless otherwise specified or acceptable to Engineer, laser beam equipment, surveying instruments, or other suitable means shall be used to maintain alignment and grade. At least one elevation reading shall be taken on each length of pipe. If laser beam equipment is used, periodic elevation
measurements shall be made with surveying instruments to verify accuracy of
grades. If such measurements indicate thermal deflection of the laser beam due
to differences between the ground temperature and the air temperature within the
pipe, precautions shall be taken to prevent or minimize further thermal
deflections.

Additional requirements for alignment and grade are covered in the Project
Requirements and Trenching and Backfilling sections and on the Drawings.

3-3.01. Tolerances. Each section of pipe shall be laid to the alignment and
grade indicated on the Drawings and pipe laying schedule with pipe ends within
the following tolerances;

± 0.10 foot in grade at any point
± 0.20 foot in alignment at any point

In addition, piping shall be visually straight or on a smooth curve between the
points of deflection or curvature indicated on the Drawings. Stricter tolerances
than specified above shall be used as necessary to maintain minimum cover, to
maintain required clearances, to place the carrier pipe inside a tunnel liner, to
make connections to existing pipe, to maintain the correct slope to avoid high or
low points along the pipeline other than at locations indicated on the Drawings, or
to meet other restrictions as required or directed by the Engineer.

3-3.02. Annotated Pipe Laying Schedule. The pipe laying schedule shall be
annotated during the progress of the Work to show all changes made during
construction for record documentation. Upon completion of the installation of the
piping, the annotated pipe laying schedule shall be submitted to Engineer in
accordance with the Submittals section.

3-4. INSTALLATION.

3-4.01. Buried Piping. Field installation of buried steel water piping shall be in
accordance with ANSI/AWWA C604 unless otherwise specified or indicated on
the Drawings.

For buried piping, all trenching, embedment, and backfilling shall conform to the
Earthwork section and the details indicated on the Drawings.

Pipe embedment and backfilling shall closely follow the installation and jointing of
steel pipe in the trench to prevent floatation of the pipe by water and minimize
longitudinal movement caused by thermal expansion or contraction of the pipe.
Pipe shall be protected from floatation during installation when subjected to
groundwater or flood conditions.
Each joint, including restrained joints, shall be checked by Contractor as recommended by the pipe manufacturer to verify that the joint and the restraints are installed properly.

3-4.02. Pipe Deflection. All buried pipe larger than 30 inches in diameter shall be tested for excessive deflection.

3-4.02.01. Test Section. Not used.

3-4.02.02. Deflection Measurements. Pipe deflection for all buried pipe shall be determined by measuring initial pipe vertical and horizontal inside diameters before the backfill load is supported by the pipe and a second vertical and horizontal inside diameters at least 24 hours after the backfill load is supported by the pipe. The second pipe deflection measurement shall be taken and the results determined before 1,000 feet of pipe is laid ahead of the initial measurement. Initial and second measurements shall be made for at least two locations on each piece of pipe and approximately equally spaced along the pipe. The points of initial deflection measurements shall be marked so that final deflection measurements are at the same points. The tolerance for deflection measurements shall be 1/8 inch. The percent deflection shall be the largest difference between the initial and second measurements at each point divided by the nominal pipe diameter. Pipe embedment and backfill not exceeding one foot above the top of pipe shall be in place during initial measurements. Struts that allow access may remain in place during initial measurements but shall be removed after initial measurements. Pipe deflection will be measured and documented by Contractor and verified by Engineer for each piece of pipe. Engineer shall be notified in advance of when deflection measurements are made. The deflection documentation shall be submitted daily unless otherwise acceptable to the Engineer.

3-4.02.03. Allowable Deflection. The allowable deflection shall be the calculated design percent of nominal diameter with a deflection lag factor of 1.0 and excluding live load, for the depth of the installed pipe to the nearest foot. Pipe exceeding the allowable deflection shall be uncovered and the embedment and backfill replaced as needed to prevent excessive deflection. After replacing embedment and backfill, the pipe shall be retested. Pipe damaged by over deflection or otherwise shall be satisfactorily repaired or removed and replaced with new pipe.

3-4.03. Flanged Joints. Flange faces shall be flat and perpendicular to the pipe centerline. The rust-preventive coating on the flange faces shall be soluble and shall be removed before the joint is made.

Care shall be taken in bolting flanged joints to avoid restraint on the opposite end of the pipe or fitting, which would prevent uniform gasket compression or would cause unnecessary stress in the flanges. The pipe or fitting shall be free to move
in any direction while the flange bolts are being tightened. Bolts shall be tightened gradually in a crisscross pattern at a uniform rate, to ensure uniform compression of the gasket around the entire flange. All flange joint bolting procedures shall be in accordance with the pipe manufacturer’s recommendations.

3-4.04. **Clippings.** Surfaces of pipe ends and couplings in contact with the sealing gasket shall be clean and free from foreign material when the coupling is installed on the pipe. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. All bolts shall be tightened by approximately the same amount, with all parts of the coupling square and symmetrical with the pipe. Following installation, the exterior coating of each coupling shall be touched up or re-primed.

Where restraint is required, Contractor shall verify that tie bolts have been stressed to assure the pipe will not creep when pressurized. When split ring, fixed type couplings are installed, piping shall be in a fully-extended position to engage the restraint rings at the pipe ends.

3-4.05. **Insulated Flanged Joints.** Insulated flanged joints shall be installed where indicated on the Drawings. In addition to one full-faced insulating gasket, each flange insulating assembly shall consist of one full-length sleeve, two insulating washers, and two backing washers for each flange bolt. The insulating gasket ID shall be 1/8 inch less than the ID of the flange in which it is installed. The insulated flanged joint accessories shall be installed in accordance with the instructions and recommendations of the insulating kit manufacturer.

3-4.06. **Stab Joints.** Gasket installation and other jointing procedures shall conform to the instructions and recommendations of the pipe manufacturer. All joint surfaces shall be lubricated with heavy vegetable soap solution immediately before making the joint. The lubricant shall be suitable for use in potable water, shall be stored in closed containers, and shall be kept clean. Measurements shall be taken at the joints after installation to ensure that the specified clearances have not been exceeded.

3-4.07. **Welded Joints.** All welds shall be sound and free from embedded scale or slag and shall be watertight. Butt welds shall have tensile strength across the weld not less than that of the thinner of the connected sections. Butt welds shall be used for all welded joints in pipe assemblies and in the fabrication of bends and other specials. Field-welded joints, where permitted, shall be either butt-welded or lap-welded Lap-welded joints shall have full fillet welds. Any weld that undercuts the parent metal shall be suitably weld repaired. Grinding to remove undercut that thins the parent metal is not an acceptable repair method.

Field welding of joints shall conform to ANSI/AWWA C206 and M11. Where acceptable to the Engineer, single field-welded butt joints with outside backing rings may be used for pipe larger than 30 inches in diameter. Backing rings will
not be permitted for 30 inch and smaller pipe. Butt straps shall be welded on both the inside and outside of the pipe and at each end of the pipe and strap to avoid stress multiplication.

Field-welded lap joints may have only a single fillet weld on the inside of the pipe joint, except where double-welded joints as detailed on the Drawings or specified. The interior joint may be welded after the exterior joint has been coated with a shrinkable wrapped sleeve or other specified coating and backfilled with at least 3 feet of backfill material. The field welding shall be performed so that the interior lining, the exterior coating, and the field applied joint coating are not damaged.

A field test, including excavation of a welded joint for inspections, shall be performed to verify that the interior lining, the exterior coating, and the field applied joint coating are not damaged by the interior welding at the start of the project. The field test shall be repeated if welding procedures are modified.

Provisions shall be made to minimize stresses in welded steel pipe to account for temperature changes and to avoid the accumulation of expansion and contraction during installation and after the pipe is in service as recommended by the pipe manufacturer and in accordance with ANSI/AWWA M11 and C604. The allowable temperature range of the pipe during welding shall be established by the pipe design and monitored during installation as recommended by the pipe manufacturer.

All field welds shall be visually inspected by a Certified Welding Inspector (CWI) qualified and currently certified in accordance with AWS QC1, Standard for Qualification and Certification of Welding Inspectors. All field welds shall be visually inspected in accordance with the acceptance criteria of AWS D1.1, Table 6.1, Visual Inspection Acceptance Criteria table for statically loaded nontubular connections (except as modified by AWWA C206, 4.6.8).

Welds that are subject to Penetrant Testing (PT) and/or Magnetic Particle Testing (MT) shall be performed in accordance with AWS D1.1, 6.10 including referenced acceptance criteria.

NDE personnel performing NDE other than visual shall be qualified and certified for the applicable NDE method. Personnel shall meet written practice ASNT SNT-TC-1A. NDE personnel qualification records shall be made available for review when requested.

The responsible supplier's welding inspector shall perform in-process visual inspections at suitable intervals during the fabrication and erection process to ensure the applicable requirements of the referenced code, design specification, and WPS are met. Such inspections, on a sampling basis, shall be performed prior to assembly, during assembly, and during welding.
3-4.07.01. **Standard Inspection and Testing.** Standard shop inspection and testing shall be in accordance with the shop inspection and testing provisions specified herein.

Field weld test specimens shall be furnished to Engineer for testing by an independent testing laboratory whenever, in the judgment of Engineer, a satisfactory weld is not being made. Test specimens shall also be furnished when Engineer desires. All costs for this testing will be paid by Owner.

3-4.08. **Couplings.** Surfaces of pipe ends and couplings in contact with the sealing gasket shall be clean and free from foreign material when the coupling is installed on the pipe. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. All bolts shall be tightened by approximately the same amount, with all parts of the coupling square and symmetrical with the pipe. Following installation, the exterior coating of each coupling shall be touched up or re-primed.

Where restraint is required, Contractor shall verify that tie bolts have been stressed to assure the pipe will not creep when pressurized. When split ring, fixed type couplings are installed, piping shall be in a fully-extended position to engage the restraint rings at the pipe ends.

3-4.09. **Flanged Coupling Adapters.** Not used.

3-4.10. **Dismantling Joints.** Not used.

3-4.11. **Mechanical Couplings.** Not used.

3-4.12. **Grooved-End Joints.** Not used.

3-5. **WALL SLEEVES AND WALL PIPES.** Not used.

3-6. **REDUCERS.** Reducers shall be eccentric or concentric as indicated on the Drawings. Reducers of eccentric pattern shall be installed with the straight side on top, so that no air traps are formed.

3-7. **ACCESS MANHOLES.** Access manholes shall be the type specified and installed at the locations indicated on the Drawings.

3-8. **PIPE ANCHORS, BLOCKING, CONCRETE ENCASEMENT, HANGERS, AND SUPPORTS.** Pipe anchors, blocking, hangers, and supports shall be installed where and as specified and indicated on Drawings and shall be fabricated in accordance with the Pipe Supports section and the details indicated on the Drawings, and shall be furnished and installed complete with all concrete bases, anchor bolts and nuts, plates, rods, and other accessories required for proper support of the piping. All piping shall be rigidly supported and anchored so
that there is no movement or visible sagging between supports. Where the
details must be modified to fit the piping and structures, all such modifications
shall be subject to acceptance by Engineer. Unless otherwise permitted, lugs for
lateral or longitudinal anchorage shall be shop welded to the pipe.

Concrete reaction anchorage, blocking, encasements, and supports shall be
installed as indicated on the Drawings or as permitted by Engineer. Concrete
and reinforcing steel for anchorages, blocking, encasements, and supports shall
conform to the Cast-in-Place Concrete section. All pipe to be encased shall be
suitably supported and blocked in proper position, and shall be anchored to
prevent floatation. A pipe joint shall be provided within 12 inches of each end of
the concrete encasement.

The concrete blocking size shall be of the dimensions indicated on the
Drawings, shall extend from the fitting to solid undisturbed earth, and shall be
installed so that all joints are accessible for repair. If adequate support against
undisturbed earth cannot be obtained, restrained joints shall be installed to
provide the necessary support. If the lack of suitable solid vertical excavation
face is due to improper trench excavation, restrained joints shall be furnished and
installed by and at the expense of Contractor.

Reaction blocking, anchorages, or other supports for fittings installed in fills or
other unstable ground, installed above grade, or exposed within structures, shall
be provided as indicated on the Drawings.

All ferrous metal clamps, rods, bolts, and other components of reaction
anchorages or joint harness, subject to submergence or in contact with earth or
other fill material and not encased in concrete, shall be protected from corrosion
as specified in the Corrosion Protection paragraph of this section.


3-9.01. Shop Holdbacks and Coatings and Linings and Field Repair. Entry into
the pipe or pipeline for application of interior linings to unlined ends shall be from
open ends or through access manholes, except as otherwise permitted by
Engineer. Pour holes will not be permitted., where allowed by the Engineer, shall
consist of 4-inch standard weight black steel pipe welded to the pipe to be lined
and covered with a bolted blind flange.

Holdbacks, coatings and linings for pipe ends at joints shall conform to the
following:
<table>
<thead>
<tr>
<th><strong>For Field-Welded Joints</strong></th>
<th><strong>Coal Tar Enamel</strong></th>
<th>Hold back coating and lining 4 inches from joint. Field repair in accordance with ANSI/AWWA C203.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cement Mortar</strong></td>
<td>Hold back coating and lining 4 to 6 inches from joint. Field repair in accordance with ANSI/AWWA C205 as modified herein.</td>
<td></td>
</tr>
<tr>
<td><strong>Tape Coating</strong></td>
<td>Hold back coating at least 4 to 6 inches from joint. Field repair in accordance with ANSI/AWWA C214 and ANSI/AWWA C604 using Heat Shrinkage Wrap ANSI/AWWA C216, 80 mils. Type I for pipe and fitting joints.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>For Flanged Joints</strong></th>
<th><strong>Coal Tar Enamel</strong></th>
<th>Hold back the coating on spigots and the lining in bells from joints in accordance with ANSI/AWWA C203. Field repair exterior coating with 20 mils of medium consistency coal tar. Repair lining in accordance with ANSI/AWWA C203.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cement Mortar</strong></td>
<td>Hold back the coating on spigots and the lining in bells from joints as submitted by the pipe manufacturer and accepted by Engineer. Field repair in accordance with ANSI/AWWA C205 as modified herein.</td>
<td></td>
</tr>
<tr>
<td><strong>Liquid Epoxy</strong></td>
<td>Epoxy shop coating shall extend to ends of pipe. Epoxy shop lining shall extend to ends of pipe. If cement-mortar or tape coating is used, epoxy shop lining shall be extended around the end of pipe to a point 4 inches past the sealing point of the rubber gasket.</td>
<td></td>
</tr>
</tbody>
</table>
Tape Coating

Hold back the coating on spigots as submitted by the pipe manufacturer and accepted by Engineer. Field repair in accordance with ANSI/AWWA C214 and ANSI/AWWA C604 using Heat Shrinkage Wrap ANSI/AWWA C216, 80 mils, Type I for pipe and fitting joints.

For Mechanically Coupled Joints

Coal Tar Enamel

Hold back coating 16 inches from joints; paint exposed surfaces with 2.5 mil dry film thickness of Type B primer in accordance with ANSI/AWWA C203. Lining shall extend to end of pipe.
Field coat exterior surfaces with 20 mil dry film thickness of ANSI/AWWA C210 Epoxy or Heat Shrinkage Wrap ANSI/AWWA C216. Repair of lining at joints not required.

Cement Mortar

Hold back coating 16 inches (or greater if required to clear harness lugs) from joints. Shop coat exposed surfaces with liquid epoxy to end of pipe in accordance with ANSI/AWWA C210 Epoxy. Lining shall extend to end of pipe. Field coat buried exterior surfaces as specified in the Corrosion Protection paragraph for mechanical couplings.

Liquid Epoxy

Epoxy shop coating shall extend to ends of pipe; epoxy shop lining shall extend to ends of pipe; in accordance with ANSI/AWWA C210. Field coat buried exterior surfaces as specified in the Corrosion Protection paragraph for mechanical couplings.

Tape Coating

Hold back coating 16 inches (or greater if required to clear harness lugs) from joints. Shop coat exposed surfaces with liquid epoxy to end of pipe in accordance with ANSI/AWWA C210 Epoxy. Field coat buried exterior surfaces as specified in the Corrosion Protection paragraph for mechanical couplings.
For Other Type of Joints and Exposed Buried Surfaces:

Other types of joints and exposed buried surfaces that cannot be shop coated with the primary coating and lining system shall be shop coated and lined with 20 mil dry film thickness of liquid epoxy in accordance with ANSI/AWWA C210 Epoxy.

3-9.02. Modifications to the Governing Standards.

3-9.02.01. Field Repair of Cement Mortar Lining. Field repair of interior joint surfaces shall be done in accordance with ANSI/AWWA C205, except that an epoxy bonding agent and latex admixture shall be used in conjunction with the sand and cement mortar. The addition of lime or pozzolan will not be permitted.

The exposed steel shall be thoroughly cleaned and all grease shall be removed. A coat of epoxy bonding agent shall be applied over the area to be lined in accordance with the coating manufacturer's recommendations. A soupy mixture of cement and water shall be applied over the epoxy after it becomes tacky. Cement mortar to which the latex admixture has been added shall then be packed into the area to be patched and screeded off level with the adjacent cement mortar lining. The patched area shall be given an initial floating with a wood float, followed by a steel trowel finish.

Defective or damaged cement mortar linings shall be removed, the surfaces cleaned, and the lining repaired as specified above for joint repair. Wire fabric reinforcement shall be used in the lining of fittings and specials in conformance with ANSI/AWWA C205.

3-9.02.02. Field-Applied Cement Mortar Lining. Except as modified herein, field-applied mortar linings shall comply with ANSI/AWWA C602.

Specials. Wire fabric reinforcement shall be used in the lining of fittings and specials in conformance with Section 4.4.5 of ANSI/AWWA C205.

Field Repair. Defective or damaged field-applied cement mortar linings shall be removed, the surfaces cleaned, and the lining repaired as specified for shop-applied cement mortar linings.

3-9.02.03. Special Procedure for Exterior Joint Grouting. Each exterior joint recess in cement coated pipe shall be filled with joint grout. A diaper shall be used to prevent foreign material from entering the joint recess before grouting and to serve as a form for the grout. Each diaper shall be of sufficient length to encircle the pipe, leaving enough space between the ends for pouring the grout. Hems shall be stitched into the edges of the diaper to receive steel strapping for
attaching the diaper to each side of the pipe joint. The diaper shall have “pouring flap” extensions that fold back while the joint is being poured and that lap over the pouring gap after the diaper is filled with grout. The grout shall be poured or pumped between the diaper and the pipe and shall be allowed to run to the bottom of the pipe on one side until it is observed coming up on the opposite side of the pipe to ensure that the space in the bottom of the joint is filled with grout. Grout can be poured or pumped, topping out on both sides of the pipe, and shall be rodded on the same side of the pipe from which it is pumped or poured, while being poured, using a stiff wire curved to the approximate shape of the pipe to prevent tearing a hole in the diaper. Each joint recess shall be completely filled with grout for the full circumference of the pipe.

Prior to grouting the exterior joints, at least two lengths of pipe shall be in final position, or the pipe shall be backfilled sufficiently to brace and secure it against displacement. Contractor shall protect the exterior joint grout against damage during pipe laying or backfilling.

3-10. CORROSION PROTECTION.

3-10.01. Flanged Joints. The flange bolts and nuts on buried flanged joints shall be protected by wrapping them with wax tape in accordance with ANSI/AWWA C217. A primer shall be applied prior to applying the wax tape. The application of the wax tape shall be as recommended by the wax tape manufacturer.

Following application of the wax tape protection, the entire flanged joint shall be encapsulated with a shrink sleeve as indicated on Drawings. The shrink sleeve shall extend a minimum of 6 inches onto the shop coated pipe on each side of the flange. A primer shall be applied to the piping on each side of the flange prior to installing the shrink sleeve. The installation of the shrink sleeve shall be in accordance with ANSI/AWWA C216 and as recommended by the shrink sleeve manufacturer. There shall be no bare or unprotected ferrous metal surfaces.

Corrosion protection of buried insulated flanges shall be as specified herein unless otherwise shown on the drawings

3-10.02. Valves. Buried valve flanges shall be protected as specified herein for buried flange joints. The corrosion protection for the entire remaining buried valve and actuator to the wrench nut shall be wax tape or shrink sleeve.

3-10.03. Mechanical Couplings. The coupling and its tie bolts and nuts on all buried mechanical couplings shall be coated with two coats, 20 mils minimum, of medium consistency coal tar.

After the protective coating has been applied to the coupling and tie bolts, the entire mechanical coupling shall be encapsulated with a shrink sleeve as indicated on the Drawings. The shrink sleeve shall extend a minimum of 6
3-10.04. **Restrained Mechanical Couplings.** Buried mechanical couplings shall be protected with two coats of medium consistency coal tar and shrink sleeve as specified herein for buried mechanical couplings.

The tie rods and bolts of the harness rings or lugs of the restrained coupling assembly shall be protected by wrapping them with wax tape in accordance with ANSI/AWWA C217 and as detailed on the Drawings. A primer shall be applied prior to applying the wax tape. The application of the wax tape shall be as recommended by the wax tape manufacturer.

Following the application of the wax tape, the entire restrained mechanical coupling assembly, including coupling, tie bolts and nuts, pipe, and harness rings or lugs, shall be encapsulated with an underlying sleeve covered by a shrink sleeve. The underlying sleeve shall extend a minimum of 6 inches onto the pipe beyond each end of the tie rods. The shrink sleeve shall extend a minimum of 6 inches onto the shop coated pipe beyond each end of the underlying sleeve. A primer shall be applied to the piping on each side of the harness assembly prior to installing the shrink sleeve. The application of the shrink sleeve shall be in accordance with ANSI/AWWA C216 and as recommended by the shrink sleeve manufacturer. There shall be no bare or unprotected ferrous metal surfaces.

3-10.05. **Other Assemblies.** All ferrous metal clamps, tie rods, bolts, and other components of buried joint harnesses, mechanical joints, wall fittings, or pipe reaction anchorages in contact with earth or other fill material and not encased in concrete, shall be protected by wrapping them with wax tape in accordance with ANSI/AWWA C217. A primer shall be applied prior to applying the wax tape. The application for the wax tape shall be as recommended by the wax tape manufacturer. There shall be no bare or unprotected ferrous metal surfaces.

3-10.06. **Surfaces Exposed in Manholes and Vaults.** Unless otherwise specified, all uncoated metal surfaces exposed in manholes and vaults shall be cleaned and coated with two coats of medium consistency coal tar. The first coat shall be dry and hard before the second coat is applied. There shall be no unprotected, bare, or uncoated ferrous metal surfaces.

3-11. **CONNECTIONS WITH EXISTING PIPING.** Connections between new work and existing piping shall be made using fittings suitable for the conditions encountered. Each connection with an existing pipe shall be made at a time and
under conditions which will least interfere with service to customers, and as authorized by Owner.

Facilities shall be provided for dewatering and for disposal of the water removed from the dewatered lines and excavations without damage to adjacent property.

Special care shall be taken to prevent contamination when dewatering, cutting into, and making connections with potable water piping. Trench water, mud, or other contaminating substances shall not be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in such connections shall be thoroughly cleaned and then swabbed with or dipped in a 200 mg/L chlorine solution.

3-12. PRESSURE AND LEAKAGE TESTS. After installation, pipe and fittings shall be subjected to a pressure test and a leakage test in accordance with the Pipeline Pressure and Leakage Testing section.

The Contractor shall provide all necessary pumping equipment; piping connections between the piping and the nearest available source of test water; pressure gauges; and other equipment, materials, and facilities necessary for the tests. The minimum test pressure shall be as indicated on the Drawings.

All pipe, fittings, valves, pipe joints, and other materials which are found to be defective shall be removed and replaced with new and acceptable materials, and the affected portion of the piping shall be retested by and at the expense of Contractor.

All joints shall be watertight and free from visible leaks. Any visible leak which is discovered within the correction period stipulated in the General Conditions shall be repaired by and at the expense of Contractor.

3-13. STEEL LINING INSTALLATION IN EXISTING RCP.

3-13.01. Line and Grade Tolerance of Steel Liner. Steel liner installation shall be controlled by the dimensions of the existing RCP. Jack and brace coiled steel liner sections as tight as practicable against the inside of the existing RCP to the dimensions and tolerances shown on the contract Drawings. In no case shall the maximum allowable gap at the longitudinal seam, the minimum circumferential stab, or the maximum gap for the circumferential seam, be compromised.

The use of clips, lugs, or equivalent devices welded to the steel liner for purposes of pushing it into position may be permitted, provided that the attachment is removed and the base metal is returned to a satisfactory condition. Inspect the area where the attachment was removed using liquid penetrant method.
3-13.02. **Preparation.** Install steel liner after the portal site is complete, ready for access, and the existing RCP has been inspected and field verified by Contractor. Remove all debris from inside the existing RCP.

Remove all seeping and standing water, including, but not limited to, storm water, from inside the existing RCP, and from the access portal areas. Control water inside the existing RCP and take all means necessary for such control. Install and maintain temporary drainage facilities of adequate capacity, with standby pumps and emergency power for emergency use, to collect and dispose of water that enters the access portals or the existing RCP. Do not allow water to stand between the steel liner and the existing RCP or in working areas.

3-13.03. **Steel Liner Installation.** Transportation and Installation System: Provide and operate a system to transport steel liner sections from the point of entry to the installation point without damage to the steel liner, the existing RCP or appurtenances, or the transportation system equipment. The system shall allow steel liner to be installed in the proper orientation and position and change the inclination along the long axis of the existing RCP, as necessary. The system shall apply a controlled uniform force on the steel liner to mate with previously installed sections. The system shall include a means for preventing runaway pipe cylinders on steep slopes such as cable winches.

Damaged Steel Liner Removal: If any part or parts of the steel liner becomes dented, chipped, gouged, or otherwise damaged before or during installation, it shall be rejected and removed from the site.

Clean all loose debris from inside the RCP, steel liner, and the annular space prior to the placement of the next steel liner section. Keep grout couplings closed during welding to avoid debris from entering the annular space. Do not place anything in the annular space that is not specified in the Contract Documents.

Place each steel liner section so the joints of the steel liner match the accepted shop drawings. Jack or push the solid steel liner can without compromising the root opening dimensions as shown on the Contract Drawings. Space stulling and bracing as necessary to secure the steel liner and to prevent damage from longitudinal bending point loads, lack of radial support, excessive deflection, buckling, and other detrimental factors.

The minimum clearance between the outside of the steel liner and the inside of the existing RCP shall be controlled by the thickness of the spacer pads welded to the outside of the steel liner sections as shown on the Contract Drawings. In order to properly align the steel liner sections inside the existing RCP, use specials, joint configuration, or adapters as necessary and as approved by the Engineer. When pulling joints to match the existing RCP configuration, maintain the required minimum stab distance as shown on the Contract Drawings.
Steel liners shall be closely aligned and brought loosely together, by means of hydraulic jacks, locomotives, pipe mobiles, or winches. Once the steel liners have been loosely joined, pull into place by means of hydraulic rams, puller, or other similar methods. Use no-impact jointing, such as ramming with locomotive or other motorized equipment.

3-13.04. **Welding and Inspection.** After each steel liner section has been set into position, attach each steel liner section to the adjoining steel liner section at the circumferential seam. Complete welds in such a manner so as to avoid excessive residual internal stresses in the welded joints and to avoid objectionable stresses due to temperature changes in the steel liner. No porosity or under-fill of the welds shall be permitted. Test all welds as described in Subparagraph, Weld Inspections, of this section. Where required by the shop drawings, weld grout rings in place before proceeding to the placement of the next steel liner section.

Weld inspections and testing are the responsibility of the Contractor. Where indicated on the fabrication drawings, examine fillet and groove weld cover passes, including seal welds, using the liquid penetrant test (PT) or magnetic particle (MT) test method. No surface porosity, slag, undercut, cracks, or other defects are allowed.

3-13.05. **Internal Bracing.** Install and utilize internal bracing as necessary during grouting to prevent steel liner damage. The Contractor shall design the bracing system subject to the following requirements:

a. Braces and end blocks shall be timber or equal.

b. The bracing system shall be designed to resist loads encountered during grouting operations without structural failure of the bracing system or damage to the steel liner.

c. Spacing of braces shall not exceed spacing as shown on the drawings or 5-feet whichever is smaller.

d. The end blocks shall be shaped to fit the curvature of the interior surface of the steel liner.

e. Lumber used shall be graded in accordance with West Coast Lumber Inspection Bureau rules, especially selected for straightness, to the grade selected by the Contractor. Lumber need not be new, but used lumber shall be of the same grade and species selected for new lumber and shall be sound, free from decay, torn grain, or other defect that could impair the serviceability of the piece. Lumber shall be stored where it can be easily inspected. Evidence of excessive knots, bark, holes, splits, or other defects will be cause for rejection of the piece.

f. The bracing system shall be designed and placed so that when the bracing system is removed after installation is complete the diameter of
the steel liner does not vary more than 1/2 of 1 percent from the specified diameter.

3-13.06. **Cleanup and Restoration.** Scrape all slag from welds and scrape spilled grout from inside the steel liner. All welds shall be cleaned and have the liquid penetrant testing material removed. Repair any damage to the steel liner. Damage includes, but is not limited to, burrs; gouges; bulges; and dents. Clean all loose debris from inside the steel liner and repair damaged sections of the steel liner prior to completion.

3-13.07. **Annulus Grouting.** Completely grout the annulus between the steel liner and the existing RCP. Perform annulus grouting so as not to collapse, buckle, or otherwise distort the steel liner. Test for voids or hollow areas by sounding or other methods. For all voids detected, install additional grout plugs for both grout placement and air release and fill all voids with additional grout. Weld all grout plugs and test all grout plug welds by the liquid penetrant test method.

3-13.08. **Mortar Lining.** Steel liner shall be lined in the field with machine-placed lining. Closures, specials, outlet extensions, and fittings, including associated field joints, shall be lined in accordance with and as specified herein. Steel liner shall not be lined prior to a minimum of 7 days following the completion of the annulus grouting work.

End of Section
STEEL PIPE FITTINGS

BLACK & VEATCH

STEEL PIPE

FIG 1-15062(A)

NOTE:
SEE FIGURE 1-15062(B) FOR DIMENSIONS.
### Dimensions in Inches (Millimeters)

<table>
<thead>
<tr>
<th>NOMINAL DIA</th>
<th>TEE</th>
<th>CROSS</th>
<th>LATERAL (45°-75°) (0.7-1.3 rad)</th>
<th>TRUE WYE (90°) (1.5 rad)</th>
<th>ELBOWS</th>
<th>REDUCER CONE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RUN A+A</td>
<td>OUTLET A</td>
<td>RUN D</td>
<td>OUTLET E</td>
<td>E'</td>
<td>F'</td>
</tr>
<tr>
<td>4 (100)</td>
<td>13 (330)</td>
<td>6.5 (165)</td>
<td>15 (381)</td>
<td>12 (305)</td>
<td>6.5 (330)</td>
<td>4 (102)</td>
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<tr>
<td>6 (150)</td>
<td>16 (406)</td>
<td>8 (203)</td>
<td>18 (457)</td>
<td>14.5 (368)</td>
<td>8 (203)</td>
<td>5 (127)</td>
</tr>
<tr>
<td>8 (200)</td>
<td>18 (457)</td>
<td>9 (229)</td>
<td>22 (559)</td>
<td>17.5 (445)</td>
<td>9 (229)</td>
<td>5.5 (140)</td>
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<tr>
<td>10 (250)</td>
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<td>11 (279)</td>
<td>25.5 (648)</td>
<td>20.5 (521)</td>
<td>11 (279)</td>
<td>11 (279)</td>
</tr>
<tr>
<td>12 (300)</td>
<td>24 (610)</td>
<td>12 (305)</td>
<td>30 (762)</td>
<td>24.5 (622)</td>
<td>12 (305)</td>
<td>7.5 (191)</td>
</tr>
<tr>
<td>14 (350)</td>
<td>28 (711)</td>
<td>14 (356)</td>
<td>33 (838)</td>
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<td>7.5 (191)</td>
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<td>8 (203)</td>
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<td>16.5 (419)</td>
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<td>8 (203)</td>
</tr>
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<td>18 (457)</td>
<td>43 (1092)</td>
<td>35 (889)</td>
<td>18 (457)</td>
<td>8 (203)</td>
</tr>
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<td>22 (550)</td>
<td>40 (1016)</td>
<td>20 (508)</td>
<td>46 (1168)</td>
<td>37.5 (953)</td>
<td>22 (559)</td>
<td>9 (229)</td>
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<td>44 (1181)</td>
<td>22 (559)</td>
<td>49.5 (1267)</td>
<td>40.5 (1029)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
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<td>30 (750)</td>
<td>50 (1270)</td>
<td>25 (635)</td>
<td>59 (1499)</td>
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<td>25 (635)</td>
<td>10 (254)</td>
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<tr>
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<td>56 (1422)</td>
<td>28 (711)</td>
<td>64 (1621)</td>
<td>56 (1422)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
<tr>
<td>42 (1050)</td>
<td>62 (1575)</td>
<td>31 (787)</td>
<td>72 (1837)</td>
<td>62 (1575)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
<tr>
<td>48 (1200)</td>
<td>68 (1727)</td>
<td>34 (864)</td>
<td>74 (1880)</td>
<td>68 (1727)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
<tr>
<td>54 (1350)</td>
<td>74 (1880)</td>
<td>37 (940)</td>
<td>80 (2032)</td>
<td>74 (1880)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
<tr>
<td>60 (1500)</td>
<td>80 (2032)</td>
<td>40 (1016)</td>
<td>80 (2032)</td>
<td>40 (1016)</td>
<td>25 (635)</td>
<td>10 (254)</td>
</tr>
</tbody>
</table>
PART 1 - GENERAL

1-1. **SCOPE.** This section covers furnishing ten (10) 12-inch eccentric plug valves as required by the Work. The 12-inch plug valves shall be furnished complete with actuators and accessories as specified herein, and elsewhere in the Contract Documents. The plug valves shall be flanged and provided with a worm gear operator with hand wheel. Six (6) plug valves will be installed as part of the Work and four (4) shall be turned over to the Owner with gaskets.

1-2. **GENERAL.** Equipment provided under this section shall be fabricated and assembled in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.

Valves shall be furnished with all necessary parts and accessories indicated on the Drawings, specified, or otherwise required for a complete, properly operating installation and shall be the latest standard products of a manufacturer regularly engaged in the production of valves.

1-2.01. **General Equipment Stipulations.** The General Equipment Stipulations shall apply to all equipment and materials furnished under this section. If the requirements in this section are different from those in the General Equipment Stipulations, the requirements in the section shall take precedence.

1-2.02. **Governing Standard.** Except as modified or supplemented herein, all eccentric plug valves and manual actuators shall conform to the applicable requirements of ANSI/AWWA C517.

1-2.03. **Marking.** Each valve shall be marked with the manufacturer's name, valve size, and pressure rating, and the country of origin of the body casting. All markings shall be cast on the exterior surface of the valve body. An identifying serial number shall be stamped on a corrosion-resistant plate attached to the valve body.

1-2.04. **Temporary Number Plates.** Not used.

1-2.05. **Identification.** Eccentric plug valves shall be identified in accordance with the Identification and Tagging section.
1-3. **SUBMITTALS.** Complete drawings, details, and specifications covering the valves and their appurtenances shall be submitted in accordance with the Submittals section.

Certified copies of test reports for tests described in Section 5 of governing standard, with an affidavit of compliance as indicated in Section 6.3 of governing standard, shall be submitted to Engineer before the valves are shipped.

1-4. **DELIVERY, STORAGE, AND HANDLING.** Shipping shall be in accordance with the Shipping section. Handling and storage shall be in accordance with the Handling and Storage section.

**PART 2 - PRODUCTS**

2-1. **ACCEPTABLE PRODUCTS.** Eccentric plug valves furnished under this section shall be manufactured by DeZurik, Pratt, Milliken, Val-Matic, Clow, or Victaulic, without exception.

2-2. **MATERIALS.** Materials used in the manufacture of eccentric plug valves shall be as indicated:

<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>Cast iron, ASTM A126, Class B; or ductile iron, ASTM A536, Grade 65-45-12.</td>
</tr>
<tr>
<td>Plug</td>
<td>Cast iron, ASTM A126, Class B; or ductile iron, ASTM A536, Grade 65-45-12.</td>
</tr>
<tr>
<td>Plug Facing</td>
<td>Chloroprene, Neoprene or Buna-N, 70 Type A durometer hardness in accordance with ASTM D2240.</td>
</tr>
<tr>
<td>Body Seat</td>
<td>Welded nickel overlay.</td>
</tr>
<tr>
<td>Upper and Lower Trunnion Bearings</td>
<td>Sleeve type; stainless steel or bronze.</td>
</tr>
<tr>
<td>Upper Thrust Bearing</td>
<td>TFE, Nylatron, or Delrin.</td>
</tr>
<tr>
<td>Stem Seal</td>
<td>V-type packing or U-cups, Buna-N or TFE.</td>
</tr>
</tbody>
</table>
The following are acceptable shop coatings.

<table>
<thead>
<tr>
<th>Shop Coatings</th>
<th>Coating Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Tar Epoxy</td>
<td>High-build coal tar epoxy; PPG Amercoat &quot;Amercoat 78HB Coal Tar Epoxy&quot;, Carboline &quot;Bitumastic 300 M&quot;, Tnemec &quot;46H-413 Hi-Build Tneme-Tar&quot;, or Sherwin-Williams &quot;Hi-Mil Sher-Tar Epoxy&quot;.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Epoxy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For Liquid Service other than in potable water facilities</td>
<td>PPG Amercoat “Amercoat 385 Epoxy”, Carboline “Carboguard 890”, Sherwin-Williams &quot;Macropoxy 646&quot; or Tnemec “Series N69 Hi-Build Epoxoline II&quot;.</td>
</tr>
</tbody>
</table>

2-3. VALVE CONSTRUCTION.

2-3.01. Valve Body. The valve port area of each valve shall be at least 80 percent of the cross section of the connecting piping for 20 inch and smaller valves and 70 percent for 24 inch and larger valves. Valves shall provide tight shutoff at the rated pressure from either direction. An adjustable closed position plug stop shall be provided.

Each valve body shall be plainly marked to indicate the seat end. The actual length of 10 inch and smaller valves shall be within plus or minus 1/16 inch of the theoretical length. The actual length of 12 inch and larger valves shall be within plus or minus 1/8 inch of the theoretical length.

Valve ends shall be compatible with connecting piping. All valves shall have flanged ends as indicated in the Valve and Gate Schedule. Flange diameter and drilling shall conform to ANSI B16.1, Class 125. Flanges shall be flat faced and finished to true plane surfaces within a tolerance limit of 0.005 inch. The finished face shall be normal to the longitudinal valve axis within a maximum angular variation tolerance of 0.002 inch per foot of flange diameter.

2-3.02. Plug. The plug shall be of one-piece construction and shall have a cylindrical or spherical seating surface eccentrically offset from the center of the plug shaft. The interference between the plug face and the body seat, with the plug in the closed position, shall be externally adjustable in the field with the valve in the line under pressure. Plug surfaces shall be faced with a resilient material.

2-3.03. Seats. Seats shall be cast in the body and shall have raised, welded-in nickel overlay not less than 0.050 inch thick on all surfaces in contact with the plug face. The overlay shall be at least 90 percent nickel and have a Brinell hardness of 200 or greater.
2-3.04. **Stem Seals.** The valve shaft shall be sealed by U-cups or by at least four self-adjusting chevron type packing rings.

2-3.05. **Working Pressure.** Valves shall be rated for a minimum working pressure as specified below, except where otherwise indicated.

<table>
<thead>
<tr>
<th>Size in inches</th>
<th>Pressure Rating in psi(kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 12</td>
<td>175</td>
</tr>
</tbody>
</table>

2-4. **VALVE ACTUATORS.** Requirements for valve actuators shall be as specified herein and on the Drawings. Valve actuators types shall be manual, types.

2-5. **SHOP PAINTING.** All interior and exterior ferrous metal surfaces, except bearing and finished surfaces and stainless steel components of valves and accessories, shall be shop painted for corrosion protection. The valve manufacturer's standard coating will be acceptable, provided it is functionally equivalent to the specified coating and is compatible with the specified field painting.

Surfaces shall be painted as follows:

- **Unfinished Surfaces**
  - **Interior Surfaces**
    - For Liquid Service: Epoxy.
    - Exterior Surfaces of Valves to be Buried, Submerged, or Installed in Manholes or Valve Vaults: Coal tar epoxy, Epoxy.
    - Exterior Surfaces of All Other Valves: Universal primer.
  - **Polished or Machined Surfaces:** Rust-preventive compound.

Interior epoxy coatings shall comply with ANSI/AWWA C550 and shall be free of holidays.

The total dry film thickness of shop-applied coatings shall be not less than:

<table>
<thead>
<tr>
<th>Type of Coating</th>
<th>Minimum Dry Film Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal Tar Epoxy</td>
<td>15 mils</td>
</tr>
<tr>
<td>Epoxy</td>
<td>10 mils</td>
</tr>
<tr>
<td>Universal Primer</td>
<td>3 mils</td>
</tr>
</tbody>
</table>
2-6. **ACCESSORIES.** Requirements for extension stems and stem guides, position indicators, floor boxes, operating stands, and valve boxes shall be as indicated on the Drawings and as specified herein.

2-7. **TESTING.** Except as modified herein, eccentric plug valves shall be tested in accordance with Section 5 of the governing standard. Each valve shall be performance tested in accordance with Section 5.2 of the governing standard. The leakage test shall be applied to the seating face of the plug (tending to unseat the plug) at the rated pressure of the valve.

Each valve shall be leaktight in both directions when closed by the actuator with the maximum differential pressure applied to the plug as specified herein.

**PART 3 - EXECUTION**

3-1. **INSTALLATION.** Valves shall be installed in accordance with the Valve Installation section.

3-1.01. **Installation Check.** An experienced, competent, and authorized representative of the manufacturer shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. The representative shall be present when the equipment is placed in operation in accordance with Testing, Startup and Training Requirements section, and shall revisit the job site as often as necessary until any problems are corrected and the equipment installation and operation are satisfactory in the opinion of Engineer.

The manufacturer's representative shall furnish a written report certifying that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping and appurtenances; and has been operated under full load conditions and that it has operated satisfactorily.

All costs for these services shall be included in the contract price.

End of Section
1-1. **SCOPE.** This section covers furnishing of ten (10) vacuum valves with air release as required by the Work. Six (6) vacuum valves will be installed as part of the Work and four (4) shall be turned over to the Owner. Installed vacuum valves shall be located as follows.

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Station*</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-06, 22, 37</td>
<td>50+00</td>
<td>Two 12” Vacuum Valve w/ Air Release</td>
</tr>
<tr>
<td>C-08, 23, 37</td>
<td>70+50</td>
<td>Two 12” Vacuum Valve w/ Air Release</td>
</tr>
<tr>
<td>C-12, 26, 37</td>
<td>111+50</td>
<td>Two 12” Vacuum Valve w/ Air Release</td>
</tr>
</tbody>
</table>

* Approximate Station

1-2. **GENERAL.** Equipment provided under this section shall be fabricated and assembled in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.

Valves shall be furnished with all necessary parts and accessories indicated on the Drawings, specified, or otherwise required for a complete, properly operating installation and shall be the latest standard products of a manufacturer regularly engaged in the production of valves.

1-2.01. **General Equipment Stipulations.** The General Equipment Stipulations shall apply to all equipment furnished under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

1-2.02. **Governing Standard.** Except as modified or supplemented herein, all valves furnished under this section shall conform to the applicable performance requirements of ANSI/AWWA C512.

1-2.03. **Identification.** All valves shall be identified in accordance with the Identification and Tagging section.

1-3. **SUBMITTALS.** Complete assembly drawings, together with detailed specifications and data covering materials used and accessories forming a part of the valves furnished, shall be submitted in accordance with the Submittals section.
PART 2 - PRODUCTS

2-1. CONSTRUCTION.

2-1.01. Clean Water Applications. Not used.

2-1.02. Wastewater Applications.

Air release valves for wastewater applications with operating pressures of 300 psi or less. Sewage air release valves shall have a 2-inch screwed inlet fitting, 3/16-inch orifice, and shall discharge not less than 45 cubic feet of free air per minute at 150 psi. They shall have cast-iron bodies and stainless steel floats, and shall be furnished with a 2-inch screwed inlet fitting. 1-inch screwed inlet, 2-inch shut-off valve, back-flush valve with quick disconnect coupling and-flushing hose, and blowoff valve. Valves shall be Apco/Valve and Primer “No. 400 or 450”, Multiplex “Crispin S Series”, ARI “No. S-020”, or Val-Matic “VM-48A or 49A”.

Vacuum relief valves shall be globe body type designed for full vacuum relief protection. The valve shall be provided with a steel head to prevent entrance of debris, shall have brass plug and resilient seat, and shall normally be kept closed by a stainless steel spring. Valves shall be Apco “Series 1500C” or equal. The vacuum relief valves shall be suitable for use with pipelines conveying secondary clarified trickling filter effluent. Vacuum relief valves shall be provided with a side mounted air release valve with shutoff valve with materials suitable for the service water.

2-2. MATERIALS. Except as modified or supplemented herein, materials of construction shall comply with the governing standard.

Valve Trim  
Bronze or austenitic stainless steel or polymer materials. Valve trim for valves in wastewater service shall be austenitic stainless steel.

Float  
Austenitic stainless steel, polycarbonate, or foamed polypropylene.

Shop Coatings  
Epoxy (NSF-61 Certified)  
PPG Amercoat “Amerlock 400 High Solids Epoxy”, Carboline “Carboguard 891”, Sherwin-Williams "Macropoxy 646NSF" or Tnemec “Series N140 Pota-Pox Plus”.

Epoxy  
PPG Amercoat “Amercoat 385 Epoxy”, Carboline “Carboguard 890”, Sherwin-Williams "Macropoxy 646" or Tnemec “Series N69 Hi-Build Epoxoline II”.

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2-3. **SHOP PAINTING.** All interior and exterior ferrous metal surfaces, except stainless steel components, shall be shop painted for corrosion protection. The valve manufacturer's standard coating will be acceptable, provided it is functionally equivalent to the specified coating and is compatible with the specified field coating. Field painting is covered in the Protective Coatings section.

Surfaces shall be painted as indicated:

- **Interior Surfaces of Valves in Wastewater Applications**: Epoxy
- **Exterior Surfaces of Valves To Be Installed in Manholes or Valve Vaults**: Epoxy.
- **Exterior Surfaces of All Other Valves**: Universal primer.
- **Polished or Machined Surfaces**: Rust-preventive compound.

Interior coatings for all valves shall be free of holidays. The total dry film thickness of shop-applied coatings shall be not less than:

<table>
<thead>
<tr>
<th>Type of Coating</th>
<th>Minimum Dry Film Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy</td>
<td>10 mils</td>
</tr>
<tr>
<td>Universal Primer</td>
<td>3 mils</td>
</tr>
</tbody>
</table>

2-4. **SHUTOFF VALVES.** A shutoff valve shall be provided in the piping leading to each vacuum air valve and air release valve. Shutoff valves for wastewater service shall be eccentric plug valves as specified in the Eccentric Plug Valve section.

### PART 3 - EXECUTION

3-1. **INSTALLATION.** Air release and vacuum valves will be installed in accordance with the Valve Installation section.