

**CITY OF PETALUMA
PETALUMA, CALIFORNIA**

**CONTRACT DOCUMENTS FOR
ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT**

(Notice Inviting Bids, Instructions to Bidders, Bid Forms, General Conditions,
Special Provisions, Technical Specifications, Construction Agreement,
Bond Forms, Project Drawings, References)

CITY PROJECT NO. C66501838

CITY OF PETALUMA - SONOMA COUNTY - CALIFORNIA

Questions concerning interpretation of improvement plans, special provisions,
contract documents and bid items shall be directed to:

***Department of Public Works and Utilities
202 N. McDowell Boulevard
Petaluma, CA. 94954
Phone: (707) 778-4546 Fax: (707) 206-6034***

Attention: Josh Minshall

Office Hours: Monday thru Thursday - 8:00 to 5:00 p.m.
Friday – 8:00 to 4:00 p.m.

Bid Opening: July 20, 2022 at 2:00 p.m.

CITY OF PETALUMA
PETALUMA, CALIFORNIA

**ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT**

CITY PROJECT NUMBER C66501838

CITY OF PETALUMA - SONOMA COUNTY - CALIFORNIA

Prepared by:

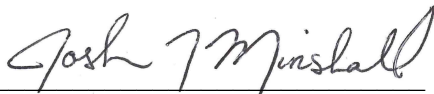


Giuseppe Tomasino, P.E.

6/28/2022

Date

Reviewed by:



Josh Minshall, P.E.

6/29/2022

Date

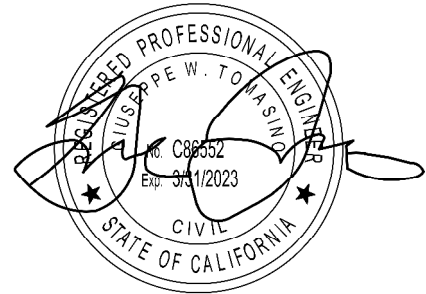


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NOTICE INVITING BIDS

1. RECEIPT OF BIDS: Sealed Bids will be received at the office of the City Clerk of the City of Petaluma located at 11 English Street, Room 4, Petaluma, California, 94952-2610, until 2:00PM (enter time) on Wednesday July 20, 2022, for the Ellis Creek Water Recycling Facility - Outfall Relocation Project. Any Bids received after the specified time and date will not be considered. Fax and other electronically transmitted Bids will not be accepted.
2. OPENING OF BIDS: The Bids will be publicly opened and read at 2:00PM (enter time) on Wednesday July 20, 2022 at the above-mentioned office of the CITY. The CITY reserves the right to postpone the date and time for opening of Bids at any time prior to the aforesaid date and time.
3. COMPLETION OF WORK: The WORK must be completed within ## working days after the commencement date stated in the Notice to Proceed.
4. DESCRIPTION OF WORK: The WORK includes The demolition of the existing Ellis Creek Water Recycling Facility outfall to the Petaluma River and temporary outfall. Installation of an outfall at the new location as shown in the project documents.
5. SITE OF WORK: The site of the WORK is located: At the Ellis Creek Water Recycling Facility, 3890 Cypress Dr. Petaluma CA and within the Petaluma River.
6. OBTAINING CONTRACT DOCUMENTS: The Contract Documents are entitled “Ellis Creek Water Recycling Facility - Outfall Relocation Project.”

The Contract Documents may be obtained by 4:00 P.M., Monday through Thursday at the office of Public Works & Utilities, 202 North McDowell Boulevard, Petaluma, California 94954.

If you would like to receive the bid documents via the CITY’s website, at no cost, please go to:

- <http://cityofpetaluma.net/pubworks/bidding-opportunities.html>
- Fill out the Plan Holder’s form by clicking on the Plan Holder’s form link
- Fill in all fields
- Click on the submit button at the end of the form

Submitting the Plan Holder’s form on-line automatically puts you on the CITY’S Bidders List and you will be notified of any Addendums or information pertaining to the bid by email.

If you would like to purchase bid documents, please call Phone No. 707-778-4585, Attention: Tiffany Avila, upon payment of \$50.00 (non-refundable) for each set of Contract

Documents (including technical specifications and accompanying reduced scale drawings). The scale of the reduced drawings is about one-half of the original scale. At the Bidder's request and expense, the Contract Documents may be sent by overnight mail.

Full-scale drawings are not available.

If full-scale drawings are available and desired, they may be purchased at reproduction cost from _____.

7. **BID SECURITY:** Each Bid shall be accompanied by a certified or cashier's check or Bid Bond executed by an admitted surety in the amount of 10 percent of the Total Bid Price payable to the City of Petaluma as a guarantee that the Bidder, if its Bid is accepted, will promptly execute the Agreement. A Bid shall not be considered unless one of the forms of Bidder's security is enclosed with it. Upon acceptance of the Bid, if the Bidder refuses to or fails to promptly execute the Agreement, the Bidder's security shall be forfeited to the CITY.
8. **CONTRACTOR'S LICENSE CLASSIFICATION:** In accordance with the provisions of California Public Contract Code Section 3300, the CITY has determined that the CONTRACTOR shall possess a valid Class A license at the time that the Contract is awarded. Failure to possess the specified license shall render the Bid as non-responsive and shall act as a bar to award of the Contract to any bidder not possessing said license at the time of award.
9. **PREFERENCE FOR MATERIAL:** Substitute products will be considered prior to award of the Contract in accordance with Section 3400 of the California Public Contract Code. The Bidder will submit data substantiating its request for a substitution of "an equal" item within 14 days following submission of its Bid. Substantiation data will conform to the requirements of the instructions for Proposed Substitutions or "or equal" items contained in the Bid Forms. The ENGINEER will make a determination of approval or rejection of the proposed substitution prior to the award of the Contract. No request for substitution of "an equal" item will be considered by the ENGINEER after award of the Contract.
10. **REJECTION OF PROPOSALS:** The CITY reserves the right to reject all or any part of all bids submitted, waive informalities and irregularities, and will not, to the extent allowed by law, be bound to accept the lowest bid.
11. **BIDS TO REMAIN OPEN:** The Bidder shall guarantee the total bid price for a period of 90 calendar days from the date of bid opening.
12. **CALIFORNIA WAGE RATE REQUIREMENTS:** In accordance with the provisions of California Labor Code Sections 1770, 1773, 1773.1, 1773.6, and 1773.7 as amended, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages in accordance with the standards set forth in Section 1773 for the locality in which the WORK is to be performed. A copy of said wage rates is on file at the office of the City Clerk. It shall be mandatory upon the CONTRACTOR to whom the WORK is awarded and upon any subcontractor under the CONTRACTOR to pay not less than said specified rates to all workers employed by them in the execution of the WORK.

13. LABOR COMPLIANCE PURSUANT TO CALIFORNIA LABOR CODE § 1771.1. A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirement of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time contract is awarded.
14. RETAINAGE FROM PAYMENTS: The CONTRACTOR may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention of any portion of the payment by the CITY, by depositing securities of equivalent value with the CITY in accordance with the provisions of Section 22300 of the Public Contract Code. Alternatively, the CONTRACTOR may request and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investments of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms as provided in Section 22300 of the Public Contract Code for securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expenses incurred by the escrow agent in administering the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director or his/her designee and the escrow agent. Upon satisfactory completion of the WORK, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of Section 22300 of the Public Contract Code. Such securities, if deposited by the CONTRACTOR, shall be valued by the CITY, whose decision on valuation of the securities shall be final. Securities eligible for investment under this provision shall be limited to those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters or credit, or any other security mutually agreed to by the CONTRACTOR and the CITY.
15. PAYMENT BOND: Pursuant to and in accordance with California Civil Code Section 3247, a payment (labor and materials) bond must be filed if the expenditure for the WORK is in excess of Twenty-Five Thousand Dollars (\$25,000.00).
16. PRE-BID CONFERENCE/SITE VISITS: [At least one box below MUST be checked]
- Check if **no** pre-bid conference/site visit is to be held: _____
- Mandatory pre-bid conference/site visit to be held:** Prospective bidders are required to attend a mandatory pre-bid conference/site visit at _____ (*enter time*) on _____, at the _____, offices at _____. Prospective bidders that fail to attend the mandatory pre-bid conference/site visit will be ineligible to bid on the project. Following the conference at City offices, City staff and prospective bidders will meet at the project Site. Transportation to the project site will be the responsibility of prospective bidders. The

purposes of the conference/site visit are to discuss the scope of the project and bidding requirements and to acquaint bidders with Site conditions.

No information communicated at the pre-bid conference/site visit may amend the project bidding requirements. Project bidding requirements may only be amended by addenda issued by authorized City officials. Following the pre-bid conference/site visit, prospective bidders may submit detailed technical questions in writing. If warranted, the City may respond to such questions by addenda.

Non-Mandatory pre-bid conference/site visit to be held: Prospective bidders are invited to attend a non-mandatory pre-bid conference/site visit at 10:00am (enter time) on Thursday, July 7, 2022, and Tuesday, July 12, 2022, at the Ellis Creek Water Recycling Facility, offices at 3890 Cypress Dr. Petaluma CA. Following the conference at City offices, City staff and prospective bidders will meet at the project Site. Transportation to the project site will be the responsibility of prospective bidders. The purposes of the conference/site visit are to discuss the scope of the project and bidding requirements, and to acquaint bidders with Site conditions.

No information communicated at the pre-bid conference/site visit may amend the project bidding requirements. Project bidding requirements may only be amended by addenda issued by authorized City officials. Following the pre-bid conference/site visit, prospective bidders may submit detailed technical questions in writing. If warranted, the City may respond to such questions by addenda.

17. **PROJECT ADMINISTRATION:** All communications relative to this WORK shall be directed to the ENGINEER prior to opening of the Bids.

NAME: Josh Minshall, PE

ADDRESS: Department of Public Works and Utilities, 202 North McDowell Boulevard, Petaluma CA 94954 or EMAIL Jminshall@cityofpetaluma.org

PHONE: 707-776-3785

18. **CITY'S RIGHTS RESERVED:** The CITY reserves the right to reject any or all bids, to waive any minor irregularity in a bid, and to make awards to the lowest responsive, responsible bidder as it may best serve the interest of the CITY.

CITY: Petaluma

BY: 

DATE: June 27, 2022

END OF NOTICE INVITING BIDS

INSTRUCTIONS TO BIDDERS

1. **DEFINED TERMS.** Terms used in these Instructions to Bidders and the Notice Inviting Bids which are defined in the General Conditions have the meanings assigned to them in the General Conditions. The term “Bidder” means one who submits a Bid directly to CITY, as distinct from a sub-bidder, who submits a price or quote to a Bidder.
2. **LOCAL BUSINESS LICENSE.** All CONTRACTORS, including subcontractors, not already having a local business license for the work contemplated, will be required to secure the appropriate license before a Contract can be executed.
3. **INTERPRETATIONS AND ADDENDA.**
 - 3.1 All questions about the meaning or intent of the Contract Documents are to be directed to the ENGINEER. Additions, deletions, or revisions to the Contract Documents considered necessary by the ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the ENGINEER as having received the Contract Documents. Questions received less than 14 days prior to the date of Bids may not be answered. Only answers to such questions issued by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
 - 3.2 Addenda may also be issued to make other additions, deletions, or revisions to the Contract Documents.
 - 3.3 Bidders shall make no special interpretation or inference of intent from differing formats in the Technical Specifications.
4. **BIDDER’S EXAMINATION OF CONTRACT DOCUMENTS AND SITE.**
 - 4.1 It is the responsibility of each Bidder before submitting a Bid:
 - A. To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including “technical” data referred to below);
 - B. To visit the site to become familiar with local conditions that may affect cost, progress, or performance of the WORK;
 - C. To consider federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the WORK;
 - D. To study and carefully correlate the Bidder’s observations with the Contract Documents; and

- E. To notify the ENGINEER of all conflicts, errors, ambiguities, or discrepancies in or between the Contract Documents and such other related data.
- 4.2 Reference is made to the Supplementary General Conditions for identification of:
- A. Those reports of explorations and tests of subsurface conditions at the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
 - B. Those drawings of physical conditions in or relating to existing surface and subsurface conditions (except Underground Utilities) which are at or contiguous to the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
 - C. Those environmental reports or drawings relating to Asbestos, Hazardous Waste, PCBs, Petroleum, and/or Radioactive Materials identified at the site which have been utilized by the ENGINEER in the preparation of the Contract Documents.
 - D. The ENGINEER makes representation as to the completeness of the reports or drawings referred to in Paragraphs 4.2A, 4.2B, and 4.2C. above or the accuracy of any data or information contained therein. The Bidder may rely upon the accuracy of the technical data contained in such reports and drawings. However, the Bidder may not rely upon any interpretation of such technical data, including any interpretation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.
- 4.3 Copies of reports and drawings referred to in Paragraph 4.2 will be made available by the CITY to any Bidder on request, if said reports and drawings are not bound herein. Those reports and drawings are not part of the Contract Documents, but the technical data contained therein upon which the Bidder is entitled to rely, are incorporated herein by reference.
- 4.4 Information and data reflected in the Contract Documents with respect to Underground Utilities at or contiguous to the site are based upon information and data furnished to the ENGINEER by the owners of such Underground Utilities or others, and the CITY does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions.
- 4.5 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Utilities, and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.2, 4.3, and 4.4 of the General Conditions.
- 4.6 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface,

subsurface, and Underground Utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.

- 4.7 On request a minimum of 2 working days in advance, the ENGINEER will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of a Bid. Location of any excavation or boring shall be subject to prior approval of ENGINEER and applicable agencies. Bidder shall fill all holes, restore all pavement to match existing structural section, and shall clean up and restore the site to its former condition upon completion of such explorations. ENGINEER reserves the right to require Bidder to execute an Access Agreement with the CITY prior to accessing the site.
- 4.8 The lands upon which the WORK is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the CITY unless otherwise provided in the Contract Documents.
- 4.9 The submission of a Bid will constitute an incontrovertible representation by the Bidder that the Bidder has complied with every requirement of this Paragraph 4 and the following:
 - A. That the Bid is premised upon performing the WORK required by the Contract Documents without exception and such means, methods, techniques, sequences, or procedures of construction (if any) as may be required by the Contract Documents;
 - B. That Bidder has given the ENGINEER written notice of all conflicts, errors, ambiguities, and discrepancies in the Contract Documents and the written resolution thereof by the ENGINEER is acceptable to the Bidder; and
 - C. That the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.
5. **BID FORMS.** The Bid shall be submitted on the Bid Forms provided by the City. All blanks on the Bid Forms shall be completed in ink. All names must be printed below the signatures. The Bid shall be submitted in a sealed envelope which shall be plainly marked in the upper left hand corner with the name and address of the Bidder and shall bear the words "BID FOR" followed by the title of the Contract Documents for the WORK, the name of the CITY, the address where Bids are to be delivered or mailed to, and the date and hour of opening of Bids.

- 5.2 The Bid must set forth the name and location of the place of business of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the WORK, or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the WORK according to detailed Drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid or, in the case of bids or offers for the construction of streets and highways, including bridges, in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars (\$10,000), whichever is greater.
6. CERTIFICATES.
- 6.1 Bids by corporations must be executed in the corporate name by the president, a vice-president, or other corporate officer. Such Bid shall be accompanied by the enclosed Certificate of Authority to sign, attested by the secretary or assistant secretary, and with the corporate seal affixed. The corporate address and state of incorporation must appear below the signature.
- 6.2 Bids by partnerships must be executed in the partnership name and be signed by a managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the partnership must appear below the signature.
- 6.3 Bids by joint venture must be executed in the joint venture name and be signed by a joint venture managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the joint venture must appear below the signature.
7. DISQUALIFICATION OF BIDDERS. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the CITY believes that any Bidder is interested in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the CITY believes that collusion exists among the Bidders, all Bids will be rejected. A party who has quoted prices to a bidder is not hereby disqualified from quoting prices to other Bidders, or from submitting a Bid directly for the WORK. If a Bidder is not registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5 and Section 1771.1, then the Bid may be rejected as non-responsive.
8. QUANTITIES OF WORK. The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price item of the WORK by an amount up to and including 25 percent of any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Bid price.

9. **SUBSTITUTE OR “OR EQUAL” ITEMS.** Whenever materials or equipment are specified or described in the Contract Documents by using the name of a particular manufacturer and the name is followed by the words “or equal”, the Bidder may write the name of a substitute manufacturer (which the Bidder considers as an “or equal”) in the List of Proposed Substitutions in the Bid Forms. The ENGINEER will make a determination of approval or rejection of the proposed substitution prior to award of the Contract. No request for substitution of an “or equal” item will be considered by the ENGINEER after award of the Contract. The procedure for the submittal of substitute or “or equal” products is contained in the Bid Forms. The Bidder shall not be relieved of any obligations of the Contract Documents or be entitled to an adjustment in the Contract Price in the event any proposed substitution is not approved.
10. **COMPETENCY OF BIDDERS.** In selecting the lowest responsive, 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. To this end, each Bid shall be supported by a statement of the Bidder’s experience as of recent date including: (a) all projects worked on by the Bidder over the past three (3) years including the contract amount for each project; (b) all complaints made against the Contractor’s license in the past ten (10) years; and (c) all claims and lawsuits presented or filed in the last five (5) years, regardless of the form, regarding any public works project.
11. **SUBMISSION OF BIDS.** The Bid shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the Bidder’s sole responsibility to see that its Bid is received in proper time and at the proper place.
12. **BID SECURITY, BONDS, AND INSURANCE.** Each Bid shall be accompanied by a certified or cashier’s check or approved Bid Bond in the amount stated in the Notice Inviting Bids. Said check or bond shall be made payable to the CITY and shall be given as a guarantee that the Bidder, if awarded the WORK, will enter into an Agreement with the CITY and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond. In case of refusal or failure to enter into said Agreement, the check or Bid Bond, as the case may be, shall be forfeited to the CITY. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein. Bid Bonds shall comply with the requirements applicable to payment and performance bonds in the General Conditions.
- 12.1 **BIDDING CAPACITY.** Each Bid shall be accompanied by a list of the projects currently being worked on by Bidder, their size, contract price, scheduled completion date, location, and owner. Additionally, Bidder shall provide certified evidence of its current bonding capacity.
13. **DISCREPANCIES IN BIDS.** In the event there is more than one Bid item in a Bid Schedule, the Bidder shall furnish a price for all Bid Items in the Schedule, and failure to do so will render the Bid non-responsive and shall 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, and the BIDDER shall be bound by said correction. In the event there is more than one Bid item in a Bid 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, and the BIDDER shall be bound by said correction.

14. MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS. Unauthorized conditions, limitations, or provisos attached to the Bid shall render it informal and may cause its rejection as being non-responsive. The Bid forms shall be completed without interlineations, alterations, or erasures in the printed text. Alternative Bids will not be considered unless called for. Oral, telegraphic, or telephonic Bids or modifications will not be considered.
15. WITHDRAWAL OF BID. The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids prior to the scheduled closing time for receipt of Bids.
16. BID PROTEST. Any Bid protest must be submitted in writing to the City Manager before 5:00 p.m. on the fifth (5th) working day following Bid opening.
 - A. The initial protest document must contain a complete statement of the basis for the protest, and all supporting documentation.
 - B. The party filing the protest must have actually submitted a Bid for the WORK. A subcontractor of a party submitting a Bid for the WORK may not submit a Bid protest. A party may not rely on the Bid protest submitted by another Bidder, but must timely pursue its own protest.
 - C. The protest must refer to the specific portion of the bid document which forms the basis for the protest.
 - D. The protest must include the name, address and telephone number of the person representing the protesting party.
 - E. The party filing the protest must concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other Bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.
 - F. The CITY will give the protested Bidder five (5) working days after the receipt of the protest to submit a written response. The responding Bidder shall transmit the response to the protesting Bidder concurrent with delivery to the CITY.

- G. The procedure and time limits set forth in this paragraph are mandatory and are the Bidder's sole and exclusive remedy in the event of Bid protest. The Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.
- H. If the CITY determines that a protest is frivolous, the protesting bidder may be determined to be non-responsible and that bidder may be determined to be ineligible for future contract awards.
17. **AWARD OF CONTRACT.** Award of the contract, if awarded, will be made to the lowest responsive, responsible Bidder whose Bid complies with the requirements of the Contract Documents. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the bids are to remain open. Unless otherwise indicated, a single award will be made for all the Bid items in an individual Bid Schedule. In the event the WORK is contained in more than one Bid Schedule, the CITY may award Schedules individually or in combination. In the case of two Bid Schedules which are alternative to each other, only one of such alternative schedules will be awarded. The CITY may condition the award upon the Bidder's timely submission of all items required by the Contract Documents, including, but not limited to the executed Agreement, performance, labor and materials, and maintenance bonds, and required certificates of insurance and endorsements.
18. **RETURN OF BID SECURITY.** Within 14 days after award of the contract, the CITY will, if requested, return the Bid securities accompanying such Bids that are not being considered in making the award. All other Bid securities will be held until the Agreement has been finally executed. They will then be returned, if requested, to the respective Bidders whose Bids they accompany.
19. **EXECUTION OF AGREEMENT.** The Bidder to whom award is made shall execute a written Agreement with the CITY on the form of agreement provided, shall secure all insurance, and shall furnish all certificates and bonds required by the Contract Documents within five (5) working days after receipt of Notice of Award from the CITY. Failure or refusal to enter into an 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 forfeiture of the Bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the CITY may award the Contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third lowest Bidder to execute the Agreement, each such Bidder's Bid securities shall be likewise forfeited to the CITY.
20. **LIQUIDATED DAMAGES.** Provisions for liquidated damages, if any, are set forth in the Agreement.

21. **WORKERS' COMPENSATION REQUIREMENT.** The Bidder should be aware that in accordance with Section 3700 of the California Labor Code it will, if awarded the Contract, be required to secure the payment of compensation to its employees and execute the Workers' Compensation Certification in the form contained in these Contract Documents.
22. **NON-COLLUSION AFFIDAVIT.** Bidders must execute the following affidavit and submit the same with his/her bid:
23. **MATERIALS SUPPLIERS LIST.** Bidders and their subcontractors must complete the List of Materials Suppliers and Material Guarantee form provided with the Bid Forms and must submit the completed form with the Bid.

END OF INSTRUCTIONS TO BIDDERS

BID PROPOSAL CERTIFICATE
(if Corporation)

STATE OF CALIFORNIA)
) ss:
COUNTY OF _____)

I HEREBY CERTIFY that a meeting of the Board of Directors of the _____

a corporation existing under the laws of the State of _____, held on _____, 20____, the following resolution was duly passed and adopted:

“RESOLVED, that _____, as _____ President of the Corporation, be and is hereby authorized to execute the Bid Proposal dated _____, 20____, for the _____ project, in the City of Petaluma, and that his/her execution thereof, attested by the Secretary of the Corporation, and with the Corporate Seal affixed, shall be the official act and deed of this Corporation.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the corporation this _____, day of _____, 20____.

Secretary

(SEAL)

BID PROPOSAL CERTIFICATE
(if Joint Venture)

STATE OF CALIFORNIA)
) ss:
COUNTY OF _____)

I HEREBY CERTIFY that a meeting of the Principals of the _____

a joint venture existing under the laws of the State of _____,
held on _____, 20____, the following resolution was duly passed and adopted:

“RESOLVED, that _____,
as _____, of the joint venture, be and is hereby authorized to execute the Bid
Proposal dated _____, 20____, for _____ project, in the City of
Petaluma, and that his/her execution thereof, attested by the _____ shall
be the official act and deed of this Joint Venture.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of
_____, 20____.

Managing Partner

(SEAL)

SECTION I

BID FORMS

(TO BE SUBMITTED WITH BIDS)

BIDDER'S AFFIDAVIT OF NON-COLLUSION SUBMITTED WITH BID

_____, *[Contractor]* hereby declares that:

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated: _____

Signature

Public Contract Code section 7106
Code of Civil Procedure section 2015.5

END OF BIDDER'S AFFIDAVIT OF NON-COLLUSION SUBMITTED WITH BID

BID PROPOSAL CERTIFICATE
(if Corporation)

STATE OF CALIFORNIA)
) ss:
COUNTY OF)

I HEREBY CERTIFY that a meeting of the Board of Directors of the _____
_____, a
corporation existing under the laws of the State of _____, held on
_____, 20____, the following resolution was duly passed and adopted:

“RESOLVED, that _____, as _____
President of the Corporation, be and is hereby authorized to execute the Bid
Proposal dated _____, 20____, for the _____
_____ project, in the City of Petaluma, and that his/her
execution thereof, attested by the Secretary of the Corporation, and with the
Corporate Seal affixed, shall be the official act and deed of this Corporation.”

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of
the corporation this _____, day of _____, 20_____.

Secretary

(SEAL)

PROPOSAL

To the City Council of the City of Petaluma:

The undersigned declares that he/she has carefully examined the location of the proposed work, that he/she has examined the plans and specifications, and read the accompanying instructions to bidders, and hereby proposes to furnish all materials and do all the work required to complete the said work in accordance with said plans, specifications, and special provisions for the unit or lump sum prices set forth in the attached Bid Schedule.

It is understood and agreed that the undersigned shall complete the work of the contract within the time provided for in the Contract Documents and Specifications governing said work.

If awarded the contract, the undersigned hereby agrees to sign said contract and to furnish the necessary bonds, insurance certificates and agreements within five (5) working days after receipt of Notice of Award of said contract from the City.

The undersigned has examined the location of the proposed work and is familiar with the plans, specifications and other contract documents and the local conditions at the place where the work is to be done.

The undersigned has checked carefully all the figures on the attached Bid Schedule and understands that the City will not be responsible for any errors or omissions on the part of the undersigned in making up the bid.

Enclosed find bidder's bond, certified check, or cashier's check no. _____ of the _____ (Company) (Bank) for _____ Dollars (\$_____).

This project requires a Class A California State Contractor's License.

Contractor's License No. _____ License Class _____

Expiration Date of Contractor's License _____

This project requires registration with the California State Department of Industrial Relations.

Public Works Contractor Registration No. _____

Registration Date _____ Expiration Date _____

A bid submitted to a public agency by a contractor who is not licensed and not registered shall be considered non-responsive and shall be rejected by the public agency. The undersigned contractor declares that the contractor's license number, public work contractor registration number, and expiration dates stated herein are made under penalty of perjury under the laws of the State of California.

Contractor: _____

Signed by: _____

Title: _____

Address: _____

Phone: _____

Fax: _____

Email: _____

Dated this _____ day of _____, 20__.

END OF PROPOSAL

Ellis Creek Water Recycling Facility – Outfall Relocation Project
City Project No. C66501838

*Note: In case of error in extension of price into the total price column, the unit price will govern.

Total Amount of Bid (written in words) is: _____ _____ Dollars and _____ Cents. In the event of discrepancy between words and figures, the words shall prevail. \$ _____ _____ Figures

Note: **The award of the contract shall be awarded to the lowest price of the Base Bid.**

Address of Bidder

Signature of Bidder

City

Name of Bidder (Print)

Telephone Number of Bidder

Fax Number of Bidder

Contractor's License Number

License's Expiration Date

Addendum Acknowledgement

Addendum No. 1 Signature Acknowledging Receipt: _____ Date: _____

Addendum No. 2 Signature Acknowledging Receipt: _____ Date: _____

Addendum No. 3 Signature Acknowledging Receipt: _____ Date: _____

Addendum No. 3 Signature Acknowledging Receipt: _____ Date: _____

LIST OF MATERIAL SUPPLIERS AND MATERIAL GUARANTEE

The bidder is required to name the make and supplier of the material items listed below to be furnished under these specifications. The bidder shall name a manufacturer for each item and the supplier of the item if the supplier is not the manufacturer. The naming of more than one supplier for a single item or naming a supplier followed by the words “or equal” will not be acceptable. Substitution of any listed supplier following submission of this form with the Bid shall only be permitted as authorized by the Engineer pursuant to Section 6.3 of the General Conditions.

Failure to complete this form and submit it with the bid proposal may cause the proposal to be rejected as being incomplete and not responsive to the solicitation.

Item	Supplier & Manufacturer	Address
Outfall Check Valve		
Concrete Headwall, if precast		

MATERIAL GUARANTEE

In addition to completion of the list of material suppliers on the Material Suppliers form, the bidder may be required to furnish prior to award of contract, a complete statement of the origin, composition and manufacturer of any or all materials to be used in the construction of the work, together with samples, which samples may be subjected to test, provided for in these specifications or in the Special Provisions to determine their quality and fitness for the work.

END OF
LIST OF MATERIAL SUPPLIERS AND MATERIAL GUARANTEE

QUESTIONNAIRE AND FINANCIAL ASSURANCE STATEMENT

The following statements as to experience and financial qualifications of the Bidder are submitted in conjunction with the proposal as a part thereof, and the truthfulness and accuracy of the information is guaranteed by the Bidder.

The Bidder has been engaged in the contracting business under the present business for _____ years. Experience in work of a nature similar to that covered in the proposal extends over a period of _____ years.

The Bidder, as a contractor, has never failed to satisfactorily complete a contract awarded to contractor, except as follows:

List all claims and lawsuits presented or filed in the last five (5) years, regardless of the form, regarding any public works project:

The following contracts for work have been completed in the last three (3) years for the persons, firm or authority indicated and to whom reference is made:

<u>Year</u>	<u>Type of Work-Size, Length and Contract Amount</u>	<u>Location and For Whom Performed</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

The following complaints have been made against the Bidder's contractor's license within the past ten (10) years:

Date: _____ Nature of Complaint _____

Reference is hereby made to the following bank or banks as to the financial responsibility of the bidder:

NAME OF BANK	ADDRESS

Reference is hereby made to the following surety companies as to the financial responsibility and general reliability of the bidder:

NAME OF SURETY COMPANY:

I, the undersigned, declare under penalty of perjury under the laws of the State of California, that the foregoing is true and correct.

SIGNATURE OF BIDDER

DATE

NAME OF BIDDER

END OF
QUESTIONNAIRE AND FINANCIAL STATEMENT FORM

**SITE VISIT AFFIDAVIT
TO BE EXECUTED
BY BIDDER, NOTARIZED AND SUBMITTED WITH BID**

(To Accompany Bid)

State of California)
) ss.
County of)

_____, **being first duly sworn**, deposes and says that he or
(Contractor's Authorized Representative)

she is

_____ of _____, the party making the foregoing
(Title of Representative) (Contractor's Name)

bid, has visited the Site of the Work as described in the Contract and has examined and familiarized themselves with the existing conditions, as well as all other conditions relating to the construction which will be performed. The submitting of a bid shall be considered an acknowledgement on the part of the Bidder of familiarity with conditions at the site of Work. The Bidder further acknowledges that the site examination has provided adequate and sufficient information related to existing conditions which may affect cost, progress or performance of the Work.

Signature Name of Bidder

STATEMENT OF QUALIFICATIONS

The apparent low Bidder shall submit a Statement of Qualifications as specified herein as a submittal to the City within 24 hours of the bid opening.

- A. The following are minimum requirements for the Bidder to be found responsible to perform the Work. Bidder's compliance with the minimum qualification requirements will be measured by the experience of the supervisory personnel who will have responsible charge of the various major components of the Work. If Bidder subcontracts portions of the Work, City, in its determination of whether the minimum qualification requirements have been met, will consider the qualifications of the Subcontractor's supervisory personnel.
 - 1. Five years experience as a continuously operating entity engaged in the performance of similar work.
 - 2. Experience on public works projects, with no history of default termination.
 - 3. Sufficient financial strength, stability and resources as measured by Bidder's equity, debt-to-assets ratio, and capability to finance the Work to be performed.

- B. Owner will notify Apparent Low Bidder in writing of any deficiencies found and will provide Bidder the opportunity to respond in writing with reasonable clarifications but will not allow any changes in the nature of Bidder as a business entity.

BID BOND

We, _____ as Principal, and _____ as Surety, jointly and severally, bind ourselves, our heirs, representatives, successors and assigns, as set forth herein, to the City of Petaluma (herein called "the Owner") for the payment of the penal sum of _____ Dollars (\$_____), lawful money of the United States, which is ten (10) percent of the total amount bid by bidder to the Owner. Principal has submitted the accompanying bid for the construction of the _____ project.

If the Principal is awarded the contract and enters into a written contract, in the form prescribed by the Owner, at the price designated by his bid, and files the bonds required by the Agreement with the Owner, and carries all insurance in type and amount which conforms to the contract documents and furnishes required certificates and endorsements thereof, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Forfeiture of this bond, or any deposit made in lieu thereof, shall not preclude the Owner from seeking all other remedies provided by law to cover losses sustained as a result of the Principal's failure to do any of the foregoing.

Principal and Surety agree that if the Owner is required to engage the services of an attorney in connection with the enforcement of this bond, each shall pay the Owner's reasonable attorney's fees, witness fees and other costs incurred with or without suit.

Executed on _____, _____.

PRINCIPAL

By _____
Signature

Title

Any claims under this bond may be addressed to:

(Name and address of Surety's agent for service of process in California, if different from above)

(Telephone number of Surety's agent in California)

(Attach Acknowledgment)

SURETY

By _____
(Attorney-in-Fact)

NOTICE:

No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

END OF BID BOND

SECTION II
GENERAL CONDITIONS

CITY OF PETALUMA - GENERAL CONDITIONS

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ARTICLE 1 - DEFINITIONS

Whenever used in these General Conditions or in the other Contract Documents, the following terms have the meanings indicated in this Article 1 which meanings are applicable to both the singular and plural thereof. If a word which is entirely in upper case in these definitions is found in lower case in the Contract Documents, then the lower case word will have its ordinary meaning.

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the CITY and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as provided therein.

Application for Payment - The form accepted by the ENGINEER which is to be used by the CONTRACTOR to request progress payments or final payment and which is to be accompanied by such supporting documentations as is required by the Contract Documents.

Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

Bid - The offer or proposal of the bidder submitted on the prescribed form setting forth the price or prices for the WORK.

Bonds - Bid, Performance, and Labor and Materials, and Maintenance Bonds and other instruments of security.

Change Order - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the CITY, and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

CITY - The City of Petaluma.

Clarification - A document issued by the ENGINEER to the CONTRACTOR that clarifies the requirements(s) and/or design intent of the Contract Documents, which may not represent an addition, deletion, or revision in the WORK or an adjustment in the Contract Price or the Contract Times.

Contract Documents - The Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates, affidavits and other documentation), Agreement, Performance Bond, Labor and Materials Bond, Maintenance Bond, General Conditions, any Supplementary General

Conditions, Special Provisions, Specifications, Drawings, all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents. Shop Drawings are not Contract Documents.

Contract Price - The total monies payable by the CITY to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Times - The number or numbers of successive calendar days or dates stated in the Contract Documents for the completion of the WORK.

CONTRACTOR - The individual, partnership, corporation, joint-venture, or other legal entity with whom the CITY has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective Work - Work that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or work that has been damaged prior to the ENGINEER's recommendation of final payment.

Drawings - The drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are included and/or referred to in the Contract Documents. Shop Drawings are not Drawings as so defined.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

ENGINEER - The City Manager or his/her designee.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

Hazardous Waste - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 U.S.C. Section 6906) as amended from time to time.

Laws and Regulations; Laws or Regulations - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

Lien or Mechanic's Lien - A form of security, an interest in real property, which is held to secure the payment of an obligation. When related to public works construction, Lien or Mechanic's Lien may be called Stop Notice.

Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date of a separately identifiable part of the WORK or a period of time within which the separately identifiable part of the WORK should be performed prior to completion of all the WORK.

Notice of Award - The written notice by the CITY to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein within the time specified, the CITY will enter into an Agreement.

Notice of Completion - A form signed by the ENGINEER and the CONTRACTOR recommending to the CITY that the WORK is Complete and fixing the date of completion. After acceptance of the WORK by the CITY Council, the form is signed by the CITY and filed with the County Recorder. This filing starts the 30 day lien filing period on the WORK.

Notice to Proceed - The written notice issued by the CITY to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK for the purpose for which it is intended prior to completion of all the WORK.

Partial Utilization - Use by the CITY of a completed part of the WORK for the purpose for which it is intended prior to completion of all the WORK.

Petroleum - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

Project - The total construction project of which the WORK to be provided under the Contract Documents may be the whole, or as part as indicated elsewhere in the Contract Documents.

Record Drawings - Drawings generated by marking a set of Drawings to reflect all of the changes that have occurred during construction of the Project.

Resident Project Representative - The authorized representative of the ENGINEER who is assigned to the Site or any part thereof.

Samples - Physical examples of materials, equipment, or workmanship that are representative of some portion of the WORK and which establish the standards by which such portion of the WORK will be judged.

Shop Drawings - All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR to illustrate some portion of WORK.

Site - Lands or other areas designated in the Contract Documents as being furnished by the CITY for the performance of the construction, storage, or access.

Special Provisions - Specific clauses setting forth conditions or requirements peculiar to the work and supplementary to the Standard Specifications.

Specifications - The directions, provisions and requirements set forth in the Standard Specifications as supplemental and modified by the special provisions.

Stop Notice - A legal remedy for subcontractors and suppliers who contribute to public works, but who are not paid for their work, which secures payment from construction funds possessed by the CITY. In some states, for public property, the Stop Notice remedy is designed to substitute for a mechanic's lien.

Subcontractor - An individual, partnership, corporation, joint-venture, or other legal entity having a direct contract with the CONTRACTOR or with any other subcontractor for the performance of a part of the WORK at the Site.

Supplementary General Conditions - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, distributor, materialman, or vendor having a direct contract with the CONTRACTOR or with any Subcontractor to furnish materials, equipment, or product to be incorporated in the WORK by the CONTRACTOR or any Subcontractor.

Utilities - All pipelines, conduits, ducts, cables, wires, tracks, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground or above the ground to furnish any of the following services or materials; water, sewage, sludge, drainage, fluids, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic control, or other control systems.

WORK - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

Working day - Any day except Saturdays, Sundays and CITY holidays.

ARTICLE 2 – PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS AND INSURANCE CERTIFICATES

- A. When the CONTRACTOR delivers the signed Agreement to the CITY, the CONTRACTOR shall also deliver to the CITY such Bonds and insurance policies and certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

2.2 COPIES OF DOCUMENTS

- A. The CITY will furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.

2.3 COMMENCEMENT OF CONTRACT TIMES; NOTICE TO PROCEED

- A. The Contract Times will start to run on the commencement date stated in the Notice to Proceed.

2.4 STARTING THE WORK

- A. The CONTRACTOR shall begin to perform the WORK on the commencement date stated in the Notice to Proceed, but no work shall be done at the Site prior to said commencement date.
- B. Before undertaking each part of the WORK, the CONTRACTOR shall review the Contract Documents in accordance with Paragraph 3.3.

2.5 PRECONSTRUCTION CONFERENCE

- A. The CONTRACTOR is required to attend a preconstruction conference. This conference will be attended by the CITY, ENGINEER, and others as appropriate in order to discuss the WORK.
- B. The CONTRACTOR's initial schedule submittals for shop drawings, obtaining permits, and Plan of Operation and CPM Schedule will be reviewed and finalized. At a minimum, the CONTRACTOR's representatives shall include its project manager, project superintendent and schedule expert. If the submittals are not finalized at the end of the meeting, additional meetings will be held so that the submittals can be finalized prior to the submittal of the first Application for Payment. No Application for Payment will be processed prior to receiving acceptable initial submittals from the CONTRACTOR.

ARTICLE 3 – INTENT AND USE OF CONTRACT DOCUMENTS

3.1 INTENT

- A. The Contract Documents comprise the entire agreement between the CITY and the CONTRACTOR concerning the WORK. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the State of California .
- B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any

labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not called for specifically.

- C. 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 in Article 1 of the General Conditions.

3.2 REFERENCE TO STANDARDS

- A. Reference to standard 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, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code shall be effective to change the duties and responsibilities of the CITY or the CONTRACTOR or any of their consultants, agents or employees, from those set forth in the CONTRACT Documents, nor shall it be effective to assign to CITY any duty or authority to direct the performance of the WORK or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.3 REVIEW OF CONTRACT DOCUMENTS

- A. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual, or code, or of any instruction of any Supplier, CONTRACTOR shall report it to ENGINEER in writing at once, and CONTRACTOR shall not proceed with the work affected thereby (except in an emergency as authorized by Paragraph 6.13 until a Clarification, Field Order, or Change Order to the Contract Documents has been issued.

3.4 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. Unless otherwise noted herein, conflicts or inconsistencies between parts of the Contract will be resolved by the ENGINEER with a Change Order or an Addendum, if required. Addenda and Change Orders bearing the most recent date shall prevail over Addenda or Change Orders bearing earlier dates. Any reference to addenda-changed specifications or drawings shall be considered to have been changed accordingly. In resolving conflicts resulting from errors or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Change Orders/Addenda (most recent in time take precedence)
2. Agreement and Bond Forms
3. Referenced Standard Specifications
4. Special Provisions
5. Drawings
6. General Conditions
7. Instructions to Bidders
8. Contractor's Bid (Bid Form)
9. Notice Inviting Bids
10. Supplementary General Conditions (if any)
11. Permits from other agencies as may be required by law

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings
3. Addenda/Change Order drawings govern over any other drawings
4. Drawings govern over standard drawings

3.5 AMENDING CONTRACT DOCUMENTS

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10).

3.6 REUSE OF DOCUMENTS

A. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the CITY shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of CITY.

ARTICLE 4 – SITE OF THE WORK

4.1 AVAILABILITY OF LANDS

- A. The CITY will furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the CITY, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the CITY until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of said easement furnished to the ENGINEER prior to said use; and the CITY will not be liable for any claims or damages resulting from the CONTRACTOR's trespass on or use of any such properties. The CONTRACTOR shall provide the CITY with a signed release from the property owner confirming that the lands have been satisfactorily restored upon completion of the WORK.

4.2 REPORTS OF PHYSICAL CONDITIONS

- A. **Subsurface Explorations:** Reference is made to any Supplementary General Conditions for identification of those reports of explorations and tests of subsurface conditions at the Site that have been utilized by the ENGINEER in the preparation of the Contract Documents.
- B. **Existing Structures:** Reference is made to any Supplementary General Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except underground Utilities referred to in Paragraph 4.3 herein) which are at or contiguous to the Site that have been utilized in the preparation of the Contract Documents.
- C. The CITY makes no representation as to the completeness of the reports or drawings referred to in Paragraph 4.2 A or B above or the accuracy of any data or information contained therein. The CONTRACTOR may rely upon the accuracy of the technical data contained in such reports and drawings. However, the CONTRACTOR may not rely upon any interpretation of such technical data, including any interpolation or extrapolation thereof, or any non-technical data, interpretations, and opinions contained therein.

4.3 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

- A. **Indicated:** The information and data indicated in the Contract Documents with respect to existing underground Utilities at or contiguous to the Site are based on information and data furnished to the CITY or the ENGINEER by the owners of such underground Utilities or by others. Unless it is expressly provided in any Supplementary General Conditions the CITY will not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of all of which are deemed to have been included in the Contract Price.
- B. **Not Indicated:** If an underground Utility is uncovered or revealed at or contiguous to the Site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such underground Utility and give written notice thereof to that owner and shall notify the ENGINEER.

4.4 DIFFERING SITE CONDITIONS

- A. The CONTRACTOR shall notify the ENGINEER, in writing, of the following unforeseen conditions, hereinafter called differing Site conditions, promptly upon their discovery (but in no event later than 14 days after their discovery) and before they are disturbed:
 - 1. Subsurface or latent physical conditions at the Site of the WORK differing materially from those indicated, described, or delineated in the Contract Documents, including those reports discussed in Paragraph 4.2, 4.3, and 4.5.
- B. The ENGINEER will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto.
- C. If the ENGINEER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the difference.
- D. In each such case, an increase or decrease in the Contract Price or an extension or shortening the Contract Times, or any combination thereof, will be allowable to the extent that they are attributable to any such difference. If the ENGINEER and the CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

- E. The CONTRACTOR's failure to give notice of differing Site conditions within 14 days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

4.5 HAZARDOUS MATERIALS

- A. CITY shall be responsible for any Asbestos, Hazardous Waste, Petroleum, or Radioactive Material uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the WORK and which may present a substantial danger to persons or property exposed thereto in connection with the WORK at the Site. CITY will not be responsible for any such material brought to the Site by CONTRACTOR, Subcontractors, Suppliers, or anyone else for whom CONTRACTOR is responsible.
 - 1. Upon discovery of any Asbestos, Hazardous Waste, Petroleum, or Radioactive Material, the CONTRACTOR shall immediately stop all work in any area affected thereby (except in an emergency as required by Paragraph 6.13) and notify ENGINEER (and therefore confirm such notice in writing). CONTRACTOR shall not be required to resume any work in any such affected area until after CITY has obtained any required permits related thereto and delivered to CONTRACTOR special written notice. Such written notice will specify that such condition and any affected area is or has been rendered safe for the resumption of the work or specify any special conditions under which the work may be resumed safely. If ENGINEER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of adjustment, if any, in Contract Price or Contract Times as a result of such work stoppage or such special conditions under which work is agreed by CONTRACTOR to be resumed, either party may make a claim therefor as provided in Articles 11 and 12.
 - 2. If, after receipt of such special written notice, CONTRACTOR does not agree to resume such WORK based on a reasonable belief it is unsafe, or does not agree to resume such WORK under special conditions, ENGINEER may order such portion of the WORK that is in connection with such hazardous condition or in such affected area to be deleted from the WORK. If ENGINEER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the WORK then either party may make a claim therefor as provided in Articles 11 and 12. CITY may have such deleted portion of the WORK performed by CITY's own forces or others in accordance with Article 7.
- B. The provisions of Paragraphs 4.2, 4.3, and 4.4 are not intended to apply to Asbestos, Petroleum, Hazardous Waste, or Radioactive Material uncovered or revealed at the Site.

4.6 REFERENCE POINTS

- A. The ENGINEER will provide the location and elevation of one bench mark, near or on the Site of the WORK, for use by the CONTRACTOR for alignment and elevation control. Unless otherwise specified in any Supplementary General Conditions, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.
- B. The CONTRACTOR shall preserve or replace any and all bench marks, section corners, witness corners, stakes, and other survey marks, and in case of their removal or destruction by any party, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by surveyor licensed under the applicable state codes governing land surveyors.

ARTICLE 5 – BONDS AND INSURANCE

5.1 BONDS

- A. The CONTRACTOR shall furnish Performance and Labor and Materials Bonds, each in the amount of one hundred percent (100%) of the contract price, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of completion, except as otherwise provided by Law or Regulation or by the Contract Documents. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. The CONTRACTOR shall guarantee the WORK to be free of defects in material and workmanship for a period of one (1) year following the CITY's acceptance of the WORK. The CONTRACTOR shall agree to make, at the CONTRACTOR's own expense, any repairs or replacements made necessary by defects in material or workmanship which become evident within the one-year guarantee period. The CONTRACTOR's guarantee against defects required by this provision shall be secured by a Maintenance Bond, in the amount of ten percent (10%) of the contract price, which shall be delivered by the CONTRACTOR to the CITY prior to acceptance of the WORK. The Maintenance Bond shall remain in force for one (1) year from the date of acceptance of the contracted WORK. The CONTRACTOR shall make all repairs and replacements within the time required during the guarantee period upon receipt of written order from the ENGINEER. If the CONTRACTOR fails to make the repairs and replacements within the required time, the CITY may do the work and the CONTRACTOR and the CONTRACTOR's surety for the Maintenance Bond shall be liable to the CITY for the cost. The expiration of the Maintenance Bond during the one-year guarantee period does not operate to waive or void the one-year guarantee, as set forth herein and in paragraph 6.16 of these General Conditions.

- C. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of “Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies” as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent’s authority to act.
- D. If the surety on any Bond furnished by the CONTRACTOR is declared a 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 days thereafter substitute another Bond and surety, which must be acceptable to the CITY.
- E. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of California to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

5.2 INSURANCE

Contractor and any subcontractor shall not commence work under this Agreement until Contractor shall have obtained all insurance required under this paragraph and such insurance shall have been approved by the City Attorney as to form and carrier and the City Manager as to sufficiency, nor shall Contractor allow any contractor or subcontractor to commence work on this contract or subcontract until all similar insurance required of the contractor and/or subcontractor shall have been so obtained and approved. All requirements herein provided shall appear either in the body of the insurance policies or as endorsements and shall specifically bind the insurance carrier.

CONTRACTOR shall procure and maintain for the duration of the contract all necessary insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, the Contractor’s agents, representatives, employees or subcontractors.

A. Minimum Scope of Insurance

Coverage shall be at least as broad as:

1. Insurance Services Office Commercial General Liability coverage.
2. Insurance Services Office form number CA covering Automobile Liability, code 1 (any auto).
3. Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.
4. [Optional] Such other insurance coverages and limits as may be required by the CITY as follows: _____.

B. Minimum Limits of Insurance

CONTRACTOR shall maintain limits no less than:

1. General Liability: \$2,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate liability is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. Automobile Liability: \$1,000,000 per accident for bodily injury and property damage.
3. Employer's Liability: Bodily Injury by Accident - \$1,000,000 each accident
Bodily Injury by Disease - \$1,000,000 policy limit
Bodily Injury by Disease - \$1,000,000 each employee

C. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the CITY. At the option of the CITY, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the CITY, its officers, officials, employees, and volunteers; or the CONTRACTOR shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

D. Other Insurance Provisions

The required general liability and automobile policies are to contain, or be endorsed to contain the following provisions:

1. The CITY, its officers, officials, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the CONTRACTOR; products and completed operations of the CONTRACTOR; premises owned, occupied or used by the CONTRACTOR; or automobiles owned, leased, hired or borrowed by the CONTRACTOR. The coverage shall contain no special limitations on the scope of protection afforded to the CITY, its officers, officials, employees, agents or volunteers.
2. For any claims related to this project, the CONTRACTOR's insurance coverage shall be primary insurance as respects the CITY, its officers, officials, employees, agents and volunteers. Any insurance or self-insurance maintained by the CITY, its officers, officials, employees, agents or volunteers shall be excess of the CONTRACTOR's insurance and shall not contribute with it.
3. Any failure to comply with reporting or other provisions of the policies including breaches of warranties shall not affect coverage provided to the CITY, its officers, officials, employees, agents or volunteers.
4. The CONTRACTOR's insurance shall apply separately to each insured against whom claim is made or suit is brought except, with respect to the limits of the insurer's liability.
5. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the CITY.

E. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII.

F. Verification of Coverage

CONTRACTOR shall furnish the CITY with original endorsements effecting coverage required by this clause. The endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. The endorsements are to be on forms provided by the CITY. All endorsements are to be received and

approved by the CITY before work commences. As an alternative to the CITY's forms, the CONTRACTOR's insurer may provide complete, certified copies of all required insurance policies, including endorsements effecting the coverage required by these specifications.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.1 COMMUNICATIONS

- A. Written communications with the CITY shall be only through or as directed by the ENGINEER.

6.2 SUPERVISION AND SUPERINTENDENCE

- A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and all safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.
- B. The CONTRACTOR shall designate in writing and keep on the Site at all times during the performance of the WORK a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the ENGINEER. The superintendent will be the CONTRACTOR's representative at the Site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR.
- C. The CONTRACTOR's superintendent shall be present at the Site at all times while work is in progress and shall be available by phone for emergencies 24 hours per day, 7 days per week. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the Site.

6.3 LABOR, MATERIALS, AND EQUIPMENT

- A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any required temporary works. The CONTRACTOR shall at all times maintain good discipline and order at the Site. Except in connection with the safety or protection of persons or the WORK or property at the Site or adjacent thereto, and except as otherwise indicated in the

Contract Documents, all work at the Site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any federally observed holiday without the CITY's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER in writing a minimum of 24 hours in advance.

- B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid to the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.
- C. All increased costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The CITY has the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.
- D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, lubricants, power, light, heat, telephone, water, sanitary facilities, and all other facilities, consumables, and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK.
- E. All materials and equipment incorporated into the WORK shall be of specified quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the CITY. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the source, kind and quality of materials and equipment. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the CITY or any of its consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.
- F. The work, unless otherwise permitted or approved by the ENGINEER, shall be completed with the incorporated use of equipment, materials, and/or products where such are specified. Substitutions and equal alternatives will be permitted as

provided in this article; however, neither the request for substitution nor the offer of alternatives shall in any way by their submittal obligate the CITY to assent to any request or offer. Failure of the CONTRACTOR awarded the work to either submit requests for substitutions or to offer alternatives within the required times provided in this General Condition will be considered as evidence that the work shall be accomplished with trade-named equipment, materials, and/or products as identified in the Specifications and/or the Drawings.

- G. Unless otherwise provided elsewhere in the Contract, all equipment, materials, and/or products incorporated into the work shall be new and, where not specified, shall be of the highest quality of the respective kinds for the intended use, and all workmanship shall meet or exceed applicable construction industry standards and practices. If equipment, materials, and/or products are designated by listing named manufacturers of particular equipment, materials, and/or products followed by the words "or equal," then the CONTRACTOR may furnish the named equipment, materials, and/or products or any equal equipment, materials, and/or products. The first-named manufacturer of particular equipment, materials, and/or products is the basis for the design shown on the Project Drawings. A subsequently named manufacturer or particular equipment, materials, and/or products has been determined to be an acceptable substitution but may require modifications in the Project's design and its ultimate construction to accommodate its use. If such subsequently named items are selected by the CONTRACTOR for incorporation into the work, the CONTRACTOR shall assume all costs required for modifications to the equipment, materials, and/or products, and Project design and construction as may be required for said items' use. Substitutions for an unnamed "equal" item of material shall be permitted upon compliance of the procedures set forth in Paragraph I of this article. If a CONTRACTOR makes use of an unnamed "equal" product as a substitute for a specifically named material or product, the CONTRACTOR shall assume all costs required to make the necessary revisions or modifications to accommodate the use of said unnamed product.
- H. Before beginning the work and within thirty-five (35) calendar days after award of the Contract, the CONTRACTOR shall submit a List of Materials to the ENGINEER for review. The List shall include all items of equipment, materials, and/or products to be incorporated into the work and the names of suppliers with whom purchase orders have been placed. The names on the List shall be arranged in the same order as in the specifications, and shall contain sufficient data to identify precisely the items of equipment, materials, and/or products the CONTRACTOR proposes to furnish. The List shall include Specifications or Drawing references. Once the submission is determined to be acceptable to the ENGINEER, it shall be returned to the CONTRACTOR.
- I. Substitution for those equipment, materials, and/or products specified shall only be permitted when the proposed unnamed "equal" product or material to be furnished is both equal in quality and utility and after the CONTRACTOR has

complied with the following provisions: (1) All substitutions shall be reviewed by the ENGINEER. (2) The ENGINEER must approve such substitution in writing prior to its incorporation into the work. (3) Unless otherwise authorized in writing by the CITY, the CONTRACTOR shall, within thirty-five (35) calendar days of award and prior to placing any purchase orders, but at least thirty (30) calendar days before it requires approval of any such alternative item, submit to the CITY sufficient data, drawings, samples, literature, or other detailed information as will demonstrate to the ENGINEER that the proposed substitute is equal in quality and utility to the equipment, materials and/or products specified.

1. Within thirty (30) calendar days following receipt of all requested information from the CONTRACTOR, the ENGINEER will determine whether the proposed alternative is equal in quality and utility and meets the requirements of the Contract and will inform the CONTRACTOR in writing of such determination. The burden of substantiating the quality and utility of alternatives shall be upon the CONTRACTOR, and the CONTRACTOR shall furnish all necessary information requested and required by the ENGINEER. The ENGINEER will be the sole judge as to the quality and utility of alternative equipment, materials, and/or products, and the ENGINEER's decision shall be final. An acceptance by the ENGINEER of a substitution shall not relieve the CONTRACTOR from complying with the requirements of the Drawings and Specifications. Acceptance by the ENGINEER shall not relieve the CONTRACTOR from full responsibility for the efficiency, sufficiency, and quality and performance of the substitute equipment, materials, and/or products, in the same manner and degree as the equipment, materials, and/or products specified by name.
2. Failure of the CONTRACTOR to submit proposed substitutions for review in the manner described above and within the time prescribed shall be sufficient cause for rejection by the CITY of any other proposed substitutions.
3. In determining whether a proposed product is equal in quality and utility, the ENGINEER is not restricted to such basic issues as performance and durability, but may consider any other issues that the ENGINEER, in the discretion of the ENGINEER, deems appropriate. Said issues may, but are not required to include, nor are they limited to, such additional factors as comparable performance, reliability, efficiency of operation, ease of operation, adaptability, ease of maintenance, capital costs, life-cycle costs, operational characteristics, costs of training personnel, maintenance history, warranties, problems created by the resulting overall warranty system, availability of qualified service, availability of parts, the history of any supplier and compatibility with existing facilities.

4. No one factor or group of factors, including such issues as savings on capital costs, shall be determinative of whether the proposed product or material is equal in quality and utility. The decision of the ENGINEER shall be based on those factors deemed by the ENGINEER to be relevant and any data, drawings, samples, literature, or other detailed information furnished by the CONTRACTOR with respect to the proposed substitution. Each decision as to whether a product or material is equal in quality and utility shall be made by the ENGINEER on a case-by-case basis.
5. The CONTRACTOR shall be responsible for any and all costs, including consultant costs, incurred by the CITY with respect to the proposed substitution that exceed the costs inherent in the normal and reasonable review of drawings and other standard data, information, and documents concerning any proposed substitution. The CONTRACTOR shall be responsible for this cost, regardless of whether or not the substitution is approved by the ENGINEER.
- J. Unless otherwise provided in the Contract, the title and interest in the right to the use of all water, and the title to all soil, stone, gravel, sand, minerals, timber, and all other materials developed or obtained within the Project limits from operations by the CONTRACTOR or any of its subcontractors, of any of their representatives or employees, and the right to use or dispose of the same are hereby expressly reserved in the CITY; and neither the CONTRACTOR nor any of its subcontractors, nor any of their representatives or employees, shall have any right, title, or interest in or to any part thereof.
- K. All material used under the Contract after it has been attached or affixed to the work or soil and after partial payment has been made therefore shall become the property of the CITY.
- L. In the event that any Indian relics or items possessing archaeological or historical value are discovered by the CONTRACTOR or any of its subcontractors or any of their representatives or employees, the CONTRACTOR shall immediately notify the ENGINEER and await the ENGINEER's decision before proceeding with any work. The CONTRACTOR shall have no property right in such relics and items.
- M. The CONTRACTOR shall be satisfied as to the quantity of acceptable materials or products which may be produced or obtained at local sources, and the CITY will not assume any responsibility as to the quantities or quality of acceptable materials or products available.
- N. The CONTRACTOR, with the permission of the ENGINEER, may use in the proposed construction such stone, gravel, sand, or other material suitable in the opinion of the ENGINEER as may be found in excavation.

- O. Existing equipment, materials, and/or products to be salvaged shall remain the property of the CITY. Salvage to be reinstalled in the work shall be refurbished as required before reinstallation. Other work to be salvaged shall be carefully removed and handled in such a manner as to avoid damage and shall be delivered to storage at a location designated by the ENGINEER.

6.4 SCHEDULE

- A. The CONTRACTOR shall comply with the schedule requirements in the Special Provisions or as otherwise provided in the Contract Documents.

6.5 SUBSTITUTES OR “OR EQUAL” ITEMS

- A. The CONTRACTOR shall submit proposed substitutes or “or equal” items in accordance with the Bidding Requirements. No request for substitution of an “or equal” item will be considered by the ENGINEER after award of the Contract, except as provided in Paragraph 6.3I herein.

6.6 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- A. The CONTRACTOR shall be responsible to the CITY for the acts and omissions of its Subcontractors, Suppliers, and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the CITY nor relieve the CONTRACTOR of any liability or obligation under the Contract Documents. The CONTRACTOR shall include these General Conditions and the Supplementary General Conditions as part of all its subcontract and supply agreements.

6.7 PERMITS

- A. Unless otherwise provided in any Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all constructions permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements shall not be made the basis for claims for additional compensation by CONTRACTOR. When necessary, the CITY will assist the CONTRACTOR, in obtaining such permits and licenses. The CONTRACTOR shall pay all charges of utility owners for inspection or connections to the WORK.

6.8 PATENT FEES AND ROYALTIES

- A. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design,

process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed by the ENGINEER in the Contract Documents. The CONTRACTOR's indemnification obligation under this Paragraph 6.8 A. for all claims and liabilities arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product or device not specified in the Contract Documents shall be in accordance with Paragraph 6.16 of these General Conditions.

6.9 LAWS AND REGULATIONS

- A. The CONTRACTOR shall observe and comply with all Laws and Regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK including, but not limited to, all applicable safety Laws and Regulations. If any discrepancy or inconsistency should be discovered between the Contract Documents and any such Laws or Regulations, the CONTRACTOR shall report the same in writing to the ENGINEER. Any particular Law or Regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations. The CONTRACTOR's indemnification obligations for all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors or Suppliers shall be in accordance with Paragraph 6.16 of these General Conditions.

6.10 TAXES

- A. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the laws and regulations of the place of the Project which are applicable during the performance of the WORK.

6.11 USE OF PREMISES

- A. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site, the land and areas identified in and permitted by the Contract Documents, and the other land and areas permitted by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall assume full liability and responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the CITY by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall

promptly attempt to settle with such other party by agreement or otherwise resolve the claim through litigation at the CONTRACTOR's sole liability expense. The CONTRACTOR's indemnification obligations for all claims and liability, arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the CITY, its consultants, subconsultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance of the WORK shall be in accordance with Paragraph 6.16 of these General Conditions.

6.12 SAFETY AND PROTECTION

- A. The CONTRACTOR shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall be responsible for the direction and control of the work assigned and for assuring that all workers on the project understand the hazards of the work involved and the safe work procedures required for each job. The CONTRACTOR shall assure that its subcontractors of all tiers shall, without expense to the CITY, comply with this safety responsibility. No work shall proceed until each worker and subcontractor understands the scope of the work and all safety rules and work procedures to be followed. The CONTRACTOR shall not allow a new employee or new subcontractor to begin work on CITY projects without a full and proper safety orientation. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage to prevent damage, injury or loss to:
1. All persons at the Site and other persons and organizations who may be affected thereby;
 2. All the WORK and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of the performance of the WORK.
- B. The CONTRACTOR shall comply with all applicable Laws and Regulations relating to the safety of persons or property or to the protection of persons or property from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may effect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. CONTRACTOR'S duties and responsibilities for safety and for protection of the WORK shall continue until such time as all the

WORK is completed and ENGINEER has issued a notice to the CONTRACTOR in accordance with Paragraph 14.7 B. that the WORK is acceptable.

- C. The CONTRACTOR shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be made available at the Site by the CONTRACTOR for every hazardous product used.
- E. Material usage shall strictly conform to OSHA safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.
- F. The CONTRACTOR shall be responsible for the exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.
- G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended use to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.
- H. Before starting work, the CONTRACTOR shall submit a written safety program to the CITY. The objective of the safety program shall be accident prevention. Such program shall include, but not be limited to, the following:
 - 1. An organization chart and accompanying narrative which describes the responsibility for employee and public safety of those individuals who control each phase of operations and set forth in writing the policies and procedures to be followed by all personnel. The chart shall also show the CONTRACTOR's internal lines of communication (including subcontractors) for the program.
 - 2. A specific program for communication between the CONTRACTOR and CITY on safety matters. The CONTRACTOR shall also designate one person with whom official contact can be made by the CITY on safety matters.
 - 3. Evidence that the CONTRACTOR has become thoroughly familiar with the potential hazards of the work and applicable federal and state regulations.

4. Specific safety procedures and guidelines for conduct of the Work.
5. The CITY's review, comment upon, and/or acceptance of the CONTRACTOR's safety program and/or plan does not in any way negate the responsibilities of the CONTRACTOR for safety or place any responsibility upon the CITY for such safety. Such review comment and/or acceptance shall not be construed as limiting in any manner the CONTRACTOR's obligation to undertake any action which may be necessary or required to establish and maintain safe working conditions at the site.

6.13 EMERGENCIES

- A. In emergencies affecting the safety or protection of persons or the WORK or property at the Site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER, is obligated to immediately act to prevent threatened damage, injury, or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the WORK or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Change Order will be issued to document the consequences of such action.

6.14 SUBMITTALS

- A. After checking and verifying all field measurements and after complying with applicable procedures specified in the Special Provisions, the CONTRACTOR shall submit to the ENGINEER for review all Shop Drawings and details of all structural and reinforcing steel, equipment, electrical controls, structural fabrications, pipe, pipe joints, special pipe sections, and other appurtenances in accordance with the accepted schedule of Shop Drawing submittals specified in the Special Provisions or as otherwise provided in the Contract Documents.
- B. The ENGINEER'S review will be only to determine if the items covered by the submittals will, after installation or incorporation in the WORK, generally conform to the Contract Documents and with the design concept of the completed Project. The ENGINEER's favorable review shall be obtained before any such items are manufactured or used in the work. The favorable review of Drawings by the ENGINEER shall apply in general design only and shall in no way relieve the CONTRACTOR from responsibility for errors or omissions contained therein. Favorable review by the ENGINEER shall not relieve the CONTRACTOR of its obligation to meet safety requirements and all other requirements of law. The ENGINEER will start reviewing the CONTRACTOR's submittals only after the

Notice to Proceed is issued by the CITY with the exception of some unusual long lead items which may require submittals prior to issuing the Notice to Proceed.

- C. The CONTRACTOR shall also submit to the ENGINEER for review all Samples in accordance with the accepted schedule of Sample submittals specified in the Special Provisions or as otherwise provided in the Contract Documents.
- D. Before submittal of each Shop Drawing or Sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the WORK and the Contract Documents. The CONTRACTOR shall provide submittals in accordance with the requirements of the Special Provisions or as otherwise provided in the Contract Documents.
- E. Shop-drawing submittal and coordination are the responsibility of the prime contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Any designation of work "by others," shown on Shop Drawings, shall mean that the work will be the responsibility of the CONTRACTOR rather than the subcontractor or supplier who has prepared the Shop Drawings.

Submittals shall be prepared in such form that data can be identified with the applicable Specification paragraph. The data shall demonstrate clearly compliance with the Drawings and Specifications and shall relate to the specific equipment to be furnished. Where manufacturer's standard drawings are employed, they shall be marked clearly to show what portions of the data are applicable to this Project.

- F. Review of shop-drawing submittals by the ENGINEER has as its primary objective the completion for the CITY of a Project in full conformance with the Drawings and Specifications, unmarred by field corrections, and within the time provided. In addition to this primary objective, shop-drawing review as a secondary objective will assist the CONTRACTOR in its procurement of equipment that will meet all requirements of the Drawings and Specifications, will fit the structures detailed on the Drawings, will be complete with respect to piping, electrical, and control connections, will have the proper functional characteristics, and will become an integral part of a complete operating facility. Acceptance of Shop Drawings and submittals does not constitute a change order to the Contract requirements.
- G. Where the CONTRACTOR is required by these Specifications to make submittals, they shall be submitted to the ENGINEER with a letter of transmittal and in sufficient number of copies to allow a distribution of at least one (1) copy to all parties needing a copy to carry out the provisions of the Specifications, including three (3) copies to be retained by the ENGINEER. The ENGINEER

shall determine the appropriate number of such copies required at the time of the preconstruction conference.

H. Within twenty-five (25) calendar days of receipt by the ENGINEER of each of the CONTRACTOR's submissions and all appurtenant data required for their review, the appropriate number of copies will be returned to the CONTRACTOR with one of the following notations:

1. Resubmittal not required; correction, if any, noted.
2. Correct and resubmit; corrections noted.

Returned copies of Drawings marked with Notation "1" authorize the CONTRACTOR to proceed with the operations covered by such returned copies, provided that such operations be subject to the comments, if any, shown on such returned copies. Returned copies of Drawings marked with Notation "2" shall be corrected, as necessary and required, and shall be submitted in the same manner as before.

I. When submittals are favorably reviewed, the ENGINEER will retain three (3) copies and will return all other copies to the CONTRACTOR. When submittals are not favorably reviewed, the ENGINEER will retain only two (2) copies and will return all others to the CONTRACTOR. It is considered reasonable that the CONTRACTOR shall make a complete and acceptable submission to the ENGINEER at least by the second submission of data. The CITY reserves the right to deduct monies from payments due the CONTRACTOR to cover additional costs of the ENGINEER's review beyond the second submission.

J. Favorable review by the ENGINEER will not constitute acceptance by the ENGINEER of any responsibility for the accuracy, coordination, and completeness of the Shop Drawings or the items of equipment represented on the Drawings. Accuracy, coordination, and completeness of Shop Drawings shall be the sole responsibility of the CONTRACTOR, including responsibility to back check comments, corrections, and modifications from the ENGINEER's review before fabrication. Supplemental, specific requirements for Shop Drawings and details are contained in the applicable technical sections of these Specifications.

K. Copies of schedules and Shop Drawings submitted to the ENGINEER for review shall be such as to provide three (3) copies for the ENGINEER's files, and such additional copies as the CONTRACTOR may desire for its own office files and/or for distribution by it to subcontractors or vendors. Exceptions will be noted in specific sections of Specifications. All Shop Drawings and supporting data, catalogs, and schedules shall be submitted as the instruments of the CONTRACTOR, who shall be responsible for their accuracy and completeness. These submittals may be prepared by the CONTRACTOR, subcontractors, or suppliers, but the CONTRACTOR shall ascertain that submittals meet all of the

requirements of the Contract, while conforming to structural, space, and access conditions at the point of installation. The CONTRACTOR shall check all submittals before submitting them to the ENGINEER.

- L. The ENGINEER shall check and review schedules, drawings, etc., submitted by the CONTRACTOR only for general design conformance with the concept of the Project and compliance with the Contract. Shop Drawings shall not be used to order products' fabrication or delivery for construction or installation unless submitted to and favorably reviewed by the ENGINEER. Acceptance by the ENGINEER of any drawings, method of work, or any information regarding materials and equipment the CONTRACTOR proposes to furnish shall not relieve the CONTRACTOR of its responsibility for any errors therein and shall not be regarded as an assumption of risks or liability by the Design ENGINEER or the CITY, or any officer or employee thereof, and the CONTRACTOR shall have no recourse against the CITY under the Contract on account of the failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Such acceptance shall be considered to mean merely that the ENGINEER has no objection to the CONTRACTOR using, upon its own full responsibility, the plan or method of work proposed or furnishing the materials and equipment proposed.

6.15 CONTINUING THE WORK

- A. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the CITY. No WORK shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the CITY may otherwise agree in writing.

6.16 CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

- A. CONTRACTOR warrants and guarantees that all WORK will be in accordance with the Contract Documents and will not be defective. The CONTRACTOR represents that the WORK performed pursuant to the Contract shall be of the quality specified or of the highest quality if no quality is specified, and shall conform to the Contract Documents. The CONTRACTOR warrants all equipment, material, products, and workmanship furnished and all work performed under the Contract against defects for a period of one (1) year after final acceptance regardless of whether the same were furnished or performed by the CONTRACTOR or by any of its subcontractors or suppliers of any tier.
- B. The CONTRACTOR shall make, at its own expense, all repairs and/or replacements necessitated by defects in the equipment, materials, and/or products and in the workmanship provided by the CONTRACTOR or any of its subcontractors that become evident within the warranty period.

- C. Upon receipt of written notice from the CITY of any breach of warranty during the applicable warranty period, the affected item shall be redesigned, repaired, or replaced by the CONTRACTOR and the CONTRACTOR shall perform such tests as the CITY may require to verify that such redesign, repair, and replacement comply with the requirements of the Contract. The CITY shall have the right to operate and use such equipment, materials, and/or products until they can, without damage to the CITY, be taken out of service for correction or replacement by the CONTRACTOR. As to the redesigned, repaired, or replaced work, the CONTRACTOR warrants such redesigned, repaired, or replaced work against defective design, equipment, materials, products, and workmanship for a period of one (1) year from and after the date of satisfactory completion of such redesigned, repaired, or replaced work. The CITY reserves the right to require that the CONTRACTOR performs such repair or replacement work.
- D. The CITY also reserves the right to make such repairs or replacements, if, within seven (7) calendar days after the mailing of a notice in writing to the CONTRACTOR and Surety, the CONTRACTOR shall neglect to make or undertake with due diligence the aforesaid repairs or replacements and that Surety within seven (7) calendar days after mailing of a notice in writing of such negligence of the CONTRACTOR shall neglect to make or undertake with due diligence the aforesaid repairs or replacements itself, provided, however, that in the case of an emergency where in the opinion of the CITY delay would cause hazard to health or serious loss or damage, repair may be made without notice being sent to the CONTRACTOR or Surety, and the CONTRACTOR shall pay the cost thereof.
- E. All costs including workforce and materials incidental to such redesign, repair, replacement, and testing, including the removal, replacement, and reinstallation of equipment necessary to gain access and all other costs incurred as the result of a breach of warranty shall be borne by the CONTRACTOR whether performed by the CITY or the CONTRACTOR.
- F. Nothing in this section shall be construed to limit, relieve, or release the CONTRACTOR, subcontractor's, and equipment, materials, and/or products suppliers, and other service providers' liability to the CITY for damages sustained as the result of latent defects in the workmanship, equipment, materials, and/or products done and/or furnished by the CONTRACTOR, its subcontractors, suppliers and/or other service providers.
- G. The Performance Bond shall extend for a period of one (1) year after acceptance of the Contract by the CITY and shall cover the CONTRACTOR's obligations resulting from the warranty requirements herein specified.
- H. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

1. Abuse, modification, or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors, or Suppliers, or other individual or entity for whom CONTRACTOR is responsible;
 2. Normal wear and tear under normal usage.
- I. CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of WORK that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents:
1. Observations by ENGINEER;
 2. Recommendation by ENGINEER or payment by CITY of any progress or final payment;
 3. The issuance of a Certificate of Completion by the CITY;
 4. Use or occupancy of the WORK or any part thereof by the CITY;
 5. Any acceptance by CITY or any failure to do so;
 6. Any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice or acceptability by ENGINEER pursuant to Paragraph 14.7 B.;
 7. Any inspection, test, or approval by others; or
 8. Any correction of Defective Work by CITY.

6.17 INDEMNIFICATION

- A. Contractor shall indemnify, defend with counsel acceptable to City, and hold harmless to the full extent permitted by law, City and its officers, officials, employees, agents and volunteers from and against any and all liability, loss, damage, claims, expenses and costs (including, without limitation, attorney fees and costs and fees of litigation) (collectively, "Liability") of every nature arising out of or in connection with Contractor's performance of the WORK or its failure to comply with any of its obligations contained in this Agreement, except such Liability caused by the active negligence, sole negligence or willful misconduct of the City. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:
1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its subcontractors, employees, or

agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;

2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, or Supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees against the CITY and/or the ENGINEER;
3. Liability or claims arising directly or indirectly from or based on the violation of any Laws or Regulations, whether by the CONTRACTOR, its subcontractors, employees, or agents;
4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its subcontractors, employees, or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specified stipulated in this Agreement;
5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the CITY or any other parties by the CONTRACTOR, its subcontractors, employees, or agents;
6. Liability or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR, its subcontractors, employees, or agents;
7. Liability or claims arising directly or indirectly from any breach of the obligations assumed in this Agreement by the CONTRACTOR;
8. Liability or claims arising directly or indirectly from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents, and;
9. Liability or claims arising directly, or indirectly, or consequentially out of any action, legal or equitable, brought against the CITY, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each or any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or area contiguous thereto or its performance of the WORK thereon.

- B. The CONTRACTOR shall reimburse the CITY for all costs and expenses, (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court costs of appeal) incurred by said CITY in enforcing the provisions of this Paragraph.
- C. The indemnification obligation under this Article 11 shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- D. Pursuant to California Public Contract Code Section 9201, City shall timely notify Contractor of receipt of any third-party claim relating to this Agreement.

6.18 CONTRACTOR'S DAILY REPORTS

- A. The CONTRACTOR shall complete a daily report indicating location worked, total manpower for each construction trade, major equipment on Site, each Subcontractor's manpower and equipment, weather conditions, and other related information involved in the performance of the WORK. These components will be decided by the ENGINEER.

6.19 CONTRACT DOCUMENTS AND RECORD DRAWINGS

- A. The CONTRACTOR shall keep on the work site a copy of the Contract Documents and shall at all times give the ENGINEER access thereto. Any drawings included in the Specifications shall be regarded as part thereto and of the Contract. Anything mentioned in these Specifications and not shown on the Project Drawings, or shown on the Project Drawings and not mentioned in these Specifications, shall be of like effect as though shown or mentioned in both. The ENGINEER will furnish from time to time such detail drawings, plans, profiles, and information as he may consider necessary for the CONTRACTOR's guidance. It shall be the duty of the CONTRACTOR to see that the provisions of the Contract Documents are complied with in detail irrespective of the inspection given the work during its progress by the ENGINEER. Any failure on the part of the CONTRACTOR to observe the requirements contained in the Contract Documents will be sufficient cause for the rejection of the work at any time before its acceptance.
- B. The CONTRACTOR shall maintain, at the jobsite, one record set of Drawings in good order and clearly marked to show any deviations which have been made from the Drawings, including concealed construction and utility features which are revealed during the course of construction. Marked prints shall be updated at least once each week and shall be available to the ENGINEER for review as to

currency prior to developing partial payment estimates. Upon completion of the work, the marked set of prints shall be delivered to the ENGINEER.

- C. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the Record Drawings shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.
- D. Requests for partial payments will not be approved if the updated set of Drawings is not in good order or is not kept current. Request for final payment will not be approved until the complete and correct Record Drawings are delivered to the ENGINEER.

6.20 CLEAN UP

The CONTRACTOR shall, at all times, keep the premises, occupied by it in relation to this Contract, in a neat, clean, and safe condition and at all times provide reasonable access thereto. The CONTRACTOR shall, as a minimum, conduct daily inspections to verify that requirements of this Article are being met.

- A. During the progress of the WORK, the CONTRACTOR shall:
 - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of material.
 - 2. Provide adequate storage of all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the environment.
 - 3. Remove any accumulation of scrap, debris, waste material, and other items not required for construction of this work.
 - 4. Dispose of existing materials and equipment to be demolished and removed and all trash such as broken concrete, wood blocking, shipping containers, etc., resulting from the contract work off the premises occupied by the CONTRACTOR, including CITY property, at the CONTRACTOR's expense. CITY-leased dumpsters and other disposal containers on CITY's property, unless specifically provided by the CONTRACTOR, shall not be used by the CONTRACTOR.
 - 5. Maintain all excavation, embankments, haul roads, permanent access roads, Plant site, waste disposal areas, borrow areas, and all other work areas within contract work limits free from dust, as determined by the

ENGINEER. Industry-accepted methods of dust control suitable for the area involved, such as sprinkling, chemical treatment, light bituminous treatment, or similar methods, will be permitted. No separate payment will be made to the CONTRACTOR for dust control.

- B. If the CONTRACTOR fails to comply with any of the foregoing, the CITY will transmit written notification of noncompliance. If, within five (5) calendar days of the written notification, the CONTRACTOR fails to comply, cleanup may be undertaken by the CITY at the expense of the CONTRACTOR.
- C. Upon completion of any portion of any WORK, the CONTRACTOR shall promptly remove all of its equipment, temporary structures, and surplus construction and other materials not to be used at or near the same location during later stages of work. Upon completion of any WORK and before final inspection is made, the CONTRACTOR shall unless otherwise specifically directed by the ENGINEER:
 - 1. Remove from the job site all plant, buildings, tools, surplus materials, equipment, forms, rubbish, scrap, debris, and waste.
 - 2. Clean all paved areas on the site. Completely remove all resultant debris.
 - 3. Visually inspect all interior surfaces, and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only approved cleaning materials and equipment.
 - 4. Restore any improved area used for the CONTRACTOR's work or material storage to its condition at the time the CONTRACTOR moved onto the site or to the satisfaction of the ENGINEER.
 - 5. Schedule final cleaning and improvement restoration to enable the CITY to accept a completely clean and restored project.

6.21 STORM WATER POLLUTION PREVENTION

A. General

- 1. Prevention - The CONTRACTOR shall prevent the pollution of storm drain systems and creeks on or near the construction project site(s) resulting from the construction operation. The CONTRACTOR shall keep pollution out of storm drains by reducing the possibility of accidental discharge of materials and wastes, by reducing erosion and sedimentation, and by any action as required. The CONTRACTOR shall train all employees and subcontractors on the storm water pollution prevention

requirements contained in these Specifications and ensure that all employees and subcontractors are aware of the consequences as described in subsection A.3. below. The CONTRACTOR shall include appropriate subcontract provisions to ensure that these requirements are met by all subcontractors.

2. Notification - If the CONTRACTOR causes or permits the spillage or overflow of any sewage, oil, or petroleum product, hazardous substance, contaminant, or waste that may result in the fluid or substance being discharged directly or indirectly into any storm drains, creeks, wetlands, or other manmade or natural waterways the CONTRACTOR shall notify the CITY as soon as possible to the extent notification can be provided without substantially impeding cleanup or other emergency measures. In no event shall such notification be later than one hour after knowledge of the occurrence.
3. Cleanup - Immediately upon gaining knowledge of such spillage, overflow, or discharge, the CONTRACTOR shall eliminate the cause of the spillage, overflow, or discharge and take action to minimize any damages. The CONTRACTOR shall also immediately implement a cleanup program. The cleanup, including sampling and testing required by regulatory agencies to determine the nature and level of contamination shall be performed and completed to the satisfaction of the various regulatory agencies involved and the CITY, at the expense of the CONTRACTOR. Any fines, penalties, and/or subsequent actions imposed upon the CITY and/or the CONTRACTOR by regulatory agencies related to the spillage, overflow, or discharge and any subsequent monitoring, testing, and reporting, as required by regulatory agencies, shall also be at the expense of the CONTRACTOR. The CONTRACTOR shall keep a stockpile of spill cleanup materials, such as rags or absorbents, readily accessible on site. The quantity of cleanup materials shall be appropriate in consideration of the risk of an occurrence of a spill, overflow or discharge.

B. Management of Nonhazardous Material and/or Waste

1. Designated Area - The CONTRACTOR shall propose designated areas of the project site, for approval by the ENGINEER, suitable for material delivery, storage, and waste collection that to the maximum extent practicable are near construction entrances and away from catch basins, gutters, drainage courses, and creeks.
2. Backfill or Excavated Material - The CONTRACTOR shall not allow backfill or excavated material to enter the storm drains or creeks. When rain is forecast within 24 hours or during wet weather, the

CONTRACTOR may be required to cover such material with a tarpaulin and to surround the material with sand bags.

3. Street Sweeping - At least once per week or more frequently as directed by the ENGINEER, the CONTRACTOR shall clean and sweep roadways and on-site paved areas of all materials attributed to or involved in the work. The CONTRACTOR shall not use water to flush down streets in place of street sweeping.
4. Disposal - At the end of each working day, the CONTRACTOR shall collect all scrap, debris, and waste material, and dispose of such materials properly. The materials may be stored in the CONTRACTOR's yard in stockpiles or placed in dumpsters. The CONTRACTOR shall inspect dumpsters for leaks and replace or repair dumpsters that leak. The CONTRACTOR shall not discharge water from cleaning dumpsters on site. The CONTRACTOR shall arrange for regular waste collection before dumpsters overflow.

C. Management of Hazardous Material and/or Waste

1. Storage - The CONTRACTOR shall label and store all hazardous materials, such as pesticides, paints, thinners, solvents, and fuels, and all hazardous wastes, such as waste oil and antifreeze in accordance with all applicable state and federal regulations. The CONTRACTOR shall store all hazardous materials and all hazardous wastes in accordance with secondary containment regulations. All such materials and wastes shall be covered, as needed, to avoid rainwater becoming polluted with hazardous constituents which could result in potential management of collected rain water as a hazardous waste. The CONTRACTOR shall keep an accurate, up-to-date inventory, including Material Safety Data Sheets (MSDSs), of hazardous materials and hazardous wastes stored on site.
2. Usage - When rain is forecast within 24 hours or during wet weather, the CONTRACTOR shall refrain from applying chemicals in outside areas. The CONTRACTOR shall follow material manufacturer's instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals. The CONTRACTOR shall post warning signs in areas treated with chemicals.
3. Disposal - The CONTRACTOR shall arrange for regular hazardous waste collection to comply with time limits on storage of hazardous wastes. The CONTRACTOR shall dispose of hazardous waste in accordance with all applicable local, state and federal regulations. The CONTRACTOR shall not wash any spilled material into streets, gutters, storm drains, or creeks and shall not bury spilled hazardous materials. The CONTRACTOR shall

report any hazardous materials spill to the CITY in accordance with Section A.2 above.

D. Vehicle/Equipment Cleaning, Maintenance, and Fueling

1. General - The CONTRACTOR shall inspect vehicles and equipment arriving on site for leaking fluids and shall promptly repair leaking vehicles and equipment. Drip pans shall be used to catch leaks until repairs are made.

The CONTRACTOR shall comply with federal, state, and city requirements for aboveground storage tanks.

2. Cleaning - The CONTRACTOR shall perform vehicle or equipment cleaning with water only in a designated, bermed area that will not allow rinse water to run off site into streets, gutters, storm drains, or creeks. Soaps, solvents, degreasers, steam-cleaning equipment, or equivalent methods shall not be allowed.
3. Maintenance and Fueling - The CONTRACTOR shall perform maintenance and fueling of vehicles or equipment in areas that will not allow run-on of storm water or runoff of spills to storm drains and provide for confined clean-up. Examples are working in bermed areas or utilizing drip pans. The CONTRACTOR shall not contaminate the soils or groundwater with such maintenance and fueling activities.

The CONTRACTOR shall use secondary containment, such as a drip pan, to catch leaks or spills any time that vehicle or equipment fluids are dispensed, changed, or poured, and shall clean up leaks and spills of vehicle or equipment fluids immediately and dispose of the waste and cleanup materials as hazardous waste, as described in Section C.3 above.

E. Dewatering Operations

1. Sediment Control - The CONTRACTOR shall route water through a control measure, such as a sediment trap, sediment basin, or Baker tank, to remove settleable solids prior to discharge to the storm drain system. Straw bales shall be placed in front of storm drain inlets as required. Filtration of the water following the control measure may be required on a case-by-case basis. Approval of the control measure shall be obtained in advance from the ENGINEER. If the ENGINEER determines that the dewatering operation would not generate an appreciable amount of settleable solids, the control measure requirement above may be waived.
2. Contaminated Groundwater - If the project is within an area of known groundwater contamination or if contamination is found, water from

dewatering operations shall be tested prior to discharge. If the water quality meets Regional Water Quality Control Board (RWQCB) standards, it may be discharged to a storm drain or creek. Otherwise, the water shall be hauled off site for proper disposal.

F. Paving or Oiling Operations

1. When rain is forecast within 24 hours or during wet weather, the ENGINEER may prevent the CONTRACTOR from paving or oiling the street. The ENGINEER may direct the CONTRACTOR to protect drainage courses by using control measures, such as earth dike, straw bale, and sand bag, to divert runoff or trap and filter sediment.
2. The CONTRACTOR shall prevent saw-cut slurry from entering catch basins and storm drains by limiting the area over which the slurry may spread.
3. The CONTRACTOR shall cover catch basins and manholes when paving or applying seal coat, tack coat, slurry seal, or fog seal.
4. The CONTRACTOR shall not sweep or wash down excess sand (placed as part of a sand seal or to absorb excess oil) into gutters, storm drains, or creeks. The CONTRACTOR shall either collect the sand and return it to the stockpile or dispose of it in a trash container.

G. Concrete, Grout, and Mortar Waste Management

1. Concrete Truck/Equipment Washout - The CONTRACTOR shall not wash out concrete trucks or equipment into streets, gutters, storm drains, or creeks. The CONTRACTOR shall perform washout of concrete trucks or equipment off site or in a designated area on site where the water will flow onto dirt or into a temporary pit in a dirt area. The CONTRACTOR shall let the water percolate into the soil and dispose of the hardened concrete in a trash container. If a suitable dirt area is not available, the CONTRACTOR shall collect the wash water and remove it off site.
2. Exposed Aggregate Concrete Wash Water - The CONTRACTOR shall avoid creating runoff by draining water from washing of exposed aggregate concrete to a dirt area. If a suitable dirt area is not available, the CONTRACTOR shall filter the wash water through straw bales or equivalent material before discharging to a storm drain. The CONTRACTOR shall collect sweepings from exposed aggregate concrete for disposal.

H. Paint Disposal and Clean-up

1. Disposal of Unused Paint - The CONTRACTOR shall carefully use, store and dispose of paint, solvents, chemicals, and waste materials in compliance with all applicable state and federal regulations. The CONTRACTOR shall not dispose of paint to sanitary sewer systems or storm drains. The CONTRACTOR shall utilize other recycling and disposal services as follows:

- a. "Recycling Centers" and "Waste Disposals" as may be listed in the yellow pages.
- b. Local household hazardous waste facility if appropriate.

The CONTRACTOR may dispose of small amounts of leftover latex (water-based) paint by applying the paint to the surface of an item to be discarded and allowing it to dry thoroughly, then disposing of it in a dumpster.

The CONTRACTOR shall store these materials and conduct cleaning of painting equipment and tools in a designated area that will not allow run-on of storm water or runoff of spills. The CONTRACTOR shall not allow wash water from cleaning of painting equipment and tools into streets, gutters, storm drains, or creeks.

2. Disposal of Paint Clean-up Waste - The CONTRACTOR shall remove as much excess paint as possible from brushes, rollers, and equipment before starting cleanup.

- a. The CONTRACTOR shall not discharge cleaning wastes from oil-based paints, buckets, brushes or tools to the sanitary sewer system. The CONTRACTOR shall retain a certified waste hauler to recycle or to dispose of cleaning wastes from oil-based paints at the CONTRACTOR's expense.
- b. The CONTRACTOR may discharge very small amounts of cleaning wastes from brushes, rollers, buckets, and tools contaminated with latex (water-based) paints to the sanitary sewer system provided they do not contain additives with pollutants of concern (e.g., mercury, tributyltin). Brushes, rollers, and tools containing latex paints may be washed over a sink with plenty of water. Buckets containing latex paints shall first be emptied into the original can or discarded as specified in paragraph 1 above. Should excessive amounts of paint or solvent be found in the wastewater discharged, the CONTRACTOR may be subject to

enforcement action by the CITY in accordance with the City Codes.

- c. The CONTRACTOR shall not discharge any of these paint clean-up wastes to storm drains, streets, gutters, or creeks.
 - d. Waste Disposal - The CONTRACTOR shall dispose of waste thinner, solvent, and sludge from cleaning of equipment and tools as hazardous waste, as described in Section C.3 above. The CONTRACTOR shall dispose of excess thinners, solvents, and oil- and water-based paint as hazardous waste.
- I. Contaminated Soil - If the project is within an area of known soil contamination or evidence of soil contamination is found, the CONTRACTOR shall comply with the requirements of all applicable local, state and federal regulations.

ARTICLE 7 – OTHER WORK

7.1 RELATED WORK AT SITE

- A. The CITY may perform other work related to the Project at the Site by the CITY's own forces, have other work performed by utility owners, or let other direct contracts for such other work. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.
- B. The CONTRACTOR shall afford each person who is performing the other work (including the CITY's employees) proper and safe access to the Site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will not only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.
- C. If the proper execution or results of any part of the CONTRACTOR's work depends upon such other work by another, the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work except for latent or nonapparent defects and deficiencies in the other work.

7.2 COORDINATION

- A. If the CITY contracts with others for the performance of other work at the Site, CITY will have sole authority and responsibility in respect of such coordination, unless otherwise provided in the Supplementary General Conditions.

ARTICLE 8 – CITY’S RESPONSIBILITIES

8.1 COMMUNICATIONS

- A. Except as may be otherwise provided in these General Conditions or the Supplementary General Conditions, the CITY will issue all its communications to the CONTRACTOR through the ENGINEER.

8.2 PAYMENTS

- A. The CITY will make payments to the CONTRACTOR as provided in Article 14.

8.3 LANDS, EASEMENTS, AND SURVEYS

- A. The CITY’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.1 and 4.6.

8.4 REPORTS AND DRAWINGS

- A. The CITY will identify and make available to the CONTRACTOR copies of reports of physical conditions at the Site and drawings of existing structures which have been utilized in preparing the Contract Documents as set forth in Paragraph 4.2.

8.5 CHANGE ORDERS

- A. The CITY will execute Change Orders as indicated in Article 10.

8.6 INSPECTIONS AND TESTS

- A. The CITY’S responsibility for inspections and tests is set forth in Paragraph 13.3.

8.7 SUSPENSION OF WORK

- A. The CITY’s right to stop work or suspend work is set forth in Paragraphs 13.4 and 15.1.

8.8 TERMINATION OF AGREEMENT

- A. The CITY's right to terminate services of the CONTRACTOR is set forth in Paragraphs 15.2 and 15.3.

8.9 LIMITATION ON CITY'S RESPONSIBILITIES

- A. The CITY shall not supervise, direct or have control or authority over, nor be responsible for CONTRACTOR's means, methods, techniques, sequences, or procedures of construction or the safety precautions and programs incident thereto, or for any failure of CONTRACTOR to comply with Laws and Regulations applicable to the furnishing or performance of the WORK. CITY will not be responsible for CONTRACTOR's failure to perform or furnish the WORK in accordance with the Contract Documents.

8.10 UNDISCLOSED HAZARDOUS ENVIRONMENTAL CONDITIONS

- A. CITY's responsibility in respect to an undisclosed hazardous environmental condition is set forth in Paragraph 4.5.

ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

9.1 CITY’S REPRESENTATIVE

- A. The ENGINEER will be the CITY’S representative during the construction period. The ENGINEER shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed, and as to the manner of performance and rate of progress of the work; all questions which arise as to the interpretation of the plans and specifications, the proposal and the contract documents therefor; all questions as to the acceptable fulfillment of the contract on the part of the CONTRACTOR; and all questions as to claim and compensation.

9.2 OBSERVATIONS ON THE SITE

- A. The ENGINEER will make observations on the Site during construction to monitor the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. The ENGINEER will not be required to make exhaustive or continuous inspections to check the quality or quantity of the WORK.

9.3 PROJECT REPRESENTATION

- A. The ENGINEER may furnish a Resident Project Representative to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority of any such Resident Project Representative will be as provided in the Supplementary General Conditions.

9.4 CLARIFICATIONS

- A. The ENGINEER will issue with reasonable promptness such written Clarifications of the requirements of the Contract Documents as the ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK

- A. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the Contract Times. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Times, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.6 REJECTING DEFECTIVE WORK

- A. The ENGINEER will have authority to reject Defective Work and will also have authority to require special inspection or testing of the WORK as provided in Article 13.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

- A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals.
- B. The ENGINEER's responsibilities for Change Orders are set forth in Articles 10, 11, and 12.
- C. The ENGINEER's responsibilities for Applications for payment are set forth in Article 14.

9.8 DECISIONS ON DISPUTES

- A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK and interpretation of the requirements of the Contract Document pertaining to the performance of the work shall be determined by the ENGINEER. Any claims in respect to changes in the Contract Price or Contract Times shall be resolved in accordance with the requirements set forth in Articles 10, 11, and 12.

9.9 LIMITATIONS ON ENGINEER'S RESPONSIBILITIES

- A. Neither the ENGINEER's authority to act under this Article 9 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.
- B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory," or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority

to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9 C.

- C. 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 the 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. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, Supplier, or any other person or organization performing any of the WORK.

ARTICLE 10 – CHANGES IN THE WORK

10.1 GENERAL

- A. Without invalidating the Agreement and without notice to any surety, the CITY may at any time or from time to time, order additions, deletions, or revisions in the WORK. Such additions, deletions or revisions will be authorized by a Change Order or Field Order. Upon receipt of any such document, CONTRACTOR shall promptly proceed to implement the additions, deletions, or revisions in the WORK in accordance with the applicable conditions of the Contract Documents.
- B. The CONTRACTOR shall not be entitled to an increase in the contract Price nor an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3.F and G.
- C. The CITY and the CONTRACTOR shall execute appropriate Change Orders covering:
 - 1. Changes in the WORK which are ordered by the CITY pursuant to Paragraph 10.1 A.;
 - 2. Changes required because of acceptance of Defective Work under Paragraph 13.6; and
 - 3. Changes in the Contract Price or Contract Times which are agreed to by the parties under Articles 11 and/or 12, respectively.
- D. If notice of any change in the WORK is required to be given to a surety, the giving of any such notice shall be the CONTRACTOR's responsibility. If the change in the WORK affects the Contract Price, the CITY may require an

adjustment to the amount of any applicable Bond and the amount of each applicable Bond shall be adjusted accordingly.

- E. If the CITY and CONTRACTOR agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the WORK pending the issuance of a Change Order.
- F. If the CITY and the CONTRACTOR are unable to agree as to the extent, if any, of an increase in the Contract Price or an extension or shortening of the Contract Times that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of time and materials so as to minimize the impact on and delays to the WORK, and the CONTRACTOR may make a claim as provided in Articles 11 and 12.

10.2 ALLOWABLE QUANTITY VARIATIONS

- A. In the event of an increase or decrease in the quantity of any bid item under a unit price contract, the total amount of work actually done or materials or equipment furnished will be paid for according to the unit price established for such work under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract Price may be made for changes which result in an increase or decrease in excess of 25 percent of the estimated quantity of any unit price bid item of the WORK.
- B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon by the CITY and the CONTRACTOR by Change Order.

ARTICLE 11 – CHANGE OF CONTRACT PRICE

11.1 GENERAL

- A. The Contract Price constitutes the total compensation payable to the CONTRACTOR FOR PERFORMING THE work. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.
- B. The Contract Price may only be changed by a Change Order. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.
 2. By mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4; or
 3. On the basis of the cost of work (determined as provided in Paragraph 11.3) plus the CONTRACTOR's overhead and profit (determined as provided in Paragraph 11.4).
- C. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and shall state the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within 60 days after the start of such event (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of such event. All claims for adjustment in the Contract Price will be determined by the ENGINEER. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1 C.

11.2 COSTS RELATING TO WEATHER

- A. The CONTRACTOR shall have no claims against the CITY for damages for any injury to work, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment, and work, the CONTRACTOR may be granted a reasonable extension of Contract Times to make proper repairs, renewals, and replacements of the work, materials, or equipment.

11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

- A. **General:** The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the CITY, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in Paragraph 11.5.
- B. **Labor:** The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is

done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from federal, state or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers will be paid only when such costs are not included in the invoice for equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Nondirect labor costs including superintendence shall be considered part of the markup set out in Paragraph 11.4.

C. **Materials:** Materials must be specifically authorized by the ENGINEER. The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the Site in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:

1. All trade discounts and rebaters shall accrue to the CITY, and the CONTRACTOR shall make provisions so that they may be obtained;
2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Except for actual costs incurred in the handling of such materials, markup will not be allowed;
3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the Site, whichever price is lower; and
4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the Site less trade discount. The CITY reserves the right to furnish materials for the extra work and no claim will be allowed by the CONTRACTOR for costs and profit on such materials.

D. **Equipment:** The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current California Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates." Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment will be the rate resulting in the least total cost to the CITY for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the above-

referenced publication, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate. Payment for equipment shall be subject to the following:

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used;
2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number;
3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer;
4. Individual pieces of equipment or tools having a replacement value of \$500 or less, whether or not consumed by use, will be considered to be small tools and no payment will be made therefore.

E. **Equipment Rental Time:** The rental time to be paid for equipment on the Site will be the time the equipment is in productive operation on the extra work being performed and, in addition, will include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the Site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the Site of the extra work on other than the extra work. Rental time will not be allowed while equipment is inoperative due to breakdowns. The rental time of equipment on the work Site will be computed subject to the following:

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation will be considered to be half-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation;
2. When daily rates are listed, any part of a day less than 4 hours operation will be considered to be half-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and

materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs 3, 4, and 5, following;

3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3 D., herein;
4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the Site, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein accordance with the provisions of Paragraph 11.3 B., herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages; and
5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.

F. **Special Services:** Special work or services are defined as that work characterized by extraordinary complexity, sophistication, innovation, or a combination of the foregoing attributes which are unique to the construction industry. The ENGINEER will make estimates for payment for special services and may consider the following:

1. When the ENGINEER and the CONTRACTOR, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its Subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for special services or work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs;
2. When the CONTRACTOR is required to perform work necessitating special fabrication or matching process in a fabrication or a machine shop facility away from the Site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as a special service and accordingly, the invoices for the work may be accepted without detailed itemization; and
3. All invoices for special services will be adjusted by deducting all trade discounts. In lieu of the allowances for overhead and profit specified in

Paragraph 11.4, herein, an allowance of 15 percent will be added to invoices for special services.

- G. **Sureties;** All work performed hereunder shall be subject to all provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to Bonds or supplemental Bonds shall be submitted to the CITY for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S OVERHEAD AND PROFIT

- A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. No additional mark-ups and/or surcharges will be added to the cost. The allowance for overhead and profit will include full compensation for superintendence, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

Overhead and Profit Allowance

Labor 20 percent
Materials 15 percent
Equipment... 15 percent

To the sum of the costs and markups provided for in this Article, an additional 2 percent of the sum will be added as compensation for Bonds and insurance.

- B. It is understood that labor, materials, and equipment for extra work may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein will be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS

- A. The term "cost of the work" shall not include any of the following:
 - 1. Payroll costs and other compensation of CONTRACTOR's officers, executives, proprietors, partners, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and

contracting agents, expeditors, timekeepers, clerks, and other personnel employed by CONTRACTOR whether at the Site or in CONTRACTOR's principal or a branch office for general administration of the WORK all of which are to be considered administrative costs covered by the CONTRACTOR's allowance for overhead and profit;

2. Non-direct labor costs, including superintendence, shall be considered part of the markup for overhead and profit, and no additional payment will be allowed for such;
3. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the Site;
4. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the WORK and charges against CONTRACTOR for delinquent payments;
5. Cost of premiums for all Bonds and for all insurance whether or no CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except as provided by Paragraph 11.4 above);
6. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective Work, disposal of materials or equipment wrongly supplied, and making good any damages to property; and
7. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in Paragraph 11.4.

11.6 CONTRACTOR'S EXTRA WORK REPORT

- A. In order to be paid for extra work, the CONTRACTOR must submit a daily extra work report on the form furnished by the ENGINEER. The form must be completely filled out based on the provisions of Paragraphs 11.3 through 11.5 and signed by the CONTRACTOR and ENGINEER at the end of each work day. Failure to complete the form and obtain appropriate signatures by the next working day after the extra work of the previous day was completed will result in CONTRACTOR's costs for extra work being disallowed.

ARTICLE 12 – CHANGE OF CONTRACT TIMES

12.1 GENERAL

- A. The Contract Times may only be changed by a Change Order. Any claim for an extension of the Contract Times shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 10 days) after the start of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 30 days after the start of such event (unless the ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR is entitled as a result of said event. All claims for adjustment in the Contract Times will be determined by the ENGINEER. No claim for an adjustment in the Contract Times will be valid if not submitted in accordance with the requirements of this Paragraph 12.1 A. An increase in Contract Times does not mean that the CONTRACTOR is due an increase in Contract Price. Only compensable time extensions will result in an increase in Contract Price.
- B. All time limits stated in the Contract Documents are of the essence of the Agreement.
- C. When CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the WORK due to such delay, if a claim is made therefor as provided in Paragraph 12.1.A. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by CITY; acts or neglect of those performing other work as contemplated by Article 7; and fires, floods, epidemics, abnormal weather conditions, or acts of God. Delays attributable to and within the control of any Subcontractor or Supplier shall be deemed to be delays within the control of the CONTRACTOR.
- D. In no event will CITY be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for any increase in the Contract Price or other damages arising out of or resulting from the following:
1. Delays caused by or within the control of CONTRACTOR; or
 2. Delays beyond the control of both CITY and CONTRACTOR including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God, or acts or neglect by those performing other work as contemplated by Article 7.

12.2 EXTENSIONS OF CONTRACT TIMES FOR DELAY DUE TO WEATHER

- A. The CONTRACTOR's construction schedule shall anticipate delay due to unusually severe weather. The number of days of anticipated delay is set forth in the Supplementary General Conditions.
- B. Contract Times may be extended by the ENGINEER because of delays in excess of the anticipated delay. The CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing and request an extension of Contract Times. The ENGINEER will ascertain the facts and the extent of the delay and extend the Contract Times when, in its judgment, the findings of the fact justify such an extension.

ARTICLE 13 – INSPECTIONS AND TESTS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.1 NOTICE OF DEFECTIVE WORK

- A. Prompt notice of Defective Work known to the ENGINEER will be given to the CONTRACTOR. All Defective Work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13. Defective Work may be rejected even if approved by prior inspection.

13.2 ACCESS TO WORK

- A. ENGINEER and other representatives and personnel of CITY, independent testing laboratories, and governmental agencies with jurisdictional interests shall have access to the WORK at reasonable times for their observation, inspecting, and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's Site safety procedures and programs so that they may comply therewith as applicable.

13.3 INSPECTIONS AND TESTS

- A. The CONTRACTOR shall give the ENGINEER not less than 24 hours notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. The CITY shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. For inspection, tests, or approvals covered by Paragraphs 13.3C. and 13.3D. below;

2. That costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.3G. shall be paid as provided in said Paragraph 13.3G.; and
 3. As otherwise provided in the Contract Documents.
- C. If Laws and Regulations of any public body having jurisdiction require any WORK (or any part thereof) to be inspected, tested, or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals; pay all costs in connection therewith; and furnish the ENGINEER the required certificates of inspection or approval.
- D. The CONTRACTOR shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for the ENGINEER's acceptance of materials or equipment to be incorporated in the WORK or acceptance of materials, mix designs, or equipment submitted for approval prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. Such inspections, tests, or approvals shall be performed by organizations acceptable to the ENGINEER.
- E. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the requirements of the Contract Documents. Unless otherwise specified in any Supplementary General Conditions, the cost of such inspection and testing will be borne by the CITY. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.
- F. If any WORK (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER not less than 24 hours notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.
- G. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.

- H. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request shall 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, material, and equipment. If it is found that such work is Defective Work, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to, fees and charges of engineers, architects, attorneys, and other professionals. However, if such work is not found to be Defective Work, 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, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.
- I. No acceptance of equipment, materials, or work shall be construed to result from such inspections by the ENGINEER. Any inspections or tests or waivers thereof shall not relieve the CONTRACTOR of its responsibility for meeting the requirement of the Contract.

13.4 CITY MAY STOP THE WORK

- A. If Defective Work is identified, the ENGINEER may order the CONTRACTOR to stop performance of the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the ENGINEER to stop the WORK shall not give rise to any duty on the part of the ENGINEER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK

- A. If required by the ENGINEER, the CONTRACTOR shall promptly either correct all Defective Work, whether or not fabricated, installed, or completed, or, if the work has been rejected by the ENGINEER, remove it from the Site and replace it with non-defective WORK. The CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, architects, attorneys, and other professionals made necessary thereby.

13.6 ACCEPTANCE OF DEFECTIVE WORK

- A. If, instead of requiring correction or removal and replacement of Defective Work, the CITY prefers to accept the Defective Work, the CITY may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the CITY's evaluation of and determination to accept such Defective Work. If

any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the CITY shall be entitled to an appropriate decrease in the Contract Price.

13.7 CITY MAY CORRECT DEFECTIVE WORK

- A. If the CONTRACTOR fails within a reasonable time after written notice from the ENGINEER to correct Defective Work, or to remove and replace Defective Work as required by the ENGINEER in accordance with Paragraph 13.5A., or if the CONTRACTOR fails to perform the WORK in accordance with the Contract Documents, or if the CONTRACTOR fails to comply with any other provision of the Contract Documents, the CITY may, after seven days written notice to the CONTRACTOR, correct and remedy any such deficiency.
- B. In exercising the rights and remedies under this paragraph, the CITY shall proceed with corrective and remedial action. In connection with such corrective and remedial action, the CITY may exclude the CONTRACTOR from all or part of the Site, take possession of all or part of the WORK, and suspend the CONTRACTOR's services related thereto and incorporate in the WORK all materials and equipment for which the CITY has paid the CONTRACTOR whether stored at the Site or elsewhere. The CONTRACTOR shall provide the CITY and its ENGINEER, access to the Site to enable CITY to exercise the rights and remedies under this paragraph.
- C. All direct, indirect, and consequential cost and damages incurred by the CITY in exercising the rights and remedies under this paragraph will be charged against the CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK; and the CITY shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, the CITY may make a claim therefor as provided in Article 11. Such claim will include, but not be limited to, all costs of repair or replacement of work of others, destroyed or damaged by correction, removal, or replacement of CONTRACTOR's Defective Work and all direct, indirect, and consequential damages associated therewith.
- D. The CONTRACTOR shall not be allowed an extension of Contract Times (or Milestones) because of any delay in the performance of the WORK attributable to the exercise by CITY of CITY's rights and remedies under this paragraph.

13.8 CORRECTION PERIOD

- A. The correction period for Defective Work shall be the longer of:
 - 1. One year after the date of final acceptance;

2. Such time as may be prescribed by Laws and Regulations;
 3. Such time as specified by the terms of any applicable special guarantee required by the Contract Documents; or
 4. Such time as specified by any specific provision of the Contract Documents.
- B. If, during the correction period as defined in Paragraph 13.8A above, any work is found to be Defective Work, the CITY shall have the same remedies as set forth in Paragraphs 13.5, 13.6, and 3.7 above.
- C. Where Defective Work (and damage to other work resulting therefrom) has been corrected, removed, or replaced under this paragraph, the correction period hereunder with respect to such work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN)

- A. The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and shall be incorporated into a form of “Application for Payment acceptable to the ENGINEER.

14.2 UNIT PRICE BID SCHEDULE

- A. Progress payments on account of unit price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

- A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, the Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the Application for Payment and accompanied by such supporting documentation as is required by the Contract Documents.
- B. The Application for Payment shall identify, as a subtotal, the amount of the CONTRACTOR total earnings to date; plus the value of materials stored at the Site which have not yet been incorporated in the WORK; and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for materials stored at the Site, but not yet incorporated in the WORK.

- C. The net payment due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the amount of retainage specified in the Supplementary General Conditions and the total amount of all previous payments made to the CONTRACTOR.
- D. The value of materials stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in any Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the Site or at another location agreed to in writing; provided, each such individual item has a value of more than \$5,000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the CITY's interest therein, all of which will be satisfactory to the CITY.
- E. A ten percent (10%) retention of payment amount shall be held by the CITY from the amount of each Application for Payment.
- F. **OPTIONAL:** Partial payments for mobilization/demobilization costs shall be as follows:
 - 1. Thirty-five percent (35%) of the amount bid for mobilization/demobilization or 1.75 percent of the original Contract Price, whichever is less, shall be paid in each of the first two progress payments.
 - 2. The balance of the amount bid for mobilization/demobilization shall be paid upon completion of all WORK on the project.

14.4 CONTRACTOR'S WARRANTY OF TITLE

- A. The CONTRACTOR warrants and guarantees that title to all WORK, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the CITY no later than the time of payment, free and clear of all Liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

- A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the application to the CITY, or return the application to the CONTRACTOR indicating in writing the ENGINEER'S REASONS FOR REFUSING TO RECOMMEND PAYMENT. In the latter case, the CONTRACTOR may make

the necessary corrections and resubmit the application. If the ENGINEER still disagrees with a portion of the application, it will submit the application recommending the undisputed portion of the application to the CITY for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER'S recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B.) become due and when due will be paid by the CITY to the CONTRACTOR.

- B. The ENGINEER, in its discretion, may refuse to recommend the whole or any part of any payment. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect CITY from loss because:
1. The work is Defective Work or the completed WORK has been damaged requiring correction or replacement.
 2. The Contract Price has been reduced by written amendment or Change Order.
 3. The CITY has been required to correct Defective Work or complete WORK in accordance with Paragraph 13.7.
 4. ENGINEER has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.1 through 15.4 inclusive.
 5. Third party claims filed or reasonable evidence indicating probable filing of such claims; or
 6. Failure of the Contractor to make payments properly to subcontractors or for labor, materials, or equipment; or
 7. Reasonable evidence that the work cannot be completed for the unpaid balance of the contract sum; or
 8. Failure of the Contractor to submit an acceptable construction schedule or failure to update the schedule; or
 9. Damage to the City or another contractor; or
 10. Reasonable evidence that the work will not be completed within the time provided for in the Contract; or

11. Contractor's failure or inability to obtain or maintain insurance coverage and bonds as required by the Contract throughout the course of the job; or
 12. Persistent failure to carry out the work in accordance with the Contract; or
 13. Failure to deliver copies of certified payrolls, as specified in Section 17.11, General Conditions.
 14. In addition, the City may deduct from any such payments due the Contractor any amounts the City may be currently or in the future authorized to retain pursuant to federal, state, or local laws or regulations, any amounts due the City from the Contractor, and any other amounts which the City is otherwise authorized to retain as specified in Special Provisions.
- C. The CITY may refuse to make payment of the full amount recommended by the ENGINEER because:
1. Claims have been made against CITY on account of CONTRACTOR's performance or furnishing of the WORK.
 2. Liens have been filed in connection with the WORK, except where CONTRACTOR has delivered a specific Bond satisfactory to CITY to secure the satisfaction and discharge of such Liens.
 3. There are other items entitling CITY to set-off against the amount recommended, or
 4. CITY has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.5B. through 14.5C and 15.1 through 15.4 inclusive.

The CITY must give the CONTRACTOR immediate written notice stating the reasons for such action and promptly pay the CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by CITY and CONTRACTOR, when CONTRACTOR corrects to CITY's satisfaction the reasons for such action.

14.6 COMPLETION

- A. When the CONTRACTOR considers the WORK ready for its intended use, the CONTRACTOR shall notify the ENGINEER in writing that the WORK is complete. The CONTRACTOR shall attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER considers the WORK complete, the ENGINEER

will prepare and execute and deliver for City Council approval and recordation the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of completion.

14.7 PARTIAL UTILIZATION

- A. The CITY 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 WORK. Whenever the CITY plans to exercise said right, the CONTRACTOR will be notified in writing by the ENGINEER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.
- B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of Partial Utilization, the CITY will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.
- C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the CITY prior to completion of the WORK.

14.8 FINAL APPLICATION FOR PAYMENT

- A. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.6 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in the General Requirements), and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the CITY) of all Liens arising out of or filed in connection with the WORK.

14.9 FINAL PAYMENT AND ACCEPTANCE

- A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt

of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the application to the CITY for payment.

- B. After acceptance of the WORK by the City Council, the CITY will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:
1. Liquidated damages, as applicable;
 2. Amounts withheld by CITY under Paragraph 14.5B. and C. which have not been released; and
 3. In accordance with Section 17.6, one-and-one-half times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the ENGINEER as required by the Contract Documents, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the CITY to cover the value of all such uncompleted or uncorrected items.
- C. Prior to final payment by the CITY, the CONTRACTOR must provide the CITY a fully-executed Conditional Waiver and Release Upon Final Payment in accordance with California Civil Code Section 3262.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.1 SUSPENSION OF WORK BY CITY

- A. The CITY may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt of a notice of resumption of work. The CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both directly attributable to any suspension if the CONTRACTOR makes an approval claim therefor as provided in Articles 11 and 12.

15.2 TERMINATION OF AGREEMENT BY ENGINEER FOR DEFAULT

- A. In the event of default by the CONTRACTOR, the ENGINEER may give seven days written notice to the CONTRACTOR and the CONTRACTOR's surety of CITY's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default within a specified period of time. It will be considered a default by the CONTRACTOR whenever CONTRACTOR shall:
1. Declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors;
 2. Disregard or violate the Laws or Regulations of any public body having jurisdiction;
 3. Fail to provide materials or workmanship meeting the requirements of the Contract Documents;
 4. Disregard or violate provisions of the Contract Documents or ENGINEER's instructions;
 5. Fail to prosecute the WORK according to the approved progress schedule;
 6. Fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents;
 7. Disregard the authority of the ENGINEER; or
 8. Assign or subcontract any part of the work without the ENGINEER's consent.
- B. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the ENGINEER may then issue the notice of termination.

- C. In the event the Agreement is terminated in accordance with Paragraph 15.2A., herein, the CITY may take possession of the WORK and may complete the WORK by whatever method or means the CITY may select. The cost of completing the WORK will be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the CITY. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

15.3 TERMINATION OF AGREEMENT BY CITY FOR CONVENIENCE

- A. Upon seven days' written notice to the CONTRACTOR, the CITY may, without cause and without prejudice to any other right or remedy of the CITY, elect to terminate the Agreement. In such case, the CONTRACTOR shall be paid (without duplication of any items):
 - 1. For completed and acceptable WORK executed in accordance with the Contract Documents, prior to the effective date of termination, including fair and reasonable sums for overhead and profit of such WORK;
 - 2. For expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted WORK, plus fair and reasonable sums or overhead and profit on such expenses;
 - 3. For all reasonable claims, costs, losses, and damages incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. For reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.4 TERMINATION OF AGREEMENT BY CONTRACTOR

- A. The CONTRACTOR may terminate the Agreement upon 14 days written notice to the ENGINEER whenever:
 - 1. The WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the

Agreement has not been received from the ENGINEER within this time period; or

2. The CITY should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the ENGINEER by the CONTRACTOR of a request therefor, unless within said 14-day period the CITY shall have remedied the condition upon which the payment delay was based.
- B. In the event of such termination, the CONTRACTOR shall have no claims against the CITY except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of said paragraph.

ARTICLE 16 – GENERAL TERMS

16.1 GIVING NOTICE

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.2 TITLE TO MATERIALS FOUND ON THE WORK

- A. The CITY reserves the right to retain title to all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with the WORK. Unless otherwise specified in the Contract Documents, neither the CONTRACTOR nor any Subcontractor shall have any right, title, or interest in or to any such materials. The CONTRACTOR will be permitted to use in the WORK, without charge, any such materials which meet the requirements of the Contract Documents.

16.3 RIGHT TO AUDIT

- A. If the CONTRACTOR submits a claim to the ENGINEER for additional compensation, the CITY shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discovery and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plant or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses

all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the CITY deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the ENGINEER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the ENGINEER.

16.4 SURVIVAL OF OBLIGATIONS

- A. All representations, indemnifications, warranties, and guaranties made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the WORK or termination or completion of the Agreement.

16.5 CONTROLLING LAW

- A. This Agreement is to be governed by the law of the state in which the Project is located.

16.6 SEVERABILITY

- A. If any term or provision of this Agreement is declared invalid or unenforceable by any court of lawful jurisdiction, the remaining terms and provisions of the Agreement shall not be affected thereby and shall remain in full force and effect.

16.7 WAIVER

- A. The waiver by the CITY of any breach or violation of any term, covenant or condition of this Agreement or of any provision, ordinance, or law shall not be deemed to be a waiver of any other term, covenant, condition, ordinance, or law or of any subsequent breach or violation of the same or of any other term, covenant, condition, ordinance, or law. The subsequent payment of any monies or fee by the CITY which may become due hereunder shall not be deemed to be a waiver of any preceding breach or violation by CONTRACTOR or any term, covenant, condition of this Agreement or of any applicable law or ordinance.

ARTICLE 17 – CALIFORNIA STATE REQUIREMENTS

17.1 STATE WAGE DETERMINATIONS

- A. As required by Section 1770 and following, of the California Labor Code, the CONTRACTOR shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages available file at the office of the City Clerk, which copies shall be made available to any interested party on request. The CONTRACTOR shall post a copy of such determination at each job site.
- B. In accordance with Section 1775 of the California Labor Code, the CONTRACTOR shall, as a penalty to the CITY, forfeit not more than **\$200.00** for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director for the work or craft in which the worker is employed for any public work done under the contract by him or her or by any subcontractor under him or her.

17.2 WORKERS' COMPENSATION

- A. In accordance with the provisions of Section 3700 of the California Labor Code, the CONTRACTOR shall secure the payment of compensation to its employees.
- B. Prior to beginning work under the Contract, the CONTRACTOR shall sign and file with the ENGINEER the following certification:

“I am aware of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for workers’ compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the WORK of this Contract.”
- C. Notwithstanding the foregoing provisions, before the Contract is executed on behalf of the CITY, a bidder to whom a contract has been awarded shall furnish satisfactory evidence that it has secured in the manner required and provided by law the payment of workers’ compensation.

17.3 APPRENTICES ON PUBLIC WORKS

- A. The CONTRACTOR shall comply with all applicable provisions of Section 1777.5 of the California Labor Code relating to employment of apprentices on public works.

17.4 WORKING HOURS

- A. The CONTRACTOR shall comply with all applicable provisions of Section 1810 to 1815, inclusive, of the California Labor Code relating to working hours. The CONTRACTOR shall, as a penalty to the CITY, forfeit \$25.00 for each worker employed in the execution of the Contract by the CONTRACTOR or by any subcontractor for each calendar day during which such worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week, unless such worker receives compensation for all hours worked in excess of 8 hours at not less than 1-1/2 times the basic rate of pay.

17.5 CONTRACTOR NOT RESPONSIBLE FOR DAMAGE RESULTING FROM CERTAIN ACTS OF GOD

- A. As provided in Section 7105 of the California Public Contract Code, the CONTRACTOR shall not be responsible for the cost of repairing or restoring damage to the WORK which damage is determined to have been proximately caused by an act of God, in excess of 5 percent of the contracted amount, provided, that the WORK damaged was built in accordance with accepted and applicable building standards and the plans and specifications of the CITY. The CONTRACTOR shall obtain insurance to indemnify the CITY for any damage to the WORK caused by an act of God if the insurance premium is a separate bid item in the bidding schedule for the WORK. For purposes of this Section, the term "acts of God" shall include only the following occurrences or conditions and effects: earthquakes in excess of a magnitude of 3.5 on the Richter Scale and tidal waves.

17.6 NOTICE OF COMPLETION

- A. In accordance with the Sections 3086 and 3093 of the California Civil Code, within 10 days after date of acceptance of the WORK BY THE City Council the ENGINEER will file, in the County Recorder's office, a Notice of Completion of the WORK.

17.7 UNPAID CLAIMS

- A. If, at any time prior to the expiration of the period for service of a stop notice, there is served upon the CITY a stop notice as provided in Sections 3179 and 3210 of the California Civil Code, the CITY shall, until the discharge thereof, withhold from the monies under its control so much of said monies due or to become due to the CONTRACTOR under this Contract as shall be sufficient to answer the claim stated in such stop notice and to provide for the reasonable cost of any litigation thereunder; provided, that if the ENGINEER shall, in its discretion, permit CONTRACTOR to file with the ENGINEER the bond referred to in Section 3196 of the Civil Code of the State of California, said monies shall not thereafter be withheld on account of such stop notice.

17.8 RETAINAGE FROM MONTHLY PAYMENTS

- A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the CITY to insure performance under the Contract. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the CITY or with a state or federally chartered bank in California as to the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract.
- B. Alternatively, the CONTRACTOR may request and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided in Section 22300 of the Public Contract Code securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expenses incurred by the escrow agent in administering the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director or his/her designee and the escrow agent. Upon satisfactory completion of the Contract, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of Section 22300 of the Public Contract Code. The CONTRACTOR shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the CONTRACTOR.
- C. Securities eligible for investment under Section 22300 shall be limited to those listed in Section 16430 of the Government Code and to bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the CONTRACTOR and the CITY.

17.9 PUBLIC WORKS CONTRACTS; ASSIGNMENT TO AWARDING BODY

- A. In accordance with Section 7103.5 of the California Public Contract Code, the CONTRACTOR and Subcontractors shall conform to the following requirements. 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 CITY 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. 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.

17.10 PAYROLL RECORDS; RETENTION; INSPECTION; NONCOMPLIANCE PENALTIES; RULES AND REGULATIONS

- A. In accordance with Section 1776 of the California Labor Code the CONTRACTOR and each Subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:
1. The information contained in the payroll record is true and correct.
 2. The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.
- B. The payroll records shall be certified and shall be available for inspection at all reasonable hours at the principal office of the CONTRACTOR on the following basis:
1. A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request as well as submitted electronically online to the Department of Industrial Relations Labor Commissioner: <https://apps.dir.ca.gov/ecpr/DAS/AltLogin>.
 2. A certified copy of all payroll records shall be made available for inspection or furnished upon request to a representative of the body awarding the contract, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
 3. A certified copy of all payroll records shall be made available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the body awarding the contract, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the

CONTRACTOR, Subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the CONTRACTOR.

- C. The certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement or shall contain the same information as the forms provided by the division.
- D. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of the CONTRACTOR awarded the contract or performing the contract shall not be marked or obliterated.
- E. The CONTRACTOR shall inform the ENGINEER of the location of the records including the street address, city and county, and shall, within 5 working days, provide a notice of change of location and address.
- F. The CONTRACTOR shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the CONTRACTOR must comply with this Section. In the event that the CONTRACTOR fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of a subcontractor to comply with this section.

17.11 CULTURAL RESOURCES

- A. The CONTRACTOR's attention is directed to the provisions of the Clean Water Grant Program Bulletin 76A which augments the National Historic Preservation Act of 1966 (16 U.S.C. 470) as specified under Section 01560 - Temporary Environmental Controls, of the General Requirements.

17.12 PROTECTION OF WORKERS IN TRENCH EXCAVATIONS

- A. As required by Section 6705 of the California Labor Code and in addition thereto, whenever work under the Contract involves the excavation of any trench or trenches 5 feet or more in depth, the CONTRACTOR shall submit for acceptance by the ENGINEER, to whom authority to accept has been delegated, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or

other provisions to be made for worker protection from the hazard of caving ground during the excavation, of such trench or trenches. If such plan varies from the shoring system standards established by the Construction Safety Orders of the Division of Occupational Safety and Health, the plan shall be prepared by a registered civil or structural engineer employed by the CONTRACTOR, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents. Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or other protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the CITY or any of its officers, agents, representatives, or employees.

- B. Excavation shall not start until the CONTRACTOR has obtained a permit from the California Division of Industrial Safety and has posted it at the site.

17.13 CONCRETE FORMS, FALSEWORK, AND SHORING

- A. The CONTRACTOR shall comply fully with the requirements of Section 1717 of the Construction Safety Orders, State of California, Department of Industrial Relations, regarding the design of concrete forms, falsework and shoring, and the inspection of same prior to placement of concrete. Where the said Section 1717 requires the services of a civil engineer registered in the State of California to approve design calculations and working drawings of the falsework or shoring system, or to inspect such system prior to placement of concrete, the CONTRACTOR shall employ a registered civil engineer for these purposes, and all costs therefore shall be included in the price named in the Contract for completion of the WORK as set forth in the Contract Documents.

17.14 REMOVAL, RELOCATION, OR PROTECTION OF EXISTING UTILITIES

- A. In accordance with the provisions with the provisions of Section 4215 of the California Government Code, the CITY shall assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the site of any construction project that is a subject of the Contract, if such utilities are not identified by the CITY in the plans and specifications made a part of the invitation for bids. The CITY will compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of the CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work.
- B. The CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the public agency or the owner of the utility to provide for removal or relocation of such utility facilities.

- C. Nothing herein shall be deemed to require the public agency to indicate the presence of existing service laterals or appurtenances when the presence of such utilities on the site of the construction project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of construction; provided however, nothing herein shall relieve the public agency from identifying main or trunklines in the plans and specifications.
- D. If the CONTRACTOR while performing the Contract discovers utility facilities not identified by the public agency in the Contract Documents it shall immediately notify the public agency and utility in writing.
- E. The public utility, where they are the owner, shall have the sole discretion to perform such repairs or relocation work or permit the CONTRACTOR to do such repairs or relocation work at a reasonable price.

17.15 CONTRACTOR LICENSE REQUIREMENTS

- A. In accordance with Section 7028.15 of the California Business and Professions Code:
- B. It is a misdemeanor for any person to submit a bid to a public agency in order to engage in the business or act in the capacity of a contractor within this state without having a license therefor, except in any of the following cases:
 - 1. The person is particularly exempted from this chapter.
 - 2. The bid is submitted on a state project governed by Section 10164 of the Public Contract Code or any local agency project governed by Section 20103.5 of the Public Contract Code.
- C. If a person has previously been convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contract work, or four thousand five hundred dollars (\$4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.
- D. In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, “the price of the contract” for the purpose of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.
- E. This section shall not apply to a joint venture license, as required by Section 7029.1 of the California Business and Professions Code. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his or her individual licensure.

- F. This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed contractors to render services within the scope of their respective practices.
- G. 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. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a public entity who knowingly awards a contract or issues a purchase order to a contractor who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections 7028.7 and 7028.13 inclusive of the California Business and Professions Code. Any contract awarded to, or any purchase order issued to, a contractor who is not licensed pursuant to this chapter is void.
- H. Any compliance or noncompliance with subdivision (G) of this paragraph shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.
- I. A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or contractor and the board failed to respond to the inquiry within three business days. For the purposes of this section, a telephone response by the board shall be deemed sufficient.

17.16 DIGGING TRENCHES OR EXCAVATIONS; NOTICE ON DISCOVERY OF HAZARDOUS WASTE OR OTHER UNUSUAL CONDITIONS; INVESTIGATIONS; CHANGE ORDERS; EFFECT ON CONTRACT

- A. If this Contract involves digging trenches or other excavations that extend deeper than four feet below the surface, the following shall apply:
 - 1. The CONTRACTOR shall promptly, and before the following conditions are disturbed, notify the ENGINEER 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 provisions of existing law.

- b. Subsurface or latent physical conditions at the site differing from those indicated.
- 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.
- d. The ENGINEER 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 the procedures described in the Contract.
- e. In the event that a dispute arises between the ENGINEER 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, but shall proceed with all work to be performed under the Contract. The CONTRACTOR shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

17.17 RETENTION PROCEEDS; WITHHOLDING; DISBURSEMENT

- A. In accordance with Section 7107 of the Public Contract Code with respects to all contracts entered into on or after January 1, 1993 relating to the construction of any public work of improvement the following shall apply:
 - 1. The retention proceeds withheld from any payment by the CITY from the original CONTRACTOR, or by the original CONTRACTOR from any subcontractor, shall be subject to this paragraph 17.18.
 - 2. Within 60 days after the date of completion of the WORK, including any punch-list WORK, the retention withheld by the CITY shall be released. In the event of a dispute between the ENGINEER and the original CONTRACTOR, the CITY may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For the purposes of this paragraph, "completion" means any of the following:
 - a. The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or

commissioning, by the CITY, accompanied by cessation of labor on the work of improvement.

- b. The acceptance by the City Council of the work of improvement.
 - c. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the CONTRACTOR.
 - d. After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the ENGINEER files for record a notice of cessation or a notice of completion.
3. Subject to subparagraph 17.18 A.4, within 10 days from the time that all or any portion of the retention proceeds are received by the original CONTRACTOR, the original CONTRACTOR shall pay each of its subcontractors from whom retention has been withheld, each subcontractor's share of the retention received. However, if a retention payment received by the original CONTRACTOR is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor, if the payment is consistent with the terms of the subcontract.
 4. The original CONTRACTOR may withhold from a subcontractor its portion of the retention proceeds if a bona fide dispute exists between the subcontractor and the original CONTRACTOR. The amount withheld from the retention payment shall not exceed 150 percent of the estimated value of the disputed amount.
 5. In the event that retention payments are not made within the time periods required by this paragraph 17.18, the CITY or original CONTRACTOR shall be subject to a charge of 2 percent per month on the improperly withheld amount, in lieu of any interest otherwise due. Additionally, in any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to attorney's fees and costs.
 6. Any attempted waiver of the provisions of this section shall be void as against the public policy of this state.

17.18 TIMELY PROGRESS PAYMENTS; INTEREST; PAYMENT REQUESTS

- A. If the CITY fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the CONTRACTOR, the CITY shall pay interest to the CONTRACTOR equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.
- B. Upon receipt of a payment request, the ENGINEER shall act in accordance with both of the following:
 - 1. Each payment request shall be reviewed by the ENGINEER as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.
 - 2. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the CONTRACTOR as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
- C. The number of days available to the CITY to make a payment without incurring interest pursuant to this paragraph shall be reduced by the number of days by which the CITY exceeds the seven-day requirement set forth above.
- D. For purposes of this paragraph:
 - 1. A “progress payment” includes all payments due the CONTRACTOR, except that portion of the final payment designated by the contract as retention earnings.
 - 2. A payment request shall be considered properly executed if funds are available for payment of the payment request, and payments is not delayed due to an audit inquiry by the financial officer of the CITY.

17.19 PREFERENCE FOR MATERIAL

- A. In accordance with Section 3400 of the California Public Contract Code, the CONTRACTOR will be provided a period prior to award of the contract for submission of data substantiating a request for a substitution of “as equal” item.

17.20 RESOLUTION OF CONSTRUCTION CLAIMS

- A. In accordance with Section 20104 et Seq. of the California Public Contract Code. This paragraph applies to all claims of \$375,000 or less which arise between the CONTRACTOR and the CITY under this Contract for:
1. A time extension;
 2. Payment of money or damages arising from work done by or on behalf of, the CONTRACTOR pursuant to this CONTRACT and payment of which is not otherwise expressly provided for or the CONTRACTOR is not otherwise entitled to; or
 3. An amount the payment of which is disputed by the ENGINEER.
- B. For any claim set out in Paragraphs A.1, 2, or 3 above, the following requirements apply:
1. The claim shall be in writing and include the documents necessary to substantiate the claim and be accompanied by the following certification:

“CONTRACT PROVISION REQUIRING PERSONAL CERTIFICATION OF ALL CLAIMS:

I, _____, BEING THE _____ (MUST BE AN OFFICER) OF _____ (GENERAL CONTRACTOR), DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CLAIM FOR ADDITIONAL COMPENSATION AND/OR EXTENSION OF TIME, AND KNOW ITS CONTENTS, AND SAID CLAIM IS MADE IN GOOD FAITH; THE SUPPORTING DATA IS TRUTHFUL AND ACCURATE; THAT THE AMOUNT REQUESTED ACCURATELY REFLECTS THE CONTRACT ADJUSTMENT FOR WHICH THE CONTRACTOR BELIEVES THE CITY IS LIABLE; AND, FURTHER THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 12650, ET SEQ. PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT AND/OR OTHER SEVERE LEGAL CONSEQUENCES.”

Claims must be filed on or before the date of final payment. Nothing herein is intended to extend the time limit or supersede notice requirements otherwise provided by Contract for the filing of claims.

The claim must include an actual cost documentation, including hours of work performed, equipment operation costs, and labor and overhead costs, which should be established at a standard percentage. Any overhead costs listed when paid, shall provide full and complete payment for any and all overhead, including jobsite overhead, home office overhead, as well as additional costs arising from disruption, resequencing or acceleration. A notice of POTENTIAL CLAIM shall be submitted in advance of the performance of any work, regardless of type, in which the CONTRACTOR may claim an additional cost. CONTRACTOR shall provide prompt notification of any disagreement in quantities of work performed along with a detailed accounting by means of a schedule update demonstrating any delays incurred.

2. For claims of less than fifty thousand dollars (\$50,000), the ENGINEER shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the CITY may have against the CONTRACTOR.

If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the ENGINEER and the CONTRACTOR.

The ENGINEER's written response to the claim, as further documented, shall be submitted to the CONTRACTOR within 15 days after receipt of further documentation or within a period of time no greater than that taken by the CONTRACTOR in producing the additional information, whichever is greater.

3. For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the ENGINEER shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the CITY may have against the CONTRACTOR.

If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the ENGINEER and the CONTRACTOR.

The ENGINEER's written response to the claim, as further documented, shall be submitted to CONTRACTOR within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the CONTRACTOR in producing the additional information or requested documentation, whichever is greater.

4. If the CONTRACTOR disputes the ENGINEER's written response, or the ENGINEER fails to respond within the time prescribed, the CONTRACTOR may notify the ENGINEER, in writing, either within 15 days of receipt of the ENGINEER's response or within 15 days of the ENGINEER's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the ENGINEER shall schedule a meet and confer conference within 30 days for settlement of the dispute.
5. Following the meet and confer conference, if the claim or any portion remains in dispute, the CONTRACTOR may file a claim pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time CONTRACTOR submits its written claim pursuant to subdivision (a) until the time the claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

C. The following procedures are established for all civil actions filed to resolve claims subject to this article:

1. Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.
2. If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of Article 1.5 of Chapter 1 of Part 3 of Division 2 of the California Public Contract Code shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

In addition to Chapter 2.5 (commencing with Section 1141.10 of Title 3 of Part 3 of the Code of Civil Procedure) any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, also pay the attorney's fees of the other party arising out of the trial de novo .

3. The CITY shall not fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in this Contract.
4. In any suit filed under Section 20104.4 of the California Public Contract Code, the CITY shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

END OF GENERAL CONDITIONS

file name:

SECTION III
SPECIAL PROVISION

SECTION III.

SPECIAL PROVISIONS

3-1. DESCRIPTION OF WORK – In general the project consists of an asphalt grind and overlay with paving grid; minor concrete work for sidewalk, curb and gutter and ADA curb ramps; temporary traffic control, temporary and permanent traffic stripes; signal interconnect and signal pole relocation; pavement markings and markers and signage improvements.

3-2. ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS – If the CONTRACTOR discovers any errors, omissions, discrepancies, or conflicts in the Contract, he/she shall immediately inform the ENGINEER in writing. The ENGINEER will promptly resolve such matters by issuing addenda or change orders. Failure or delay to act on the part of the ENGINEER shall not constitute a waiver of any right afforded the CITY or the ENGINEER by the Contract or constitute an implied approval. Any work affected by such discoveries that is performed by the CONTRACTOR prior to authorization by the CITY shall be at the CONTRACTOR'S risk.

Unless otherwise noted below, conflicts or inconsistencies between parts of the Contract will be resolved by the ENGINEER with a change order or an addendum, if required. Addenda and change orders bearing the most recent date shall prevail over addenda or change orders bearing earlier dates. Any reference to addenda-changed specifications or drawings shall be considered to have been changed accordingly.

In resolving conflicts, errors, or discrepancies, the order of precedence shall be as follows:

- 1) Change Orders/Addenda (most recent in time takes precedence)
- 2) Agreement and Bond Forms
- 3) Special Provisions
- 4) Technical Specifications
- 5) Standard Specifications (Current Caltrans or SSPWC Standard Specifications)
- 6) Drawings
- 7) General Conditions
- 8) Instructions to Bidders
- 9) CONTRACTOR'S Bid (Bid Form)
- 10) Notice Inviting Bids
- 11) Permits from other agencies as may be required by law.

3-3. COOPERATION -.

The CONTRACTOR shall not prevent the City's ability to operate the Water Recycling Facility. This includes coordination of chemical deliveries, as well as potential discharge activities.

3-4. OBSTRUCTIONS -

The CONTRACTOR shall notify the ENGINEER and the appropriate regional notification center for operators of subsurface installations at least 5 working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Underground Service Alert
Northern California (USA)
Telephone: 1 (800) 227-2600

3-5. ORDER OF WORK – The CONTRACTOR shall submit a work plan to the City for review and shall identify proposed order of work to maximize efficiency of construction, minimize impact to the community and maintain safety.

3-6. MAINTAINING TRAFFIC – Attention is directed to Sections 7-1.03, “Public Convenience”, 7-1.04, “Public Safety”, and 12, “Temporary Traffic Control”, of the Standard Specifications, City of Petaluma Traffic Control Design and Construction Standards Series 700 and the latest edition of the California Manual of Uniform Traffic Control Device. Nothing in these special provisions shall be construed as relieving the CONTRACTOR from his/her responsibility as provided in said Section 7-1.04.

The CONTRACTOR will minimize disruption to all traffic (vehicular, transit, bicycle, and pedestrians) during the allowed work window.

Construction traffic shall use the Cypress Ave. entrance, except for vehicles which exceed the weight and geometric limits of the internal site access route and bridge. Large vehicles may use the Lakeville/SR-116 access gate only under the conditions of an approved traffic control plan. **CONTRACTOR is prohibited from making a left turn out of the Lakeville access gate onto SR-116. This condition is required as part of the project, and shall be reflected in the traffic control plan provided for review and approval.**

Personal vehicles of the CONTRACTOR's employees shall not be parked on the traveled way, including any section closed to public traffic. The CONTRACTOR, at all times, shall provide flag person(s) to direct delivery trucks and CONTRACTOR's vehicles entering or leaving the public traffic.

The CONTRACTOR shall notify the City of Petaluma of his/her intent to begin work at least 5 days before work is begun. The CONTRACTOR shall cooperate with local authorities relative to handling traffic through the area and shall make his/her own arrangements relative to keeping the working area clear of parked vehicles.

In addition to the traffic control plan, the CONTRACTOR shall submit a haul route for approval by the ENGINEER. The route must minimize hazardous maneuvers on high-speed roadways as well as minimize traffic on residential streets that are not part of the project. Temporary staging of construction materials shall not occur on streets or areas that are not within the immediate limits of the project.

The Traffic Control Plan shall contain a title block which contains the contractor's name, address, phone number, project superintendent's name, contract name, dates and hours traffic control will be in effect, and a space for review acknowledgement by the City.

The content of the Traffic Control Plan shall include, but not limited to, the following:

- A. Show location and limits of the work zone for each phase or specific operation of construction if requiring different traffic control.
- B. Give dimensions of lanes affected by traffic control that will be open to traffic.
- C. Indicate signing with ca MUTCD designation, cone placement (including spacing), changeable message signs, flashing arrow boards, pavement markings, and other methods of delineation and reference to appropriate standards and sign designations.
- D. Dimension location of signs and cone tapers.
- E. Location of any and all flagmen, if applicable.
- F. Identify facility driveways and access locations affected by construction and show how they will be handled.

The City of Petaluma Traffic Control Design and Construction Standards (Series 700) shown elsewhere in these specifications are guidelines only. The CONTRACTOR is not relieved from his/her responsibility for submitting his/her own traffic control plan.

The CONTRACTOR's failure to comply with the requirements of this section will be sufficient cause for the ENGINEER to suspend work at no cost to the City.

All costs involved for completing all work described in this section shall be considered to be included in the contract price paid for Traffic Control System and no additional compensation shall be allowed therefore.

- 3-7. WATERING - Watering shall conform to the provisions in Section 17, "Watering", of the Standard Specifications except that full compensation for developing water supply shall be considered as included in the prices paid for various contract items for work involving the use of water and no separate payment will be made therefore. The application of water for dust control will not be considered as extra work under any circumstances. Water can be purchased from the City at current rates provided that the CONTRACTOR meters the water so used with a City furnished meter (a deposit will be required) and a CONTRACTOR furnished valve assembly. Attention is directed to drought conditions

and limitations of water provisions, including requiring the use of recycled water instead of potable water and potential quantity restrictions.

- 3-8. PROGRESS SCHEDULE - The CONTRACTOR shall submit a schedule which includes all major tasks and milestones to the City of Petaluma, Public Works and Utilities Department for review at least ten (10) working days prior to start of work.

After beginning of work, updated schedules shall be submitted. No progress payments will be processed without accepted updated schedules.

Payment for the original schedule and updated, weekly schedules shall be considered to be included in the various items of work and no additional compensation will be allowed therefore.

- 3-9. SUPERINTENDENCE - The CONTRACTOR shall designate in writing and submit to the Project ENGINEER two (2) working days before starting work, an authorized representative who shall have the authority to represent and act for the CONTRACTOR for the duration of the contract. Any change in the designation shall require prior approval of the ENGINEER.

When the CONTRACTOR is comprised of two (2) or more persons, firms, partnerships or corporations functioning on a joint venture basis, said CONTRACTOR shall designate in writing before starting work, the name of one authorized representative who shall have the authority to represent and act for the CONTRACTOR.

Said authorized representative shall be present at the site of work at all times while work is actually in progress on the contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the ENGINEER shall be made for any emergency work, which may be required.

If work is in progress and the authorized representative is not on site, the City reserves the right to stop the work at no cost to the City.

Once the work begins, the Superintendent shall keep the ENGINEER informed of the CONTRACTOR's daily schedule. The ENGINEER shall have at least twenty-four (24) hour advance notice of all work, on a daily basis, including SUBCONTRACTOR's work. If the CONTRACTOR fails to notify the ENGINEER, the ENGINEER reserves the right to stop the work at no cost to the City.

In the case of urgency or emergency where the CONTRACTOR's authorized representative is not present on any particular part of the work and where the ENGINEER wishes to give notification or direction, it will be given to and be obeyed by the superintendent or foreperson who may have charge of the particular work or it will be given to and be obeyed by any worker in the area should the superintendent or foreperson not be immediately available.

All costs involved in superintendence shall be included in the contract prices paid for various items of work and no additional payment will be allowed therefore.

- 3-10. SAFETY REQUIREMENT - The CONTRACTOR shall comply with all CAL/OSHA safety requirements. It shall be the CONTRACTOR's sole responsibility for making sure these safety requirements are met and the CONTRACTOR shall fully assume all liabilities for any damages and/or injuries resulting from his or her failure to comply with the safety requirements. Failure on the City's part to stop unsafe practices shall, in no way, relieve the CONTRACTOR of his/her responsibility.

The CONTRACTOR shall first call City of Petaluma Emergency Center at 911, from a regular telephone, and (707) 762-2727 or from a cellular phone (707) 762-4545, if any gas lines or electrical power lines are broken or damaged.

- 3-11. PROJECT APPEARANCE – The CONTRACTOR shall maintain a neat appearance to the work area.

When practicable, debris developed during construction shall be disposed of concurrently with its removal. Stockpiling on the street shall not be allowed.

The CONTRACTOR shall provide dust control as often as required during the construction, and shall clean the roads/streets with street sweepers at least once a day at the end of each working day or more often if safety or appearance conditions warrant. Failure to maintain dust control, street cleaning and/or any required work specified in this section shall result in the City performing the work with other forces and back charge the CONTRACTOR for the costs.

Full compensation for conforming to the provisions in this section, not otherwise provided for, shall be considered as included in prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

- 3-12. RESPONSIBILITY FOR DAMAGE - The CONTRACTOR shall indemnify, hold harmless, release and defend the City of Petaluma, its officers, officials, employees and agents from and against any and all liabilities, claims, demands, losses, damages, expenses, costs (including without limitation costs and fees of litigation) of every nature arising out of or in connection with the activities of the CONTRACTOR, his/her subcontractors, employees and agents, except such loss or damage which was caused by the sole negligence or willful misconduct of the CITY, its employees or agents. The CITY may retain so much of the money due the CONTRACTOR as shall be considered necessary, until disposition has been made of claims or suits for damages as aforesaid.

The CONTRACTOR shall provide great care and ensure no damage occurs to the existing pond levees during construction operations or transportation. Any damage that occurs to the pond levees the CITY will hold the CONTRACTOR liable.

- 3-13. GUARANTEE OF WORK - Neither the final certificate of payment nor any provision in the contract nor partial or entire use of the improvements embraced in this contract by the City or the public shall constitute an acceptance of work not done in accordance with the contract or relieve the CONTRACTOR of liability in respect to any warranties or

responsibility for faulty materials or workmanship. The CONTRACTOR's attention is directed to Article 5, "Bonds and Insurance", of the General Conditions.

- 3-14. NOTICE TO PROCEED, BEGINNING OF WORK, CONTRACT TIME, TIME OF COMPLETION, AND LIQUIDATED DAMAGES – Article 2.3, "Commencement of Contract Times; Notice To Proceed" of the General Conditions is amended to read:

The CONTRACTOR shall begin work within ten (10) working days from the date of Notice To Proceed (NTP) and shall diligently prosecute the same to completion before the expiration of total allocated working days as specified in the Construction Agreement and/or Invitation to Bid, from the date of starting work. The CONTRACTOR shall complete all of the work directed by the ENGINEER in all parts and requirements within the time set forth. A working day is defined in these specifications.

The CONTRACTOR is on notice that it may take approximately eight (8) weeks from the bid opening to obtain the City Council's award of the contract, to process the construction agreement, and to issue the Notice to Proceed.

The CONTRACTOR shall pay to the City of Petaluma the sum of \$1,500 per day for each and every *calendar day's* delay in finishing the work in excess of the number of days prescribed above (and/or in excess of the number of days prescribed for any scheduled operations or works described in the Special Provisions).

A working day is defined as any day, except as follows:

- a. Saturdays, Sundays, and legal holidays
- b. Days on which the CONTRACTOR is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the ENGINEER, from proceeding with at least 75 percent of the normal labor and equipment force engaged on that operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

Should the CONTRACTOR prepare to begin work at the regular starting time of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the CONTRACTOR does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the CONTRACTOR will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom shall be made by the ENGINEER. The CONTRACTOR will be allowed 10 days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects the

CONTRACTOR differs from the ENGINEER; otherwise, the decision of the ENGINEER shall be deemed to have been accepted by the CONTRACTOR as correct. The ENGINEER will furnish the CONTRACTOR a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract, and the number of working days remaining to complete the contract and any time extensions thereof.

Due to construction schedule constraints, CONTRACTOR to identify Critical Path Items for construction, and prepare early submittals/shop drawings for approval and procurement; such as:

- Precast Concrete Headwall
- Rubber Check Valve

3-15. HOURS OF WORK

Weekdays – Weekdays (Monday through Friday) hours shall be from 7:00 a.m. to 5:00 p.m. for all required work except those hours approved by the City of Petaluma or specified in “Order of Work” Section of these special provisions. Work hours for County of Sonoma and Caltrans right of way shall be governed by their respective permit conditions.

Night Hours – Other than emergency work, there will be no night hours allowed on this project.

Liquidated Damages in the sum of Fifteen Hundred Dollars (\$1,500) per day will be assessed against the CONTRACTOR if he fails to comply with any of the daily conditions or operations such as maintaining erosion control facilities, job site/street cleanliness and daily cleanup and traffic control and flagging, as described in the General Conditions, these Special Provisions, and the Technical Specifications.

If the CONTRACTOR closes facility access without prior notice and approval of the ENGINEER within 24 hours, the associated operation will be shutdown at the CONTRACTOR’s expense.

Holidays - Designated holidays are: January 1st, the third Monday in January, the third Monday in February, March 31st, the last Monday in May, July 4th, the first Monday in September, , November 11th, Thanksgiving Day, the day after Thanksgiving, December 24th and December 25th. When a designated holiday falls on a Sunday, the following Monday shall be a designated holiday. When a designated holiday falls on a Saturday, the preceding Friday shall be a designated holiday. The CONTRACTOR shall not work on the designated holidays unless approved in writing by the ENGINEER.

3-16. RECORD ("AS-BUILT") DRAWINGS – The CONTRACTOR shall furnish Record Drawings of the complete project and procure from the Director of Public Works a full sized set of Contract Drawings. Construction drawings shall be on the construction site at all times while the work is in progress. Drawings shall show approved substitutions, if any, of material including manufacturer's name and catalog number. The Drawings shall

be to scale and all indications shall be neat and legible. All information noted on the CONTRACTOR's job-site print shall be transferred to the Record Drawings by CONTRACTOR and all indications shall be recorded in a neat, legible and orderly way. The Record Drawings shall be signed by the CONTRACTOR and turned over to the Director of Public Works before the final acceptance of the project. If the CONTRACTOR fails to provide the City with an acceptable "Record Drawings", the City shall deduct \$2,000 from the amount due CONTRACTOR.

- 3-17. NOTICE OF POTENTIAL CLAIM - If for any reason the CONTRACTOR deems that additional compensation is due him/her for work or materials not clearly provided for in the contract, plans, or specifications or previously authorized extra work, a Notice of Potential Claim shall be made. The CONTRACTOR shall give the ENGINEER a written Notice of Potential Claim for such additional compensation before work begins on the items on which the claim is based. The notice shall set forth the reasons for which the CONTRACTOR believes additional compensation will or may be due and the nature of the costs involved. The CONTRACTOR shall afford the ENGINEER every opportunity and facility for keeping records of the actual cost of the work. The CONTRACTOR shall keep records of the disputed work in accordance with Contract General Conditions, Section 11.3, "Cost of Work (Based on Time and Materials)."

If such notification is not given or the ENGINEER is not afforded proper opportunity by the CONTRACTOR for keeping strict account of actual cost as required, then the CONTRACTOR hereby agrees to waive any claim for such additional compensation. Such notice by the CONTRACTOR and the fact that the ENGINEER has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the CONTRACTOR shall, within 10 calendar days, submit his/her written claim to the ENGINEER who will present it to the City for consideration in accordance with local laws or ordinances. The CONTRACTOR is directed to Section 17.20 "Resolution of Construction Claims" of the General Conditions.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any claim for overhead shall also be subject to audit by the City at its discretion.

Any costs or expenses incurred by the City in reviewing or auditing any claims that are not supported by the CONTRACTOR's cost accounting or other records shall be deemed to be damages incurred by the City within the meaning of the California False Claims Act.

Nothing in this subsection shall be construed as a waiver of the CONTRACTOR's right to dispute final payment based on differences in in-place quantity measurements or computations of unit priced pay items.

- 3-18. PAYMENT FOR MATERIALS ON HAND - At the discretion of the ENGINEER, partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the

contract, plans, and specifications. Such delivered costs of stored or stockpile materials may be included in the next partial payment after the following conditions are met:

1. The material has been stored or stockpiled and protected at the sole expense of the CONTRACTOR at a location acceptable to the City and in a manner acceptable to the ENGINEER.
2. The CONTRACTOR has furnished the ENGINEER with acceptable evidence of the quantity and quality of such stored or stockpiled materials.
3. The CONTRACTOR has furnished the ENGINEER with satisfactory evidence that the material and transportation costs have been paid.
4. The CONTRACTOR has furnished the City legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.
5. The CONTRACTOR has furnished the City evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at anytime prior to use in the work.
6. The CONTRACTOR shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

It is understood and agreed that the transfer of title and the City's payment for such stored or stockpiled materials shall in no way relieve the CONTRACTOR of his/her responsibility for furnishing and placing such materials in accordance with the requirements of the contract, plans, and specifications. In no case will the amount of partial payments for materials on hand exceed 70% of the contract price for the contract items in which the material is intended to be used.

- 3-19. ACCESS TO FACILITIES – All accesses for facility operations shall be maintained at all times, unless otherwise approved by the ENGINEER in writing prior to closure. The CONTRACTOR shall coordinate with facility operations as needed.
- 3-20. ARCHAEOLOGICAL MONITORING – In the event that archaeological materials are found during construction, CONTRACTOR shall notify the ENGINEER immediately and shall temporarily cease work in the area until a determination or investigation of the site can be made by a qualified archaeologist. Archaeologist services shall be provided by the City at no cost to the CONTRACTOR.
- 3-21. STORM WATER MANAGEMENT, AND SEDIMENT AND EROSION CONTROL – CONTRACTOR shall prepare storm water management, and sediment and erosion control measures for implementation and shall maintain these measures during the construction period.

Storm water management, and sediment and erosion control shall include, but not be limited to silt curtains, fiber rolls (sediment logs or wattles), straw bales, drain rock,

check dams, mouse exclusion fencing, siltation basins and as required for construction conditions. Measures shall be submitted to the ENGINEER for review seven (7) days prior to start of construction. The CONTRACTOR shall be responsible for providing the measures that comply with the environmental permits.

The CONTRACTOR shall comply with all Federal, State and local regulations and ordinances governing storm water pollution prevention.

All costs involved for completing all work described in this section shall be considered to be included in the contract price paid for Storm Water Management and Sedimentation/Erosion Control and no additional compensation shall be allowed therefore.

3-22. ITEM INCREASES AND DECREASES -

Increased or Decreased Quantities

Increases or decreases in the quantity of a contract item of work will be determined by comparing the total pay quantity of that item of work with the ENGINEER's Estimate therefor.

If the total pay quantity of any item of work required under the contract varies from the ENGINEER's Estimate therefore by 25 percent or less for increases and 25 percent or less for decreases, payment will be made for the quantity of work of the item performed at the contract unit price.

If the total pay quantity of any item of work required under the contract varies from the ENGINEER's Estimate therefor by more than 25 percent for increases and 25 percent for decreases, in the absence of an executed contract change order specifying the compensation to be paid, the compensation payable to the CONTRACTOR will be determined in accordance with the following sections.

Increases of More Than 25 Percent

Should the total pay quantity of any item of work required under the contract exceed the ENGINEER's Estimate therefore by more than 25 percent, the work in excess of 125 percent of the estimate and not covered by an executed contract change order specifying the compensation to be paid therefor will be paid for by adjusting the contract unit price based upon a force account analysis.

The adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost which will be determined as hereinafter provided, of the total pay quantity of the item. If the costs applicable to the item of work include fixed costs, the fixed costs will be deemed to have been recovered by the CONTRACTOR by the payments made for 125 percent of the ENGINEER's Estimate of the quantity for the

item, and in computing the actual unit cost, the fixed costs will be excluded. Subject to the above provisions, the actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on a force account basis.

When the compensation payable for the number of units of an item of work performed in excess of 125 percent of the ENGINEER's Estimate is less than \$5,000 at the applicable contract unit price, the ENGINEER reserves the right to make no adjustment in the contract unit price if the ENGINEER so elects, except that an adjustment will be made if requested in writing by the CONTRACTOR.

Decreases of More Than 25 Percent

Should the total pay quantity of any item of work required under the contract be less than 25 percent of the ENGINEER's Estimate therefore, an adjustment in compensation pursuant to this Section will not be made unless the CONTRACTOR so requests in writing. If the CONTRACTOR so requests, the quantity of the item performed, unless covered by an executed contract change order specifying the compensation payable therefor, will be paid for by adjusting the contract unit price based upon a force account analysis. In no case shall the payment for that work be less than that which would be made at the contract unit price.

The adjustment of the contract unit price will be the difference between the contract unit price and the actual unit cost, which will be determined as hereinafter provided, of the total pay quantity of the item, including fixed costs. The actual unit cost will be determined by the ENGINEER in the same manner as if the work were to be paid for on a force account basis; or the adjustment will be as agreed to by the CONTRACTOR and the ENGINEER.

The payment for the total pay quantity of the item of work will in no case exceed the payment which would be made for the performance of 25 percent of the ENGINEER's Estimate of the quantity for the item at the original contract unit price.

- 3-23. WAGE RATES - The 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 1773.2. The CONTRACTOR can download this information from the web site: <http://www.dir.ca.gov/dlsr/PWD/>

The most current prevailing wage rates available at the time of bid opening shall be used.

- 3-24. INSTRUCTIONS TO BIDDERS Section 17, "Award of Contract" of the Instruction to Bidders is amended to read:

The award of contract shall be based on the lowest Bid. However, the CONTRACTOR shall submit a bid for each add alternate section. The City reserves the right to award, to the lowest responsive bidder, the combination of base bid plus add alternate sections that will allow the most work to be completed within the City's budget.

3-25. ENVIRONMENTAL PERMIT REQUIREMENTS

CITY has applied for coverage under a Nationwide Permit with US Army Corps, Section 7 Consultation with USFWS and NMFS, Regional Water Quality Control Board Water Quality Certification, California Department of Fish & Game Streambed Alteration Agreement, and coverage under Regionwide 2 with Bay Conservation Development Commission. As the permits are received the CITY shall issue as an Addendum to this Bid Package.

At a minimum, the CONTRACTOR will comply with:

- 1) Construction within and adjacent to the slough and tidal marsh is limited to September 1 to January 31.
- 2) Construction within the Petaluma River is limited to September 1 to October 15.
- 3) Avoidance and Minimization Measures committed to in the permit applications, currently under review by the regulatory agencies, found in the Section VII References.

3-26. SUBMITTALS

The CONTRACTOR shall prepare and submit construction document submittals to the CITY REPRESENTATIVE. Submittals include Shop Drawings, samples, Progress Schedules, Cost Schedules, Daily Reports, Record Drawings, Spare Part List, Operations and Maintenance Manuals, copies of Permits and other items as required by the Contract Documents.

1. CONTRACTOR shall provide a minimum of 14 days for the ENGINEER to review Submittals unless agreed upon otherwise.
2. In accordance with the requirements, deliver to the ENGINEER and CITY REPRESENTATIVE ENGINEER a preliminary schedule of submittals showing the content and proposed dates for delivery of submittals as required herein. All submittals and samples shall become the property of the CITY REPRESENTATIVE.
3. All submittals shall clearly identify the item(s) by Specification Section, Plan sheet number, and include references to applicable standards and codes.
4. Submittals shall be complete in all respects. If the submittals show any deviations from the requirements of the Contract Documents, the deviations and the reasons therefor shall be set forth in the Letter of Transmittal.
5. By providing the submittals, the CONTRACTOR states that the material, equipment, and other work shown thereon conforms to the Contract Documents, except for the deviations set forth in the Letter of Transmittal

Submittal review by the CITY REPRESENTATIVE/ ENGINEER is only for general compliance with the design concept of the Project and general compliance with the Contract Documents, and shall not be construed as relieving the CONTRACTOR of the full responsibility for: providing materials, equipment, and work required by the Contract Documents; the proper fitting and construction of the work; the accuracy and completeness of the submittals; selecting fabrication processes and techniques of construction; and performing the work in a safe and orderly manner.

The CONTRACTOR is responsible for providing shop drawings. The term "Shop Drawings" as used herein shall be understood to include but are not limited to: Design Calculations, Shop Drawings, Fabrication and Installation Drawings, Erection Drawings, lists, graphs, operating instructions, Catalog Sheets, Data Sheets, and similar items.

1. Review, stamp with approval, and submit for review by the CITY REPRESENTATIVE/ENGINEER all Shop Drawing submittals. Submit each Shop Drawing submittal to the CITY REPRESENTATIVE/ENGINEER and transmit with a letter of transmittal listing the Shop Drawings submitted. Indicate on each Shop Drawing submittal the name of the project, the name of the CONTRACTOR, and if any, the names of the suppliers, manufacturers, and subcontractors. Submit Shop Drawing submittals in an orderly sequence, so as to cause no delay in the prosecution of the work. Shop Drawings may be submitted in electronic format.
2. Provide on each Shop Drawing submittal the following Certification Statement, signed by the CONTRACTOR:
3. "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 submittals and other requirements of the CONTRACTORS Agreement."
4. Use a separate transmittal form for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are functionally
5. Assign each submittal a unique number. Clearly note the submittal numbers on the transmittal. Number each submittal with the identifying specification section, followed by a sequential number that represents the CONTRACTOR's assigned number of 01, 02, et cetera. Resubmittals shall be numbered by adding a dot (.) and 01, 02, 03, et cetera to the original submittal number, depending on the number of times the submittal has been resubmitted.

If a submittal is returned to the CONTRACTOR marked "RESUBMITTAL IS NOT REQUIRED. CORRECTIONS, IF ANY, ARE NOTED" a formal revision and resubmission of said submittal will not be required.

If a submittal is returned to the CONTRACTOR marked "REVISE AND RESUBMIT" revise said submittal with responses to the Material Issue Comments and resubmit the corrected submittal to the CITY REPRESENTATIVE/ENGINEER.

As soon as practicable after approval by the ENGINEER of any Shop, Assembly, or Layout Drawing, forward an electronic copy to the CITY REPRESENTATIVE/ENGINEER in PDF format of the approved drawing.

Minimum sheet size shall be 8-1/2 inches by 11 inches for datasheets, manuals, permits and other documents. Minimum sheet size for all drawings is 11 inches by 17 inches and maximum sheet size shall be 24 inches by 36 inches. Every page in a submittal shall be numbered in sequence.

CONTRACTOR is responsible for providing samples. Whenever architectural or paint samples are required, submit not less than three samples of each such item or material to the CITY REPRESENTATIVE/ENGINEER.

1. Submit samples for acceptance a minimum of 15 workdays prior to ordering such material for delivery to the jobsite. Submit samples in an orderly sequence so that dependent materials or equipment can be assembled and reviewed without causing delays in the work.
2. Label or tag all samples individually and indelibly indicate thereon all specified physical characteristics and manufacturer's name for identification and submit to the CITY REPRESENTATIVE/ENGINEER for acceptance. Upon receiving acceptance of the CITY REPRESENTATIVE/ENGINEER, one set of the samples will be stamped and dated by the CITY REPRESENTATIVE/ENGINEER and returned to the CONTRACTOR, one set of samples will be retained by the CITY REPRESENTATIVE/ENGINEER, and one set of samples will remain at the job site until completion of the work.
3. All colors and textures of specified items will be selected by the CITY REPRESENTATIVE/ENGINEER from the manufacturer's standard colors and standard materials, products, or equipment lines

CONTRACTOR is responsible for providing WORK ACTIVITIES REPORTS. A daily written Work Activities Report to the CITY REPRESENTATIVE/ENGINEER summarizing the daily work performed (including work performed by subcontractors), conditions encountered, weather conditions, delays to the work, accidents or safety concerns, and any construction problems or deviations from the requirements of the Contract Documents. Show on the Work Activities Report an itemized breakdown of all labor, material deliveries, equipment, and subcontract labor used in performing the work. Subcontractor Work Activities Reports may be attached but will not be accepted in lieu of the CONTRACTOR Work Activities Report.

CONTRACTOR is responsible for providing SPARE PARTS LIST to the CITY REPRESENTATIVE/ENGINEER a listed of manufacturer recommended spare parts for all mechanical, electrical, and instrumentation equipment. The current list price for each spare part shall be included as well as the name, address, telephone number, and email address of the nearest outlet of each manufacturer or supplier of spare parts to facilitate the CITY REPRESENTATIVE in ordering. Cross- reference all spare parts to the equipment numbers designated in the Contract Documents. Spare parts information may be submitted electronically

SECTION IV
TECHNICAL SPECIFICATIONS

ELLIS CREEK WATER RECYCLING FACILITY OUTFALL RELOCATION PROJECT

TECHNICAL SPECIFICATIONS

CITY OF PETALUMA, CA

Prepared by:



Prepared for:



JUNE 24, 2022



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END OF SECTION

SECTION 02 11 00
CLEARING AND GRUBBING

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section describes the work included in clearing, grubbing, stripping, and mulching to prepare the Ellis Creek Water Recycling Facility Outfall project site for construction operations, and to salvage topsoil and vegetative material for later revegetation of cleared areas.
- B. Perform mulching of vegetative material, stripping of topsoil and salvaging of such within all construction disturbed areas to the limits designated on the Plans and as specified herein. Comply with prohibitions, if any, on the removal of vegetation in accordance with regulatory permit conditions. Comply with seasonal and environmental restrictions as indicated on such permits, or as specified herein.
- C. The removal and storage of topsoil and existing vegetation is included in the work of this section. Topsoil replacement is included in Section 02200, Earthwork.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 Earthwork
- B. Section 02270 Temporary Erosion Control
- C. Section 02940 Revegetation

1.3 SUBMITTALS

- A. Storm Water Pollution Prevention Plan (SWPPP) in accordance with the National Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activities prior to commencing clearing and grubbing operations. The erosion and sedimentation control measures included in the SWPPP shall be in accordance with Section 02270, Temporary Erosion Control as well as local and state guidelines.
- B. Copies of required permits for off-site disposal of cleared material not specified for reuse.
- C. List of equipment to be used for clearing, grubbing, stripping and mulching.

1.4 DEFINITIONS

- A. Topsoil is defined as the top layer of pre-construction ground surfaces and earthen material, excluding vegetation. Salvage material shall include topsoil and mulched native vegetation.

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PART 2 MATERIALS

2.1 TREE WOUND PAINT

- A. Tree wound paint shall be bituminous-based of standard manufacture for treating tree cuts and wounds.

2.2 PROTECTIVE FENCING AND ENVIRONMENTAL FLAGGING

- A. Protective fencing shall be four-foot-tall lightweight polypropylene, orange color barrier safety fencing.
- B. Environmental flagging shall be single strand fluorescent red or orange color, 3-mil thick, 1-3/16-inch-wide vinyl tape.
- C. Support posts for protective fencing and environmental flagging shall be four-foot-tall above grade, placed at maximum spacing of ten feet on center.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING LIMITS

- A. Clear and grub only the areas to be disturbed by excavations, embankments, structures, slabs and roadways. Do not clear and grub topsoil stockpile areas.
- B. Existing trees, shrubbery and other vegetation may not be shown on the Plans. Inspect the site prior to beginning of clearing and grubbing operations to document the nature, location, size and extent of vegetation, structures, fencing, pavement, poles, posts, rock outcroppings and other items within the designated area to be cleared, grubbed, stripped, mulched or preserved, as specified herein. Prior to the start of grading, verify with the Engineer the areas where topsoil is to be salvaged and the locations where topsoil will be stockpiled.

3.2 PROTECTION

- A. Protect and preserve in place all trees, plants, lawns, structures, and other improvements that are specifically designated on the Plans to be preserved, or are not required to be removed for the performance of the work.
- B. Conduct clearing and grubbing operations in a manner that will preserve and protect vegetation beyond the limits of clearing and grubbing. No filling, excavating, trenching or stockpiling of materials shall be permitted within the drip line of the protected vegetation. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of the vegetation. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.

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- C. When protected trees are close together, restrict entry to area within drip line by fencing. In areas where no fence is erected, protect tree trunks two inches or greater in diameter, by encircling the trunk entirely with boards held securely by 12-gauge wire and staples. This protection shall extend from ground level to a height of six feet. Cut and remove tree branches only where such cutting is necessary to effect construction operation. Remove branches other than those required to affect the work to provide a balanced appearance of any tree. Treat scars resulting from the removal of branches with tree wound paint. Replace trees in kind which die as a result of construction work.
- D. Prior to the start of clearing and grubbing, schedule and attend a site observation visit with the Engineer to verify existing conditions and the location of environmentally sensitive areas. Erect protective fencing or environmental flagging around environmentally sensitive areas and along the rights-of-way as shown on the Plans and as directed by the Engineer during the site observation visit. Maintain fencing and flagging in good condition for the duration of the work.

3.3 CLEARING

- A. Remove stumps, shrubs, brush, limbs and other vegetative growth from areas where topsoil salvaging is not required. Remove evidence of their presence from the surface including sticks and branches greater than one inch in diameter or thickness.
- B. Remove all fencing that interferes with construction of new facilities.

3.4 MULCHING OF NATIVE VEGETATION

- A. In areas where topsoil salvaging is required, mulch or crush the existing native vegetation into the topsoil prior to salvaging. Native vegetation shall include grasses, brush, and woody materials. Remove rocks, stumps and branches larger than 12 inches and dispose offsite.
- B. Mulch vegetative material to a size no larger than six inches long by one inch wide by any mechanical means available. Incorporate and store mulched native vegetation with salvaged topsoil.

3.5 TOPSOIL STRIPPING AND SALVAGING

- A. Strip topsoil to a depth of six inches in all disturbed areas, unless otherwise shown or specified. Where the in situ topsoil depth exceeds six inches, and upon written approval of the Engineer, the Contractor may remove suitable topsoil to a depth as directed by the Engineer to meet topsoil replacement requirements described in Section 02200, Earthwork. Do not contaminate topsoil with other excavated materials.

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- B. Stockpile topsoil within the limit of construction, separate from other excavated materials and pile free of undesirable materials. Place topsoil in elongated piles, or "windrows," no greater than six feet in height. Windrows shall run parallel to the easement edge from which the topsoil was removed, or at offsite locations approved by the Engineer. Keep separate stockpiles of the topsoil and native vegetation that is salvaged from distinct vegetative types.
 - 1. Provide the Engineer with an estimate of the quantity of salvaged topsoil at each stockpile location. Mark stockpiled topsoil with signs noting the location where the topsoil was removed, and the type of vegetation that was mulched.
 - 2. Prior to stockpiling topsoil, spread clean rice straw or crushed native vegetation on the ground surface to delineate between the in-situ and salvaged topsoil.
- C. Do not allow weed growth on salvaged topsoil stockpiles. Control weeds in accordance with Section 02940, Revegetation. Do not apply pre-emergent herbicides on topsoil stockpiles. Remove and dispose offsite any weed growth before weeds produce mature seed heads.
- D. If erosion occurs to stockpiled topsoil, or as requested by the Engineer to control erosion, hydroseed without seed in the stockpile areas in accordance with Section 02940, Revegetation.
- E. Protect topsoil stockpiles from intrusion by erecting and maintaining protective fencing around stockpiles.
- F. If the Contractor fails to perform topsoil salvaging, or if the quantity of topsoil salvaged does not equal the quantity of topsoil available for salvaging due to improper removal, storage or maintenance of stockpiles, import additional topsoil in quantities sufficient to meet the topsoil replacement requirements described in Section 02200, Earthwork. Imported topsoil shall be of natural, friable material possessing the characteristics of representative in situ materials.

3.6 GRUBBING

- A. Remove wood or root matter below the ground surface remaining after clearing and stripping, including stumps, trunks, roots or root systems greater than one inch in diameter or thickness to a depth of 12 inches below the ground surface.

END OF SECTION

SECTION 02 14 00
DEWATERING

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes materials, installation, maintenance, operation, and removal of temporary dewatering systems for the control and disposal of surface and groundwaters.
- B. Dewatering is the process of designing, installing, operating, treating, disposing of extracted water, and removing a system that lowers the existing groundwater level while minimizing ground movement due to soil loss from dewatering.
- C. Dewatering is required to two feet below deepest excavation before commencing any excavation work.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 Earthwork
- B. Section 02270 Temporary Erosion Control
- C. Section 15000 General Piping System and Appurtenances

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. National Pollutant Discharge Elimination System (NPDES) Permit for Groundwater Extraction Waste Discharges from Construction

1.4 JOB CONDITIONS

- A. Dewatering includes single or multiple stage well point systems, eductor and ejector type systems, deep wells, and combinations thereof.
- B. Locate dewatering facilities where they shall not interfere with utilities and construction work to be performed by others.
- C. Modify dewatering procedures which cause, or threaten to cause, damage to new or existing facilities, and prevent further damage. Install settlement gauges, as necessary, to monitor settlement of critical structures or facilities adjacent to areas of dewatering. Control the rate of dewatering and fines migration to avoid subsidence.
- D. Comply with Regional Water Quality Control Board Waste Discharge requirements under the currently adopted Order for Permit No. CAG919001 and CAG 919002. Obtain authorization, as required, prior to discharge of groundwater, and comply with the sampling, testing, monitoring, and reporting requirements specified therein.

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- E. The project site will be exposed to tidal condition as well as high groundwater conditions. The contractor shall take appropriate measures to maintain an area of construction that meets project requirements and stays free of water, as needed.

1.5 SUBMITTALS

- A. Shop Drawings which, at a minimum, indicate the proposed type of dewatering system; the arrangement, location, and depths of systems components; a complete description of equipment and instrumentation to be used, with installation, operation, and maintenance procedures; the methods of disposal of pumped water; and the final discharge location.
- B. Well installation or destruction permits.

PART 2 MATERIALS

2.1 MATERIALS AND EQUIPMENT

- A. Furnish and maintain all materials, tools, equipment, facilities, and services as required for providing the necessary dewatering work and facilities.

PART 3 EXECUTION

3.1 DEWATERING

- A. Perform dewatering in accordance with approved Shop Drawings. Keep the Engineer advised of any changes made to accommodate field conditions and, on completion of the dewatering system installation, revise and resubmit Shop Drawings as necessary to indicate the installed configuration.
- B. Organize dewatering operations to lower the groundwater level in excavations as required for prosecution of the work, and to provide a stable, dry subgrade for the prosecution of construction operations.
- C. Maintain water level at lower elevations to avoid buildup of excessive hydrostatic pressure.
- D. Maintain groundwater level a minimum of two feet below the prevailing level of backfill being placed.
- E. Dispose of water in such a manner as to cause no injury or nuisance to public or private property or be a menace to the public health. Dispose of the water in accordance with applicable regulatory agency requirements. Do not drain trench water through the pipeline under construction.
- F. The dewatering operation will be continuous, so that the excavated areas shall be kept free from water during construction, while concrete is setting and achieves full strength, and until backfill has been placed to a sufficient height to anchor the work against possible flotation.

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- G. Prevent disposal of sediments from the soils to adjacent lands or waterways by employing necessary methods, including settling basins. Locate settling basins away from watercourses to prevent silt-bearing water from reaching the watercourse during flow regime.
- H. Where excavations may obstruct the natural flow of a watercourse, implement measures to control and dispose of the surface water that will not adversely affect water quality or beneficial uses of the watercourse. Divert watercourse flows around excavation areas by constructing barriers, temporary culverts, new channels, or other appropriate means.
- I. Do not allow water containing mud, silt or other pollutants from aggregate washing or other construction activities to enter a watercourse or be placed in locations that may be subjected to high storm flows.
- J. Water shall not be discharged within the slough, pond or waterbody at any point. The water shall be discharged above the BCDC jurisdictional line and Mean Higher High-Water line. The final location for dewatering discharge shall be approved by the Engineer or Owners Representative.

3.2 RECORDS

- A. Provide a daily record of the average flow rate. Provide water quality testing as required by the Regional Water Quality Control Board.
- B. Observe and record the elevation of the groundwater during the period that the dewatering system is in operation.

END OF SECTION

SECTION 02 20 00
EARTHWORK

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes materials, testing and other requirements of earthwork for excavation, trenching, shoring, backfilling, compaction and grading necessary for the construction of the work. The excavation shall include the removal and disposal of materials of whatever nature encountered, including water that would interfere with the proper construction and completion of the work.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02110 Clearing and Grubbing
- B. Section 02270 Temporary Erosion Control
- C. Section 02940 Revegetation
- D. Section 15000 General Piping System and Appurtenances
- E. Section 15 06 60 High Density Polyethylene (HDPE) Pipe
- F. Section 31 41 33 Shoring and Trench Safety

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. American Society for Testing and Materials
 - 1. D75 Standard Practice for Sampling Aggregates.
 - 2. D1556 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 3. D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft³ (2,700 kN-m/m³))
 - 4. D1784 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
 - 5. D2419 Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
D2729 Specification for Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
 - 6. D4253 Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

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7. D4254 Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 8. D4632 Test Methods for Grab Breaking Load and Elongation of Geotextiles.
 9. F405 Specification for Corrugated Polyethylene (PE) Pipe and Fittings.
- B. State of California, Department of Transportation, Manual of Test Volumes 1-2-3 (Standard Test Methods)
1. Test 417 - Testing Soils and Waters for Sulfate Content.
 2. Test 422 - Testing Soils and Waters for Chloride Content.
 3. Test 643 - Laboratory Method of Determining Minimum Resistivity.
- C. Standard Specifications for Public Works Construction

1.4 SUBMITTALS

- A. Drawings, sections and supporting calculations for temporary sheeting, temporary shoring, bracing, sloping or other means to provide worker protection during excavation and trenching operations. Provide submittals for each trench section to be constructed and indicate the anticipated locations and lengths for each trench section.
- B. Methods, schedule and equipment to be used for earthwork activities.
- C. Three copies of a report from a testing laboratory verifying that all materials conform to the requirements specified and are asbestos free.
- D. Manufacturer's catalog data and a sample of filter fabric. Submit manufacturer's installation instructions and details for filter fabric.
- E. Ground Penetrating Radar and/or Potholing Report identifying material, size, approximate horizontal and vertical depth to a fixed location, and date potholed. Report should identify each utility with a clear image and Project Plans identifying rough location.

1.5 PLAN FOR SHORING, BRACING OR SLOPING OF TRENCHES

- A. All excavations shall be protected in a manner as set forth in the rules, orders and regulations of the Construction Safety Orders issued by the Division of Industrial Safety. Drawings showing the method of worker protection shall comply with CALOSHA. If, however, such drawings do not comply with CALOSHA, an alternative drawing prepared and signed by a civil or structural engineer registered in the State of California shall be submitted to the Engineer prior to any excavation certifying that the drawing is not less effective than the shoring, bracing, sloping, or other provisions of the Safety Orders.
- B. If the Contractor's trench protection system includes the use of a shield, the shield design shall be approved by the Division of Industrial Safety. Structural details shall indicate the maximum pressure the shield can safely withstand, the trench configuration and supporting calculations

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indicating the maximum pressure against the shield. In portions of the trench near existing facilities, use sheeting or other acceptable methods in lieu of a shield.

- C. Include on the detailed drawing showing the shoring, bracing, sloping and other provisions surcharge loads for nearby embankments and structures, for spoil banks, and for construction equipment and other construction loadings. Indicate on the drawing for all trench conditions the minimum horizontal distances from the side of the trench at its top to the near side of the surcharge loads.
- D. Nothing contained in this section shall be construed as relieving the Contractor of the full responsibility for providing shoring, bracing, sloping, or other provisions which are adequate for worker protection.

1.6 FIELD QUALITY CONTROL

- A. Sampling and testing methods used by the Engineer to determine the performance or lack of performance of backfill materials shall not relieve the Contractor from his responsibilities for compliance with the contract documents.
- B. The following sampling and testing methods will be used by the Engineer:
 - 1. Determination of soil density in place by the sand cone method, ASTM D1556.
 - 2. Determination of laboratory moisture density relations of soils by ASTM D1557.
 - 3. Determination of the relative density of cohesionless soils by ASTM D4253 and D4254.
 - 4. Sampling of backfill materials by ASTM D75.
- C. The City Representative shall determine how many, and from where, the test samples shall be obtained.
- D. Provide the City Representative a minimum two (2) working day advance notice of any work which will require testing and sampling as specified herein.
- E. Allot sufficient time during construction for the performance of any quality control testing deemed necessary by the City Representative. Permit the City Representative to make field density tests of any compacted backfill layer prior to placing additional backfill material.
- F. Any test falling below the specified relative compaction shall be deemed non-compliant with the specifications. Rework the entire area between locations that have passed until all tests in the area meet the specified relative compaction.
- G. Reference to soil classification types shall be pursuant to the Unified Soil Classification System.

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1.7 DEFINITIONS

- A. PAVEMENT ZONE. The pavement zone is defined as the asphalt concrete and aggregate base pavement section, or the concrete flatwork and aggregate base areas, placed over the trench backfill.
- B. STREET ZONE. The street zone is defined as the top 12 inches of the trench immediately below the pavement zone.
- C. TRENCH ZONE. The trench zone is defined as the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.
- D. PIPE ZONE. The pipe zone is defined as the full width of trench from the bottom of the pipe or conduit to a horizontal level above the top of the pipe. Thickness of pipe zone above the top of the pipe shall be 12 inches unless otherwise shown in the contract documents for the particular type of pipe installed. Where multiple pipes or conduits are placed in the same trench, extend the pipe zone from the bottom of the lowest pipe to a horizontal level 12 inches above the top of the highest pipe unless otherwise shown in the contract documents.
- E. PIPE BEDDING ZONE. The pipe bedding zone is defined as a layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width on which the pipe is bedded. Thickness of pipe bedding zone shall be 6 inches unless otherwise shown in the contract documents for the particular type of pipe installed.

PART 2 MATERIALS

2.1 EARTH BACKFILL

- A. Earth backfill is defined as material removed from the required excavations and used as backfill or earth fill. Earth backfill that meets the requirements specified herein may be used for all backfill or fill, except where imported materials are shown on the Plans or specified herein. Do not use stockpiled topsoil for backfill or fill.
- B. Earth backfill shall be excavated material that is free from organic matter, roots, debris, and rocks larger than six inches in the greatest dimension.
- C. Earth backfill used in the trench zone shall be native granular materials free from roots, debris, and organic matter with less than 50 percent passing the No. 200 sieve and with no more than 60 percent gravel (i.e., not less than 40 percent passing the No. 4 sieve) and rock particles with a maximum dimension no greater than six inches.
- D. Where the onsite materials are determined by the City Representative to be unsuitable, imported fill shall be provided by the Contractor.

2.2 STRUCTURAL BACKFILL

- A. Material for structural backfill shall be free from clay balls and shall have a sand equivalent greater than 30 per ASTM D2419 with the following gradation:

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Sieve Size	Percent Passing By Weight
3/4 inch	100
1/2 inch	95 - 100
3/8 inch	50 - 100
No. 4	20 - 65
No. 8	10 - 40
No. 40	0 - 20
No. 100	0 - 5

- B. Excavated material may be used for structural backfill provided it conforms to the specification for structural backfill.

2.3 IMPORTED SAND

- A. Imported sand shall be free from clay balls, organic matter, and other deleterious substances and shall have a coefficient of permeability greater than 0.014 measured in accordance with ASTM D2434 or a sand equivalent of greater than 30 per ASTM D2419. Resistivity for imported sand shall be not less than 2,000 ohm cm when measured in accordance with California Test Method 643. Imported sand shall not exceed a maximum chloride concentration of 200 mg/l when measured in accordance with California Test Method 422 and a maximum sulfate concentration of 500 mg/l when measured in accordance with California Test Method 417.
- B. Imported sand gradation shall conform to SSPWC, Section 200-1.5.5 (A) for Portland cement concrete
- C. If the Contractor elects to use imported sand in the pipe and pipe bedding zones, the entire pipe zone and pipe bedding zone shall be backfilled with the same material placed at the same relative compaction.

2.4 CRUSHED ROCK

- A. Crushed rock shall contain less than 1 percent asbestos by weight or volume and shall conform to the SSPWC, Section 200-1.2, for 3/4 inch crushed rock gradation.
- B. If the Contractor elects to use gravel or crushed rock in the pipe and pipe bedding zones, the entire pipe zone and pipe bedding zone shall be backfilled with the same material placed at the same relative density.

2.5 PERMEABLE MATERIAL

- A. Permeable material shall consist of hard, durable, clean sand, gravel, or crushed stone and shall be free of asbestos, organic material, clay balls or other deleterious substances. Durability Index shall be at least 40 per California Test Method No. 229. Gradation shall be:

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<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
3/4 inch	100
1/2 inch	95 - 100
3/8 inch	70 - 100
No. 4	0 - 55
No. 8	0 - 10
No. 200	0 - 3

2.6 LIGHTWEIGHT FILL MATERIAL

- A. The lightweight fill shall consist of naturally occurring volcanic rock with a maximum unit weight of 65 pounds per cubic foot, minimum Durability Index of 35 (California Test 229), minimum R-value of 50 (California Test 301) and should meet the gradation requirements outlined below.

<u>Sieve Size</u>	<u>Percent Passing By Weight</u>
1-1/2 inch	100
1 inch	95 - 100
3/4 inch	90 - 100
3/8 inch	15 - 85
No. 4	0 - 9

2.7 ROCK REFILL

- A. Rock refill shall be crushed or natural rock containing less than 1 percent asbestos by weight or volume and shall conform to SSPWC, Section 200-1.2 for 1-inch rock.

2.8 CEMENT SLURRY OR ALKALIZED SAND BACKFILL

- A. Cement slurry backfill, where shown on the Plans, shall consist of 1 1/2 sack (94 pounds) Type II Portland cement added per cubic yard of imported sand, except within six inches of a buried flexible pipe coupling, in which case use 1/2 sack (25 pounds) hydrated lime added per cubic yard of imported sand. Within the City of Santee, this option may only be used in narrow trenches.

2.9 RIP-RAP

- A. Stone for rip-rap energy dissipator shall conform with SSPWC, Section 200-1.6. Placement of rip-rap energy dissipator shall be in accordance with the plans. Rock class, bedding and thickness, "T" shall be as indicated on the Plans.
- B. Rip-rap filter fabric shall be placed against a compacted excavated subgrade. Crushed rock shall be placed and compacted atop the filter fabric. Placement of rip-rap by dumping will not be permitted.

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2.10 WATER FOR COMPACTION

- A. Water shall be free of organic materials and have a pH of 7.0 to 9.0, a maximum chloride concentration of 500 mg/l when tested by California Test Method 422, and a maximum sulfate concentration of 500 mg/l when tested by California Test Method 417.

2.11 FILTER FABRIC

- A. Type 180N filter fabric shall conform with SSPWC, Section 213-2.

2.12 DRAIN BOARD

- A. Provide drainboard as indicated on the drawings. Drainboard to be installed vertically adjacent to the length of the concrete headwall. Filter fabric to wrap the drainboard to prohibit sediment from clogging the drain. Drain board must meet the minimum physical properties:

Thickness = 0.40 inches

Compressive Strength = 15,000 psf

Flow Rate = 12.5 gpm/ft

PART 3 EXECUTION

3.1 GENERAL

- A. Bay Mud is not suitable for re-use as trench backfill and should be removed from the site and disposed of.
- B. Sufficient earthwork material to complete the work may not be available at the site. Secure material, as necessary and required permits to complete the project requirements.
- C. Access to the site will be over public roads and restricted to only those private roads shown on the Plans. Exercise care in the use of such roads and repair any damage caused thereto. Such repair shall be to the satisfaction of the or agency having jurisdiction over the road. Take whatever means necessary to prevent damage and tracking of mud onto the existing roads and keep roads free of debris.
- D. Prevent dust from damaging crops, orchards, cultivated fields, and dwellings, or causing a nuisance to persons. Dust control measures shall be in effect for the duration of the Pipeline Project.
- E. Immediately dispose of excavated materials unsuitable for backfill. Excavated materials suitable for backfill may be stored at the site and shaped so as not to interfere with public traffic or to mix with other stockpiled material.
- F. Provide and operate equipment to keep excavations and trenches free of water in accordance with Section 02140, Dewatering.

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- G. Provide adequate facilities for drainage of water from stockpiled excavated material and adequate facilities for handling of storm drainage from the storage area.

3.2 SUPPORT OF EXCAVATIONS

- A. Take necessary measures to protect excavations and adjacent improvements from running, caving, boiling, settling, or sliding soil resulting from high groundwater table, surcharge, or other problems associated with the soil excavated.
- B. Install shoring, sheeting and bracing for trench and structure excavation progressively with the removal of excavated material. Erect sheeting or lagging to exclude groundwater and prevent fines from migrating into the excavation. In soft, wet ground, drive sheeting to a lower elevation level as excavation progresses so that sheeting is embedded in undisturbed earth. Bracing or sheet piling may be permitted to penetrate structural concrete only as approved in advance by the City Representative. Shoring shall be performed in compliance with Section 02250.
- C. The support for excavation shall remain in place until the pipeline or structure has been completed. During the backfilling of the pipeline or structure, the shoring, sheeting and bracing shall be carefully removed so no voids shall be created and no caving, lateral movement or flowing of the subsoils shall occur.
- D. Withdraw the sheeting and bracing members as the backfill is raised, maintaining sufficient support to protect the work and workers. Remove bracing completely. Where unstable conditions may occur in the underlying strata, and withdrawal of the excavation support system may endanger the work, portions of the sheeting and bracing, including pressure treated lagging, may be left in place with approval of the Engineer. Remove all wood within a zone extending five feet below finished grade.
- E. Any damage resulting from improper installation or inadequate maintenance shall be the responsibility of the Contractor.

3.3 EXCAVATION

- A. Excavation is unclassified. Perform all excavation regardless of the type, nature, or condition of the material encountered to accomplish the work. Do not operate excavation equipment within five feet of existing structures or newly completed construction. Accomplish excavation in these areas with hand tools.
- B. Where trenching or excavation occurs in paved areas, sawcut or grind the pavement, regardless of the thickness, and curbs, gutters, and sidewalks prior to excavation of the trenches with a pavement saw or pavement cutter. Width and depth of the pavement cut shall be in accordance with the SSPWC. Remove and dispose of pavement and concrete materials off the site in accordance with local regulations. Do not use for backfill.
- C. Perform excavation for structures to the dimensions and grades indicated. Excavate to such width outside the lines of the structure to be constructed as may be required for proper working methods, the erection of forms, and the protection of the work.

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- D. In areas, where the pipe invert elevation is greater than 3 feet below the top of Bay Mud, use lightweight fill for backfilling to minimize new loads and the potential for settlement. The lightweight fill shall be placed up to the top of Bay Mud. The lightweight fill should be completely wrapped with a geotextile filter fabric of Mirafi FW300 or an approved equivalent.
- E. Compact subgrade until the top 12 inches are compacted to 90 percent relative compaction. Fill holes and depressions to the required line, grade, and cross sections with structural backfill or other material approved by the Engineer. The finished subgrade shall be within a tolerance of plus or minus 0.10 of a foot of the grade and cross section indicated, shall be smooth and free from irregularities, and shall be at the specified relative compaction. The subgrade shall be considered to extend over the full width and extend one foot beyond the edge of the foundations.
- F. Notify the Engineer when structure excavation is complete. Do not place forms, reinforcing steel, concrete, or precast structure until the excavated area has been inspected by the Engineer.

3.4 TRENCH EXCAVATION

- A. Construct the trench to the grades as shown on the Plans and in accordance with the plan for shoring, bracing, or sloping of trenches. Accurately grade the bottom of the trenches to provide uniform bearing and support for each section of the pipe or conduit at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for pipe bells and pipe slings. In order that the pipe rests on the bedding for as nearly its full length as practicable, bell holes and depressions shall be only of such length, depth and width as required for properly completing the joint. Remove stones and hard objects protruding above grade as necessary to avoid pointbearing.
- B. Where earth fills or embankments are required to cover the pipe, construct and compact the fill to an elevation of one-foot minimum greater than the top of the largest pipe or conduit to be installed. Excavate trench in the newly compacted fill or embankment. Compact backfill above the pipe zone to the same relative compaction as the original fill or embankment.
- C. The material excavated from unshored trenches may be temporarily placed alongside the trench beyond a one horizontal to one vertical plane drawn upward from the lower of the base of excavation. Do not obstruct drainage courses, roadways or streets.

3.5 TRENCH WIDTHS

- A. When using mechanical compaction methods, both maximum and minimum trench widths in the pipe zone shall be as shown on the Plans, except the maximum width may be increased as necessary for sheeting and bracing and for the proper performance of the work. Notify the Engineer if the trench width exceeds the maximum allowable width for any reason.
- B. Trench width at the top of the trench shall not be limited, except where the width of excavation would undercut or endanger adjacent structures, utilities and footings, or exceeds the permitted disturbance limits provided for the work. In such case, width of trench shall be such that there is at least 18 inches between the top edge of the trench and the structure, utility or footing.

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3.6 DRAINBOARD

A. Preparation

1. Concrete Surface Preparation: Prepare concrete surfaces to receive drainage composite per manufacturers recommendations. Surfaces shall be smooth, free of depressions, voids, protrusions, clean and free of other surface contaminants that may impair the performance of drainage and manufacturer's warranty requirements.

B. Installation

1. Vertical Surfaces
 - a. Completed Walls: Position the panel with the flat side against the wall and filter fabric toward the sol/drainage side. A Contact Adhesive may be used to attach the drain board panel over the waterproofing membranes.
 - b. Connecting Adjacent Panels: Connect adjacent panels at the longitudinal edge by pulling the filter fabric back to expose the flange. The panel edge should be butted to the edge of the adjacent panel dimple to dimple, or the edge of the next panel may overlap to the onto the next panel. Panel ends are the be attached in the same manner. Connections should be completed in shingle fashion so that the moisture will flow with the overlap and not against it. Overlap fabric in the direction of water flow. Cover all terminal edges with the filter fabric flap by tucking in behind the drainboard and if there is insufficient fabric, the core shall be cut out from the fabric by a depth of 3 dimples to provide excess fabric for wrapping the core.
2. Discharge Connections: Weepholes: Cut a hole in the core corresponding to the size and location of the weep hole. Avoid cutting a hole in the fabric by cutting the backside of the core between the dimples. A four dimples square cut between the dimples (2 ½ square inch) should be sufficient for most applications.

C. Cleaning and Protection

1. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove constructions debris from project site and legally dispose of debris.
2. Protection: Protect installed products finished surfaces from damage during construction.

3.7 OVER-EXCAVATION

- A. After the required excavation has been completed, the City Representative will inspect the exposed subgrade to determine the need for any additional excavation. Conduct over-excavation to the depth and as directed by the City Representative in all areas where

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unsuitable materials exist at the exposed subgrade and replace with structural backfill, rock refill or other suitable material approved by the City Representative.

- B. Over-excavation shall include the removal of all such unsuitable material that exists directly beneath the influence of the pipeline or structure and within a zone outside and below the structure defined by a line sloping at one horizontal to one vertical from one foot outside the edge of the structure footing.
- C. Payment for over-excavation directed by the City Representative will be made in accordance with unit price bid items for over-excavation or as extra work. Payment for over-excavation during trench excavation will be made for the area which is located directly below the allowable trench width as shown on the Plans.
- D. No additional payments will be made for over-excavation and placement of structural backfill, rock refill or other suitable material not directed by the City Representative. No compensation shall be made for over-excavation and placement of such material for the Contractor's convenience.

3.8 PLACING AND COMPACTING FILL

- A. Remove form materials and trash from the excavation before placing any fill material.
- B. Remove uncompacted fill, loose and disturbed soils until firm soils or formational material are exposed. The removed materials may be used as compacted fill provided they are free of deleterious materials.
- C. Scarify the exposed surface to a depth of six inches, moisture condition to within 2 percent of optimum moisture content, and compact to at least 90 percent relative compaction. Obtain approval from the City Representative of the exposed surface before placement of fill.
- D. Add water to the backfill material or dry the material as necessary to obtain a moisture content within 2 percent of optimum. Obtain a uniform moisture content throughout the material of each layer being compacted.
- E. If the backfill material becomes saturated from rains or any other source, remove and replace the unsatisfactory material with suitable material compacted to the specified density. No additional payment will be made for removal and replacement of unsatisfactory material.
- F. Where fill is to be constructed on slopes steeper than five to one, excavate an equipment width keyway beneath the toe at the base of the fill. The keyway will have a minimum width of ten feet and slope at least 2 percent into the slope. Continue benching into competent material as the fill progresses up slope. All benching shall be approved by the Engineer.
- G. Place fill in six- to eight-inch lifts, brought to within 2 percent of optimum moisture content, and compacted to at least 90 percent relative compaction. Do not place rocks larger than six inches in maximum dimension in the fills.
- H. Provide special attention to compaction along the top and outer edge of the fill slope during construction. Backroll fill slopes after each fill lift is completed. Perform additional rolling

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and trimming as may be required at the finish of the slope construction to correct local surficial slumping.

3.9 PLACING AND COMPACTING STRUCTURAL BACKFILL

- A. Place structural backfill material around structures, channels, vaults, manholes, and other structures to a minimum distance of five feet from the outside structure surface, or to the limits shown on the Plans. Do not exceed loose lifts of eight inches. Compact each lift to 95 percent relative compaction. Stop structural backfill 12 inches below finished grade in areas where topsoil is to be replaced.
- B. Do not operate earthmoving equipment within five feet of any concrete structure. Backfill shall not be placed until the concrete has developed to at least 75 percent of the 28-day compressive strength, and in all cases not less than 48 hours after the last pour. Place and compact fill or backfill adjacent to concrete structures with hand-operated tampers, roller wheels, or other equipment that shall not damage the structure.
- C. Confirm with Geotechnical Engineer for approval prior to affixing pipe within the headwall. No active settlement may be observed, and base for headwall must be compacted to 95% relative compaction.

3.10 TRENCH BACKFILL AND COMPACTION

- A. Unless otherwise shown in the Plans or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as follows:
 - 1. Pipe zone and pipe bedding zone - 90 percent relative compaction.
 - 2. Trench zone - 90 percent relative compaction.
 - 3. Street zone - 95 percent relative compaction.
 - 4. Rock refill for foundation stabilization - 80 percent relative density.
 - 5. Rock refill for overexcavation - 80 percent relative density.
- B. Place bedding and backfill materials true to the lines, grades, and cross-sections indicated on the Plans and compacted to the degree specified herein. Place bedding and backfill materials in horizontal uncompacted lifts not exceeding eight (8) inches in thickness. The difference in level on either side of a pipe shall not exceed eight (8) inches.
- C. Unless otherwise indicated, use crushed rock or imported sand for pipe bedding and pipe zone materials.
- D. If the material for the pipe zone and pipe bedding consists primarily of gravel or crushed rock, provide a filter fabric between the gravel or crushed rock and the material being used as backfill in the trench zone and on the sides of the pipe and pipe bedding zones between the native material and the gravel or crushed rock to prevent migration of fines. Filter fabric shall not be required where sand is used as the backfill material in the pipe zone and pipe bedding zone, unless directed by the Engineer. Filter fabric shall be overlapped a minimum of one foot.

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- E. Protect the pipe from damage during construction. Replace or repair broken or damaged pipe or pipe coatings. For tamping of backfill over the pipe, use tampers, vibratory rollers, and other equipment that shall not injure or disturb the pipe. Carefully place backfill around and over the pipe and do not allow it to fall directly upon the pipe. Place backfill material carefully and evenly onto the backfill previously placed in the pipe zone to prevent lateral movement of the pipe. Do not permit free fall of the material until at least two feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pipe.
- F. Backfilling of the trench above the pipe zone shall not proceed until the required compaction in the pipe zone has been tested, verified and accepted by the Engineer.
- G. Compact material placed within 12 inches of the outer surface of the pipe by hand tamping only.
- H. Do not allow construction traffic nor highway traffic over the pipe trench until the trench backfill has been compacted and brought back even with existing adjacent grade.

3.11 ALTERNATIVE TRENCH BACKFILL METHODS

- A. At the Contractor's option one or more procedures for the placement of backfill to achieve the required compaction may be submitted to the City Representative. Clearly identify the proposed material, equipment, maximum lift thickness, and number of passes of the compaction equipment to obtain the necessary compaction.
- B. At the beginning of the Pipeline Project, prepare a test section using the proposed compaction equipment and backfill material to experiment with each backfill procedure. Do not commence with backfill operations until one backfill procedure has been selected and accepted by the City Representative.
- C. Limit the maximum lift height to 1/2 of the pipeline diameter. Periodic monitoring and testing will be performed by the Engineer to determine that the requirements of the specification are being met. Proposed changes in methods and/or materials shall be retested as provided herein.

3.12 HYDRAULIC CONSOLIDATION AND VIBRATION

- A. Compaction by hydraulic consolidation or jetting and vibration shall be permitted when, as determined by the City Representative, the material is of such character that it shall be self-draining when compacted, that foundation materials shall not soften or be otherwise damaged by the applied water, and no damage from hydrostatic pressure shall result. No sluicing or flooding of backfill material will be allowed.
- B. Prior to compaction by hydraulic consolidation, submit procedures, proposed material, equipment, maximum lift thickness, methods of removing excess water, and prepare a test section using the proposed procedure. Include methods to prevent the removal of fines from the backfill material and to prevent the creation of voids. Do not commence with hydraulic consolidation operations until the procedure has been accepted by the City Representative. Periodic monitoring and testing will be performed by the Engineer to determine that the requirements of the specification are being met. Retest each proposed change in methods and/or change in materials.

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- C. When hydraulic consolidation and vibration is permitted, place and compact the washed sand in layers not exceeding four feet in thickness. Water jets shall be of sufficient length to extend to the bottom of each layer. Operate the jets with sufficient water pressure to settle the backfill thoroughly.
- D. The material shall be settled to the satisfaction of the City Representative throughout the length and depth of each layer before discontinuing operations on said layer. Each previously placed layer shall have drained and shall be unyielding, as determined by the Engineer, before placing subsequent layers thereon.
- E. Where natural drainage fails to remove excess water from the soil as required to achieve the specified compacted density, remove the excess water by pumping.

3.13 PLACING CEMENT SLURRY

- A. Provide batching equipment to obtain the proper weights of sand, cement, water and admixtures. The cement slurry as discharged from the mixer must be uniform in composition and consistency throughout each batch. On slopes, a stiffer mix of cement slurry may be required. In such cases, use vibration to ensure the cement slurry completely fills all spaces.
- B. The pipe may be supported on rock bags or sand bags so that the cement slurry flows under the pipe until the slurry appears on the other side. Where required to prevent uplift, place the cement slurry in two stages, allowing sufficient time for the initial set of the first stage before the remainder is placed.
- C. Do not place backfill above the pipe until the cement slurry has reached the initial set. If backfill is not placed over the cement slurry within eight hours, place a six-inch minimum cover of moist backfill over the cement slurry.

3.14 SITE GRADING

- A. Perform earthwork to the lines and grades shown on the Plans. Shape, trim, and finish slopes to conform with the lines, grades, and cross sections as shown. Remove exposed roots and loose rocks exceeding three inches in diameter. Round tops of banks to smooth curves to not less than a six-foot radius. Neatly and smoothly trim rounded surfaces.
- B. Shape, trim and finish slopes around structures as shown on the Plans. Maintain a 2 percent grade away from all structures for a minimum of three feet all around. Provide positive drainage away from all structures.
- C. Maintain temporary construction roads in a safe condition free from rock, boulders, roots, ruts, or other debris which impairs normal use.

3.15 TOPSOIL REPLACEMENT

- A. Replace topsoil after completion of backfilling, compaction and site grading. With the exception of permanent access roads and structures, replace topsoil in the same areas and to the same depth from where the topsoil was originally removed. Pursuant to Section 02110, Clearing and Grubbing, import topsoil, as required, to meet the replacement requirement.

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- B. Spread the salvaged topsoil over all specified areas at a uniform depth. Unify the topsoil with surface soils by scarifying the compacted surface perpendicular to the slope to a depth of 12 inches using rippers spaced 12 inches apart. Do not operate equipment on or otherwise recompact scarified surfaces.

3.16 DISPOSAL OF EXCESS MATERIALS

- A. Immediately dispose of unsuitable excavated material. No prearranged disposal site or related permits have been determined or secured. Obtain written permission and/or permit(s) from the property owner(s) where excess or unsuitable material will be disposed.
- B. Obtain a release from individual property owner(s) absolving the City from any and all responsibility in connection with the disposal of such material. Provide the City Representative with two copies of each release and permit.
- C. Haul excavated materials from the work site to approved disposal location(s) during the hours permitted in accordance with local traffic control regulations. Provide traffic control as required by the agency having jurisdiction. Material may be stockpiled temporarily at locations on the work site if approved in writing by the City Representative.

3.17 RESTORATION

- A. Grade the right of way to the contours of the original ground and match the adjacent undisturbed ground. Make surfaces free of all cleared vegetation, rubbish, and other construction wastes. Dispose of all excess excavation, surface rocks and spoil.
- B. Replace curbs, gutters, sidewalks, asphalt and paving as shown on the Plans or in conformance with the requirements of the agency having jurisdiction. When there is no agency requirements, replace asphalt and paving in conformance with the SSPWC.

END OF SECTION

SECTION 02 27 00
TEMPORARY EROSION CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. This WORK shall consist of temporary measures needed to control erosion and water pollution. These temporary measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. These temporary measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the PROJECT, and as directed by Engineer, and as shown on the DRAWINGS.
- B. The Erosion Control Plan presented in the DRAWINGS serves as a minimum for the requirements of erosion control during construction. Contractor has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the PROJECT. Therefore, if the provided plan is not working sufficiently to protect the PROJECT areas, then Contractor shall provide additional measures as required to obtain the required protection. Contractor shall include in the BID price for erosion control a minimum of all items shown on the Erosion Control Plan and any additional items that may be needed to control erosion and water pollution.

1.2 RELATED SECTIONS

- A. Section 31 23 19 Dewatering
- B. Section 31 11 00 Cast in Place Concrete
- C. Section 03 35 00 Clearing and Grubbing

1.3 SUBMITTALS

- A. Section 01 30 00 – Contractor Submittals
- B. Erosion Control Plan.
- C. Construction schedule for Erosion Control per Article Scheduling.
- D. Sequencing Plan per Article Scheduling.
- E. Plan for disposal of waste material per Article Scheduling.
- F. Product data for materials proposed for use.
- G. All applicable permits for Erosion Control.

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1.4 SCHEDULING

A. Sequencing Plan

1. Contractor shall submit a sequencing plan for approval for erosion control in conformance with Contractor's overall Construction Plan for approval by City Representative.
2. Changes to the Erosion Control Sequencing Plan may be considered by City Representative only if presented in writing by the Contractor.

B. Temporary Erosion Control:

1. When so indicated in the Contract Documents, or when directed by Engineer, Contractor shall prepare construction schedules for accomplishing temporary erosion control WORK including all maintenance procedures.
2. These schedules shall be applicable to clearing and grubbing, grading, structural WORK, construction, etc.

C. Contractor shall submit for acceptance the proposed method of erosion control on haul roads and borrow pits and a plan for disposal of waste material.

D. Contractor shall be required to incorporate all permanent erosion control features into the PROJECT at the earliest practicable time as outlined in the accepted schedule. Temporary erosion control measures shall then be used to correct conditions that develop during construction.

E. WORK shall not be started until the erosion control schedules and methods of operations have been accepted.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials shall be submitted for approval prior to installation.

B. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.

C. Grass Seed:

1. Temporary grass cover (if required) shall be a quick growing species, suitable to the area, in accordance with local criteria and permit requirements, which will provide temporary cover, and not compete with the grasses sown for permanent cover.

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2. All grass seed shall be approved by Engineer and in accordance with local regulations prior to installation.
- D. Fertilizer and soil conditioners shall be approved by Engineer and in accordance with local regulations prior to installation.
- E. Hydroseed mix shall meet requirements shown on the drawings.

PART 3 EXECUTION

3.1 GENERAL

- A. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to ensure continued performance of their intended function.
- B. City Representative will monitor Contractor's erosion control and WORK methods.
 1. If the overall function and intent of erosion control is not being met, City Representative will require Contractor to provide additional measures as required to obtain the desired results.
 2. Costs for any additional erosion control measures shall be paid for at contract unit prices.
- C. The erosion control features installed by Contractor shall be adequately maintained by Contractor until the PROJECT is accepted.
- D. Working In or Crossing Watercourses and Wetlands:
 1. Construction vehicles shall be kept out of watercourses to the extent possible.
 2. Where in-channel WORK is necessary, precautions shall be taken to stabilize the WORK area during construction to minimize erosion.
 - a. The channel (including bed and banks) shall always be restabilized immediately after in-channel WORK is completed.
 3. Where a live (wet) watercourse must be crossed by construction vehicles during construction, a Temporary Stream Crossing shall be provided for this purpose.

3.2 PROTECTION OF ADJACENT PROPERTIES

- A. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.
- B. In addition to the erosion control measures required on the DRAWINGS, perimeter controls may be required if damage to adjacent properties is likely, and may include, but is not limited to:

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1. Vegetated buffer strip around the lower perimeter of the land disturbance.
 - a. Vegetated buffer strips may be used only where runoff in sheet flow is expected and should be at least twenty (20) feet in width.
- C. Sediment barriers such as straw bales, erosion logs, and silt fences.
- D. Sediment basins and porous landscape detention ponds.
- E. Combination of above measures.

3.3 CONSTRUCTION

A. Stabilization of Disturbed Areas

1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.
2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.

B. Stabilization of Sediment and Erosion Control Measures:

1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.
2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.
3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.
 - a. Stabilization of Waterways and Outlets
 - 1) All onsite stormwater conveyance channels used by Contractor for temporary erosion control purposes shall be designed and constructed with adequate capacity and protection to prevent erosion during storm and runoff events.
 - 2) Stabilization adequate to prevent erosion shall also be provided at the outlets of all pipes and channels.
 - b. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction, or which drain stormwater runoff from a construction site shall be protected from sediment deposition by the use of filters.
 - c. Construction Access Routes

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- 1) Wherever construction vehicles enter or leave a construction site, a Stabilized Construction Entrance is required.
- 2) Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.
- 3) Sediment shall be removed from roads by shoveling or sweeping and be transported to a sediment-controlled disposal area.
- 4) Street washing shall be allowed only after sediment is removed in this manner.

3.4 DISPOSITION OF TEMPORARY MEASURES

- A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by City Representative.
- B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.
- C. Substantial Completion of Erosion Control Measures
 1. At the time specified in the Contract Documents, and subject to compliance with specified materials and installation requirements, Contractor shall receive a Substantial Completion Certificate for temporary erosion control measures.
 2. Maintenance of Erosion Control Measures after Substantial Completion: Contractor shall be responsible for maintaining temporary erosion control measures as specified in the DRAWINGS and Contract Documents until such time as WORK has been accepted by City Representative as specified in Section 01 77 00, Closeout Procedures.
- D. Final Completion and Acceptance of Erosion Control Measures
 1. After Engineer and City Representative have determined that the drainage area has stabilized, Contractor shall remove all remaining temporary erosion control measures.
 2. Any damage to the site shall be repaired to the satisfaction of Engineer and at no cost to City Representative.

END OF SECTION

SECTION 02 41 19
SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes inspection, demolition, cutting, salvaging, disposal of debris, and restoration of existing structures and facilities.
- B. The facility involved in this work will be in continuous operation during the construction period. This will require that the Contractor plan the Work carefully to work around unavoidable obstacles in the prosecution of the Work. It will require further that the Contractor complete some new construction facilities required in the renovation work before removing existing like facilities during transitional work.
- C. Utility services to facilities to be removed or demolished shall be disconnected, cut, and capped, as required.
- D. The work includes restoration of existing structures and facilities to remain in place that are damaged by demolition and removal operations.

1.2 RELATED SECTIONS

- A. Section 02 11 00 Clearing and Grubbing
- B. Section 02 27 00 Temporary Erosion Control

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A10.6 Safety Requirements for Demolition Operations

1.4 REGULATORY REQUIREMENTS

- A. In addition to the foregoing referenced standards, the regulatory requirements which govern the work of this Section include the following governing codes:
 - 1. California Code of Regulations (CCR), Title 8, Chapter 4, Subchapter 4, Construction Safety Orders.
 - 2. California Code of Regulations (CCR), Title 24, Part 2, California Building Code, Chapter 33, "Site Work, Demolition and Construction."

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1.5 PERMITS

- A. The Contractor shall obtain all special permits and licenses and give all notices required for performance and completion of the selective demolition and removal work, hauling, and disposal of debris.

1.6 SUBMITTALS

- A. Selective Demolition Plan: Submit a comprehensive selective demolition plan, describing the proposed sequence, methods, and equipment for demolition, removal, and disposal of structure(s); include salvage if required. Do not proceed with demolition work until the City Representative has approved the selective demolition plan.
- B. Permits: Submit copies of demolition, hauling, and debris disposal permits and notices for record purposes. Include description of proposed haul routes.
- C. Utility Severance Certificates: Provide certificates, issued by the utility owners, of severance of utility services for record purposes.
- D. Private Property Owner's Release: If material demolished and removed from the site will be deposited on private property, submit two copies of written releases not more than 15 days before the start of work. Releases shall absolve the City from responsibility in connection with the depositing of material on private property and shall be signed by the owners of such property on which the material will be deposited.
- E. Record Documents: Provide copies of all approved submittals, specified herein, for record purposes.

1.7 SITE CONDITIONS

- A. Protection of Persons and Property: Erect and maintain temporary bracing, shoring, lights, barricades, baffles, curtains, signs, and other measures as necessary to protect the public, workers, and adjoining property from damage from demolition work, all in accordance with applicable codes and regulations.
- B. Protection of Utilities:
 - 1. Protect active sewer, water, gas, electric, and other utilities; and drainage and irrigation lines indicated or, when not indicated, found, or otherwise made known to the Contractor before or during demolition work. If utility is damaged, immediately notify the utility owner for corrective action.
 - 2. Arrange with and perform work required by utility companies and municipal departments for discontinuance or interruption of utility services due to demolition work.
- C. Noise and Dust Abatement: Comply with requirements specified in Section 02 27 00 - Temporary Erosion Controls, and the following:

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1. Provide continuous noise and dust abatement as required to prevent disturbance and nuisance to the public and workers and to the occupants of adjacent premises and surrounding areas. Dampen or cover areas affected by demolition operations as necessary to prevent dust nuisance.
2. When a certain level of noise is unavoidable because of the nature of the work or equipment involved, and such noise is objectionable to the occupants of adjacent premises, make arrangements with the authorities having jurisdiction to perform such work or operate such equipment at the most appropriate time periods of the day. Provide abatement measures to the extent feasible and practicable.

D. Unknown Conditions:

1. The Contract Drawings and related documents may not represent all surface conditions at the site and adjoining areas. The known surface conditions are as indicated and shall be compared with actual conditions before commencement of work.
2. Existing utilities and drainage systems below grade are located from existing documents and from surface facilities such as manholes, valve boxes, area drains, and other such surface fixtures.
3. If existing active services encountered are not indicated or otherwise made known to the Contractor and interfere with the permanent facilities under construction, notify the Engineer in writing, requesting instructions on their disposition. Take immediate steps to ensure that the service provided is not interrupted, and do not proceed with the work until written instructions are received from the Engineer.

PART 2 PRODUCTS

2.1 MATERIALS, EQUIPMENT, AND FACILITIES

- A. The Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities, and services as required for performing the selective demolition and removal work.
- B. Materials forming portions of the structure indicated to be removed shall become the Contractor's property, and the Contractor shall be responsible for their removal from the site.

PART 3 EXECUTION

3.1 INSPECTION

- A. Prior to starting selective demolition operations, perform a thorough inspection of the premises, and report to the Engineer any defect.
- B. Examine areas affected by the Work of this Section and verify the following conditions:

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1. Disconnection of utilities as required.
 2. That utilities serving occupied portions of adjacent or surrounding facilities will not be disturbed, except as otherwise indicated.
- C. If unsatisfactory conditions exist, notify the Engineer, and do not begin demolition operations until such conditions have been corrected.

3.2 PREPARATION

- A. The limits of the site are shown on the Contract Drawings. The Contractor shall confine its operations within the site limits indicated.
- B. Lay out cutting work at the site and coordinate with related Work for which cutting is required.
- C. Review the proposed layout with the Engineer prior to performing cutting operations.

3.3 DEMOLITION

- A. Operational Procedures and Methods:
 1. Perform demolition and removal work in accordance with the approved Selective Demolition Plan. Perform demolition work in accordance with ANSI A10.6 and the California Code of Regulations, Title 8, and Title 24, as applicable.
 2. Operational procedures shall be optional with the Contractor as far as procedures do not infringe on the approved work schedule or salvage requirements. Conduct demolition and removal work in a manner that will minimize the spread of dust and flying particles.
 3. Remove items indicated for demolition within the limits of the Work and as required to complete the Work of this Contract. Do not remove anything beyond the limits of Work indicated without prior written approval of the Engineer. If in doubt whether to remove an item, obtain written approval of the Engineer prior to proceeding.
 4. Remove materials carefully, to the extent indicated and as required, providing for neat and orderly junctions between existing and new materials.
 5. Protect existing structures, facilities, and landscaping from damage. Items damaged because of demolition operations shall be repaired or replaced, as required, at no increase in the Contract Price.
 6. Perform work to provide the least interference and most protection to existing facilities and improvements to remain.
 7. Demolish concrete and masonry in small sections. Perform demolition with small tools as much as possible. Blasting will not be permitted.

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B. Jackhammering:

1. Jackhammering will be permitted only to a limited degree with prior approval of the Engineer.
2. Do not jackhammer within two inches of reinforcing or structural steel to remain. Remove final two inches of material with a chipping gun.

3.4 CUTTING

- A. Cut new openings neat, as close as possible to profiles indicated.
- B. Do not cut or alter structural members without the prior written approval of the Engineer.
- C. Remove concrete and masonry whenever possible by saw cutting or similar approved method.

3.5 SALVAGING

- A. Before demolition commences, confirm with the City Representative any items to be salvaged such as k-rails, swamp pads, or other miscellaneous items.
- B. Where salvaging is required, procedures shall be such that the maximum amount of salvage will result.
- C. Coordinate the Work of this section closely with the Work of other sections of these Specifications requiring salvage and reuse of materials.
- D. Refer to other Divisions for mechanical and electrical equipment removal and salvage requirements.

3.6 DISPOSAL OF DEBRIS

- A. Dispose of removed materials, waste, trash, and debris in a safe, acceptable manner, in accordance with applicable laws and ordinances and as prescribed by authorities having jurisdiction.
- B. Burying of trash and debris on the site will not be permitted. Burning of trash and debris at the site will not be permitted.
- C. Remove trash and debris from the site at frequent intervals so that their presence will not delay the progress of the work.
- D. Removed materials, trash, and debris shall become the property of the Contractor and shall be removed from the City's property and disposed of in a legal manner. Location of disposal site and length of haul shall be the Contractor's responsibility.

3.7 RESTORATION OF EXISTING STRUCTURES AND FACILITIES

- A. All damage to existing structures and facilities, which are to remain in place, shall be repaired to a condition equal to that existing prior to the beginning of demolition and removal

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operations. The cost of repairing existing structures and facilities damaged by the Contractor's operations shall be at the Contractor's expense.

3.8 FIELD QUALITY CONTROL

- A. Following performance of the Work, perform an inspection of the premises and report defects and structural weaknesses of structures partially demolished, cut, or removed; of adjacent structures; and of improvements remaining.
- B. The Engineer will accompany the Contractor before and after performance of the Work to confirm the physical condition of the structures and improvements involved.

END OF SECTION

SECTION 02 94 00
REVEGETATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section describes materials and services required to revegetate areas disturbed by construction activities, and other areas to be revegetated as shown on the Plans. Revegetation includes, but is not limited to, application of seed mixes, planting of container plants and cuttings, straw mulching, establishment of plant materials, weed control and maintenance of seeded and planted areas for a two-year period following the date of filing of the Notice of Completion.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02110 Clearing and Grubbing
- B. Section 02200 Earthwork

1.3 DEFINITIONS

- A. Plant names indicated in plant palettes conform to "Standard Plant Names" established by the American Joint Committee on Horticultural Nomenclature, and, for California native plant species, "The Jepson Manual: Higher Plants of California" - Hickman, J.C., 1993.

1.4 SUBMITTALS

- A. List of plant materials and seeds to be provided, with quantities of each and sources indicated, no later than 60 days after Notice to Proceed. Indicate that the materials specified will be available at anticipated installation date or are to be contract grown.
- B. Delivery certificates for container plant materials stating source, quantity, type of material (container size, genus and species), and that plant materials conform to the specifications. Certificates shall be submitted prior to approval to begin planting.
- C. Seed bag certification tags and a signed certificate listing the quantity and type of seed. Tags shall include seed type (genus and species), quantity (weight), analysis, name of supplier, seed purity percentage, seed germination percentage, weed seed content, and date seed was tested.
- D. Source, supplier's and manufacturer's literature for bulk material samples, and samples of up to half a pound of mulch and soil stabilizers.
- E. Furnish bulk material delivery certificates of each delivery stating source, quantity, type of material, and that material conforms to specifications. For mulch and binders in containers, furnish a certificate stating total quantity by weight and volume for each material.

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- F. Provide a schedule of revegetation work consistent with regulatory permits and requirements herein, prior to commencement of revegetation work.
- G. Samples of two ounces of each individual species' seed, drawn at the time of each seed delivery to site.
- H. Three samples of plant materials and cuttings for each variety and size specified delivered to the site a minimum of three days prior to planting operations. Approved samples shall be inspected by the City Representative for conformity to the requirements herein and shall remain on the site and shall be maintained by the Contractor as standards of comparison for plant materials to be furnished. Upon acceptance of plant materials, approved samples shall be tagged and incorporated into the work.
- I. Reports on the status of revegetation activities. Status reports shall be submitted with the Contractor's daily reports.
- J. Qualifications of revegetation specialists.
- K. Submit a weed control plan a minimum of ten working days in advance of weed control activities.

1.5 QUALITY ASSURANCE

- A. Contractor qualifications: Perform work in accordance with best standards of practice under continuous supervision of a qualified, experienced revegetation specialists capable of interpreting the specifications and distinguishing the various vegetation types encountered in execution of the work.
- B. The Contractor or subcontractor performing revegetation shall possess valid California Contractor License, Class C-27.
- C. Nursery qualifications: All plant nurseries providing materials shall possess a valid California Nursery License and shall show proof of growing the type of specified plants a minimum of five years. Plant and seed materials shall meet applicable inspections required by law.
- D. Review and conform to all permits, and regulatory requirements applicable to revegetation of this Pipeline Project, as issued by the California Department of Fish and Wildlife, United States Fish and Wildlife Service, Army Corps of Engineers, Regional Water Quality Control Board and any of the federal, state or local regulatory agency. Copies of permits will be provided to the Contractor by the City Representative.
- E. A licensed pest control advisor shall prescribe the type and amount of herbicides. Use herbicides in accordance with the manufacturer's product label and applicable regulations. Use an indicator dye in conjunction with all herbicide applications to clearly mark areas that have been treated. Do not use pre- emergent herbicides.

1.6 REJECTION AND SUBSTITUTION

- A. Plants, seeds, and other revegetation materials not conforming to the requirements specified herein shall be considered defective, and such materials, whether in place or not, shall be

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marked as rejected, removed from the site, and replaced with acceptable materials. The City Representative may reject entire lot of plants represented by defective samples.

- B. Make no substitutions from specified plant, seed, or other specified revegetation materials without written approval of the City Representative. All requests for substitute plant and seed materials shall be submitted to the City Representative a minimum of 30 days prior to the scheduled seed application or planting date.

1.7 SEQUENCING AND SITE CONDITIONS

- A. Prior to the start of work, examine site conditions, and locate all environmentally sensitive areas, and other features, so that precautions may be taken not to damage such areas. In the event of conflicts between environmentally sensitive areas and the work of this section, promptly notify the City Representative. Provide for the protection of environmentally sensitive species and habitats within and adjacent to the work areas at all times.
- B. With the exception of surveying and collection of seeds or plant cuttings, no construction or other disruptive activities (including soil testing or other form of surface disturbance) may occur in or adjacent to environmentally sensitive areas without prior written approval from the City Representative.
- C. Planting and seeding shall not start in any area prior to inspection and approval of site preparation work, which includes topsoil replacement, weed control and soil preparation.
- D. Install container plants and cuttings, where shown, prior to seeding.

1.8 SITE OBSERVATION VISITS

- A. Schedule site observation visits with the City Representative prior to the start of each of the activities listed below. Provide a minimum of two and not more than ten working days advance notice for each day in which the following activities will occur.
 - 1. Commencement of work for verification of existing conditions and locations of environmentally sensitive areas.
 - 2. Topsoil salvaging for review of salvage and stockpile procedures.
 - 3. Completion of backfilling and grading.
 - 4. Replacement of salvaged topsoil and soil preparation.
 - 5. Delivery of plant materials and when the plants and cuttings are spotted in place for planting, but prior to excavation of planting holes.
 - 6. Excavation of plant holes, and plant installation.
 - 7. Seeding and straw mulching operations.
 - 8. Plant watering.

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9. Commencement of weed control work.
10. Completion of weed control work.

PART 2 PRODUCTS

2.1 FIBER MULCH

- A. Provide fiber mulch consisting of a green-dyed virgin wood cellulose fiber mulch containing no germination or growth inhibiting factors. Suppliers shall certify that their products meet all specified requirements based on laboratory and field testing. Weight specifications of this material shall refer to air dry weight of fiber material. Absolute air-dry weight is based on normal standards of Technical Association of Pulp and Paper Industry for wood cellulose and is considered equivalent to 10 percent moisture. Each package of cellulose fiber shall be marked by manufacturer to show air dry weight content.

2.2 SEED MATERIALS

- A. A general seed mix shall consist of what is shown on the plans.
- B. Seed not required to be labeled under the California Food and Agriculture Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts, or a seed technologist certified by the Society of Commercial Seed Technologists. Seed shall have been tested for purity and germination not more than one year prior to application of seed.
- C. Deliver to the jobsite seeds for each plant species in separate, scaled containers. Perform proportioning by weight and mixing of seed mixes in the field in the presence of the City Representative immediately prior to application.

2.3 SOIL STABILIZER

- A. Soil stabilizer will be a 100 percent organic tackifier, supplied in powder form and comprised of at least 83 percent pure mucinoid derived from organic sources. Tackifier will be water soluble, non-toxic, hydrophilic and will not inhibit germination. Acceptable products include "M-Binder," or equal.

2.4 STRAW MULCH

- A. Provide certified clean, weed free rice straw.

2.5 STRAW WATTLES

- A. Straw wattles shall be manufactured from rice straw and be wrapped in a tubular plastic netting. The netting shall have a strand thickness of 0.30 inch, a knot thickness of 0.55 inch and a weight of 0.35 oz/ft, and shall be made from 85 percent high density polyethylene, 14 percent

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ethyl vinyl acetate, and 1 percent color for UV protection. Straw wattles shall be nine inches in diameter, 25 feet long and weight approximately 30 pounds.

- B. Wood stakes for anchoring straw wattles shall be 3/4-inch-square and 24 inches long.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. Deliver seed in unopened supplier's sealed containers bearing original certification labels. Label seed according to state and federal laws.
- B. Keep seed materials, during delivery and when temporarily stored on site, in a cool dry place, protected from moisture, wind, heat, vandalism, rodents, insects, weather and other conditions that would damage or impair viability of seed.
- C. Keep container plants and cuttings, during delivery and when temporarily stored on site, in a cool place, protected from wind, heat, vandalism, rodents, insects, weather, desiccation and other conditions that would damage plants. Care shall be taken in handling plants to prevent damage to stems and trunks.
- D. Water container plants to maintain soil moisture and to prevent desiccation or damage to root ball or leaves.
- E. Store container plants and seed materials on site for no longer than two weeks.
- F. The City Representative may reject any plant material damaged due to mishandling.

3.2 VERIFICATION OF SITE CONDITIONS

- A. Locations of plant materials as shown on the Plans are approximate only. Before proceeding with any work, verify all dimensions and quantities and inform the City Representative of discrepancies between contract documents and actual conditions. Do not perform work in any area where a discrepancy exists.

3.3 WEATHER

- A. Perform planting and seeding during periods when weather and soil conditions are normal for season and suitable in accordance with locally accepted horticultural practice. Apply hydroseeding and straw mulching only when winds are calm. Do not apply hydroseeding during rainy weather or when the soil temperature is below 40 degrees F.

3.4 SOIL PREPARATION

- A. Mechanically scarify (rip) the soil surface to roughen and alleviate compaction prior to seeding. Thoroughly scarify areas to be planted and seeded with ripper blades spaced 6 inches apart to a depth of 12 inches.

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- B. Leave soil surface in acceptable condition, suitable for seeding, installation of container-grown plants or cuttings.
- C. Verify adequacy of soil preparation in revegetation areas with the City Representative prior to initiating seeding and planting operations.
- D. Prepare all areas to be seeded in the above manner, including but not limited to, staging areas and stockpile storage areas.

3.5 EROSION CONTROL

- A. Continuously control erosion as specified herein and in accordance with measures shown on the Plans or the SWPPP. Erosion control measures shall be implemented and maintained throughout the warranty period. Remove temporary erosion control measures that will not be a part of the permanent erosion control plan.
- B. Immediately notify the City Representative of any situation requiring additional erosion control devices to prevent soil erosion or sedimentation into any area beyond the Pipeline Project limits.
- C. Monitor for erosion within revegetation areas and provide measures to prevent gullies, rill and sheet erosion, and silt deposition from occurring. Erosion control shall emphasize prevention. Repair erosion as required and include redirection or dissipation of the water source and recontouring of soil, followed by seeding, mulching, or planting. Strategically placed and secured straw wattles, hay bales or sandbags may be used to dissipate water sources.
- D. Use methods and materials for re-hydroseeding, or planting of eroded areas consistent with the requirements herein. Do not use invasive exotic species for erosion control.

3.6 HYDROSEEDING

- A. Hydroseeding shall consist of a slurry mix of seed, soil stabilizer, fiber mulch, water and other approved additives. The mix shall include 2000 lb/acre of fiber mulch, 100 lb/acre of soil stabilizer, seed materials as specified and water as required to prepare a mix that shall become uniformly suspended to form a homogeneous slurry, that when hydraulically sprayed on the ground, will form a blotter-like ground cover impregnated uniformly with seeds and which, after application, will allow absorption of moisture and rainfall to percolate to underlying soil.
- B. Use hydraulic hydroseeding equipment, with a built-in agitation system and sufficient operating capacity to continuously agitate, suspend and homogeneously mix the slurry. Use distribution lines of sufficient size to prevent stoppage and provide even distribution of slurry. Use traveling unit hydroseed equipment capable of placing slurry tank and spray nozzles within sufficient proximity of areas to be hydroseeded so as to provide uniform distribution without waste. Limit the operation of hydraulic hydroseeding equipment to access roads to prevent soil compaction or damage to seeded areas. Provide extension hoses, as necessary, to reach all areas to be hydroseeded. Damage to prepared ground surface resulting from hydroseed application shall be repaired and reseeded at the direction of the City Representative.

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- C. Apply hydroseed within 30 days after topsoil replacement operations are complete. Perform topsoil replacement coincident with backfilling operations.
- D. Mix hydroseed slurry immediately prior to hydroseed application. Do not allow slurry to remain in the tank for more than one hour before application.
- E. Apply the slurry in a one-step application. Using the wood fiber as a guide, spray soil with uniform visible coat of slurry in sweeping motion, allowing wood fibers to build upon each other, until complete, even coverage is achieved.
- F. Apply hydroseed to all bare soil areas disturbed during construction, with the exception of permanent access roads, and structures. Designated slope areas are subject to approval by the City Representative.

3.7 IMPRINT SEEDING

- A. Use imprint seeding methods only in areas designated on the Plans. Imprint seed to areas disturbed during construction, with the exception of permanent access roads, structures, or other areas designated for other revegetation as shown on the Plans. Use imprint seeding after topsoil replacement operations are complete. Perform topsoil replacement coincident with backfilling operations.
- B. Imprint seeding equipment shall consist of a heavy weighted roller with minimum core diameter of 20 inches, and a length of eight feet or less. The roller shall form discontinuous, v-shaped troughs on the soil surface that produce corresponding soil imprint patterns when towed. The imprint roller shall have teeth between four inches and 10 inches in height. Teeth shall be v-shaped in transverse section and rectangular or triangular in longitudinal section. Crest to crest spacing between teeth shall be one foot or less and the angle between front and rear faces of imprinting teeth shall be 60 degrees or less. The imprint roller shall provide a minimum static pressure on the soil surface between 10 psi and 50 psi. Provide a minimum of one imprint pattern per every square foot of area imprinted. The imprint shall cover a minimum of 70 percent of the area imprinted.
- C. Attach a calibrated seed bin on top or directly in front of the imprinting roller to distribute seed mixes. Thoroughly clean the seed bin prior to use. Do not allow residual seeds remaining from previous uses in the seed bin.
- D. Mix seed with wheat bran or approved substitute to aid in calibrating seed application rate and to prevent seed segregation. Determine the mixing ratio in the presence of the City Representative at the seeding site immediately prior to commencing with imprint seeding. Do not allow seed and bran mixture to remain in seed bin for more than four hours.
- E. Seed bin shall drop seeds onto or directly in front of imprinting roller during application. Rollers shall immediately firm seeds into contact with soil.

3.8 STRAW MULCHING

- A. Apply straw mulching on all slopes 2:1 or steeper, and as designated on the Plans, promptly after topsoil replacement operations are complete. Apply straw mulching in a four-step operation as follows:

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1. Hydroseed areas with the specified seed mix, except that the quantity of fiber mulch in the mix shall be reduced to 1700 lb/acre and the soil stabilizer shall be removed.
2. Uniformly apply straw at a minimum rate of 4000 lb/acre. When weather conditions are suitable, straw may be pneumatically applied by equipment that will not render the straw unsuitable for incorporation into the soil. Use hand spreading or other means where pneumatic equipment is unable to reach the limits for straw mulching.
3. Roll straw into soil surface with studded steel plate straw roller equipment capable of forcing straw into the soil to a sufficient depth to tie down the surface soils. Steel plate studs shall be at least six inches wide, and approximately one inch thick, with rounded edges.
4. Apply a fiber mulch mix consisting of 300 lb/acre fiber mulch and 100 lb/acre soil stabilizer over the rolled straw.

3.9 STRAW WATTLES

- A. Install straw wattles, where shown on the Plans, on slopes with minimum spacing as follows:

Gradient	Measured Slope Surface
1:1 or steeper	20 feet apart
1:1 to 2:1	30 feet apart
2:1 to 3:1	50 feet apart

- B. Install straw wattles across the full width of the restored area level to the slope contour, in three-inch deep trenches. Anchor straw wattles with wood stakes at four-foot intervals, with additional stakes at each end. Tightly abut the ends of adjacent straw wattles to each other. Do not overlap ends.

3.10 CLEAN UP

- A. Keep all work areas clean, neat and orderly at all times.
- B. Upon completion of revegetation work, remove rubbish, trash, and debris resulting from the revegetation operations.
- C. Remove oversprayed hydroseeding and straw from walks, lights, access roads, streets, fences, structures, riprap, existing vegetation, trails, and all other areas not intended to be hydroseeded.
- D. Remove any detrimental, non-native plants growing in the work area not specified in the seed mix.

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3.11 ESTABLISHMENT MAINTENANCE

- A. The establishment maintenance period will begin on the first day following completion and acceptance of the revegetation work. Continue the establishment maintenance activities for a period of two years following the date of filing of the Notice of Completion (i.e., the contract warranty period), and as specified herein.
- B. Provide water, as necessary, to plantings during the establishment period. Determine watering frequency by checking soil moisture levels to prevent wilting or other damage to plant materials.
- C. Apply water in a manner that ensures deep penetration into the soils surrounding the plant root balls. Fill plant basins until the soil around the roots is moist from the bottom of the hole to the top of the ground. Filling the plant basins several times per watering event may be required.
- D. Inspect and repair plant basins as needed prior to each watering.
- E. Perform weed control as specified herein, or as directed by the City Representative.
- F. Make inspections at a minimum of every three months to ensure plant materials are healthy and free of insect infestations and plant diseases. Report any findings to the City Representative. Remove diseased plants and replace them to prevent the spread of diseases and insects.
- G. Monitor plant materials for damage caused by animals and inform the City Representative of such damage. Propose remedial actions to the City Representative for approval. Provide remedial actions, such as fencing.
- H. Remove and dispose of all trash and litter accumulated during the establishment maintenance period.
- I. At no time apply fertilizers, pesticides, or herbicides other than those specified to any of the planted or hydroseeded areas without the written approval of the City Representative. Biological control agents, such as insect predators, may be used with the approval of the City Representative.
- J. During the establishment maintenance period, replace in like kind and size to the same specifications required for original planting all plants which die, are unhealthy, or diseased. All replacement planting shall be performed within 30 days receipt of written notice provided by the City Representative.

3.12 WEED CONTROL

- A. Control noxious and annual weeds in all areas to be planted and hydroseeded during construction. Weed control shall be required during the maintenance period. Within ten days prior to initiating seeding and planting operations, perform weed eradication. Noxious and annual weeds are identified as follows:
 1. Noxious weeds are perennial weeds that pose a threat to establishment of revegetation areas and resprout from underground roots. A general list of noxious

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weeds targeted for control include Artichoke thistle (*Cynara cardunculus*), Fennel (*Foeniculum vulgare*), Castor bean (*Ricinus communis*), Tree tobacco (*Nicotiana glauca*), Pampas grass (*Cortaderia* spp.), Bermuda grass (*Cynodon dactylon*), Tamarisk (*Tamarix* spp.), Eucalyptus (*Eucalyptus* spp.), Acacia (*Acacia* spp.), Hottentot fig (*Carpobrotus* spp.) palms (phoenix spp. and *Washingtonia* spp.), Gazania (*Gazania* spp.), and Giant reed (*Arundo donax*).

2. Annual weeds are those that pose a threat to establishment of revegetation areas due to vigorous, competitive growth habits. A general list of annual weeds targeted for control include tall annual grasses of various species, Mustard (*Brassica* spp.), Russian thistle (*Salsola australis*), Medic (*Medicago* spp.), Sweet-Clover (*Melilotus* spp.), Wild radish (*Raphanus* spp.), Tocalote (*Centaurea melitensis*), Garland chrysanthemum (*Chrysanthemum coronarium*), and Cocklebur (*Xanthium spinosum* and *X. strumarium*).
 3. Other weeds may be identified for control by the City Representative during the establishment maintenance period.
- B. All areas shall be weeded prior to the weeds reaching 12 inches in height or before ripening of seed.
- C. Employ weed control methods as follows:
1. Train personnel to be knowledgeable in the identification of weed species and desirable seeded and planted species to ensure only the spraying and removal of weedspecies.
 2. Control noxious weeds and their root systems by cutting top growth off and spot spraying the stumps with an approved herbicide that will translocate to the roots. Top growth, seed heads and plant mass shall be removed from the site.
 3. Control annual weeds by either pulling out by hand or hoeing. The stems of the hoed plants will be cut below ground level. Weed plant mass shall be removed from the site.
- D. Leaf and branch drop, and other organic debris of species not identified as weeds may be left in place.

3.13 PERFORMANCE STANDARDS DURING PLANT ESTABLISHMENT PERIOD

- A. At six-month intervals following the completion of planting, or at other intervals as directed by the City Representative, inspect the container plants in the presence of the City Representative and determine the plant survival rate. At each inspection, should the mortality rate of any individual species exceed 10 percent of the original number of that species, or should the mortality rate of the total planting exceed 10 percent of the total original number of container plants, or at the completion of the warranty period should the plant mortality rate of any individual species exceed 20 percent of the original number, or should the mortality rate of the total planting exceed 20 percent of the total original number of container plants, plant additional container plants of like kind and to original numbers and size as specified herein for

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the original planting. Warranty replacement plants for the duration of the warranty period, but in no case for less than eight months.

END OF SECTION

**SECTION 03 11 00
CONCRETE FORMWORK**

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Layout of formwork.
2. Formwork construction.
3. Embedded items and openings in concrete.
4. Form release materials.
5. Removal of forms.
6. Field quality control.
7. Detection of movement.
8. Re-use of forms.

1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast in Place Concrete
- B. Section 03 35 00 Concrete Finishing

1.3 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 Specifications for Structural Concrete
2. ACI 318 Building Code Requirements for Structural Concrete
3. ACI 347R Guide to Formwork for Concrete

B. American Plywood Association (APA):

1. Voluntary Product Standard, PS 1, Structural Plywood

C. West Coast Lumber Inspection Bureau (WCLIB):

1. WCLIB No. 17 Standard Grading Rules

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1.4 COORDINATION

- A. Allow sufficient time between erection of forms and placing of concrete for the various trades to properly install concrete reinforcement, embedded items, sleeves, and block outs.
- B. Allow sufficient time for coordinating review and approval of submittals before installation.

1.5 SUBMITTALS

- A. Section III – Special Provision Submittal Procedures
- B. Shop Drawings: Submit drawings that include the following details and requirements:
 - 1. Concrete Forms:
 - a. Forming system and method of erection with associated details.
 - b. If temporary shoring of existing structure is required, shoring design shall be accompanied by design calculations. Include reshoring procedures. Both drawings and calculations shall be signed by an engineer who is currently registered as a civil or structural engineer in the State of California.
 - c. Locations of construction joints in plan and elevation views. Means of leakage prevention for concrete exposed to view in finished construction.
 - d. Locations and sizes of conduits, openings, recesses, pipes, ducts, and other attached or embedded products.
 - e. Beam intersections and other conditions where concrete casting by vertical drop may be restricted.
 - f. Chamfer strips for corner treatment.
 - g. Method and schedule for removing forms and shoring.
 - h. Method for detecting formwork movement during concrete placement.
 - i. Details of formed openings in formwork for installation of concrete pump ports and vent ports. Provide locations of pump ports and vent ports in the formwork.
 - 2. Product Data: Submit product data including the following:
 - a. All manufacturers' literature, catalog cuts and data sheets for each material to be used for special formwork.
 - b. Submit manufacturers' product data for manufactured products. Include products proposed for leakage control.

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1.6 QUALITY ASSURANCE

- A. Formwork Standards: Unless otherwise indicated, design, construct, erect, maintain, and remove forms and related structures for concrete work in accordance with applicable requirements of ACI 301, ACI 318, and ACI 347R.
- B. Deflection: Where dead and live loads on forms will be more than 20 percent greater than the weight of the concrete, provide framing lumber of required strength, and comply with ACI 301 and ACI 347R for design of framing members. Deflection shall be kept within the herein specified tolerances.
- C. Removal Features: Design formwork to be readily removable without impact, shock, and damage to concrete surfaces and adjacent materials.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Storage: Store form panels to prevent warpage. Protect panels from damage and contamination which could adversely affect concrete.
- B. Handling: Lift form panels by methods that will protect panels from damage and distortion.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Lumber: Boards and framing lumber shall be graded and grade-marked in accordance with WCLIB No. 17. Provide framing lumber of required strength, conforming to the above-specified WCLIB No. 17.
 - 1. Boards: Provide all West Coast Species, "Construction" or "Standard" Boards. Use dressed side of lumber for surface in contact with the concrete and provide boards with dressed or tongue-and-groove edges to provide tight joints to prevent mortar leakage.
- B. Framing Lumber:
 - 1. Light Framing: Provide all West Coast Species, "Construction" or "Standard" Light Framing, dressed or rough. Where loads are not a factor, "Utility" Light Framing will be acceptable.
 - 2. Joists and Planks: Provide all West Coast Species, "No. 2" Structural Joists and Planks, dressed or rough.
 - 3. Beams and Stringers: Provide all West Coast Species, "Standard" Beams and Stringers or "No. 2 Structural" Beams and Stringers, dressed or rough.
- C. Plywood (Plyform): Plywood shall be graded and grade-marked in accordance with APA Voluntary Product Standard PS-1.

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1. B-B Plyform: Provide Class I, EXT-APA, sanded, APA trade marked.
 2. B-C Plyform: Provide Class I, EXT-APA, APA trade marked.
 3. High Density Overlay (HDO) Plyform: Provide A-A, 60-60, Class I, EXT-APA, APA trade marked.
 4. Thickness: As required to maintain surface smoothness without deflection, but not thinner than 5/8 inch.
- D. Steel Forms: Proprietary, patented, or fabricated steel forms, using standard or commercial quality, uncoated steel sheet or plate, 3/16-inch minimum thickness, for panel facings. Provide surfaces that will not impart corrosion residue to concrete. Include panel framing, reinforcement, and erection accessories.
- E. Provide forms which will not deflect under pressure of concrete placement, and which will not deflect or blow off under added pressure of placement of fly-ash-modified concrete.
- F. Alternate Form Materials and Systems: Contractor may propose other form materials and systems for the consideration of the Owner or Owner's Representative. Alternate materials and system shall have strength and ability to maintain required tolerances and to provide required finishes.
- G. Leakage Control Materials: Provide materials capable of producing flush, watertight, and nonabsorbent surfaces and joints, and compatible with forming material and concrete ingredients. Seal form edges with gasketing material or sealant placed in the joint in such a way that neither a fin nor groove is made in the face of the cast concrete.
- H. Form Release Agent: Commercial formulation, silicone-free form-release agent, designed for use on all types of forms, which will not bond with, stain, nor adversely affect concrete surfaces, and which will not impair subsequent treatment of concrete surfaces, requiring bond or adhesion nor impede wetting of surfaces which will be cured with water, steam, or curing compounds.
- I. Plugged Cone Form Ties: Rod type, with ends or end fasteners which can be removed without spalling the concrete and which leave a hole equal in depth to the required reinforcement clearance. Form ties shall be of a design in which the hole left by the removed end or end fastener is easily filled to match the surface of the hardened concrete. Provide removable cones 1-1/4 inches in diameter by 1-1/2 inches deep. Provide preformed mortar plugs to match the color of the concrete, recessed 1/4 inch, adhered with an approved epoxy adhesive.
- J. Inserts: Cast stainless steel or welded stainless steel, Type 316 or similar 300 Series, complete with anchors to concrete and fittings such as bolts, wedges, and straps.
- K. Chamfer Strips: 3/4 inch by 3/4 inch triangular fillets milled from clear, straight-grain pine, surfaced each side, or extruded vinyl type with or without nailing flange.
- L. Pump ports and vent ports: Pump ports and vent ports in the formwork shall be provided as needed to facilitate proper placement of repair concrete in the formwork.

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2.2 FABRICATION

- A. Formwork - General: Fabricate forms in accordance with approved Shop Drawings. Maintain forms clean, smooth, and free from imperfections and distortion. Construct formwork in accordance with ACI 301 Section 2.
- B. Joints:
 - 1. Arrange form panels in symmetrical patterns conforming to general lines of the structure.
 - 2. Unless otherwise indicated, orient panels on vertical surfaces with long dimension horizontal, and make horizontal joints level and continuous.
 - 3. Align form panels on each side of the panel joint with fasteners common to both panels, and in a manner, which will result in a continuous, unbroken concrete plane surface.
- C. Steel Forms: Use material which is clean, smooth, and free from warps, bends, kinks, rust, cracks, and matter which may stain concrete. Fabricate panels in accordance with approved Shop Drawings. Deflection between form supports from concrete placement shall not exceed 1/240 of the span length.

PART 3 EXECUTION

3.1 LAYOUT OF FORMWORK

- A. Locate and stake out all forms and establish all lines, levels, and elevations.

3.2 GENERAL

- A. Do not apply superimposed loads to the structure until concrete has developed its specified 28-day compressive strength.

3.3 CONSTRUCTION

- A. Formwork:
 - 1. Construct formwork in accordance with the approved Shop Drawings, and in a manner that will produce finished concrete surfaces conforming to indicated design and within specified tolerances. Formwork for concrete not exposed to view in the finished work may be constructed of any material that will adequately support the weight of the concrete.
 - 2. Make joints and seams mortar-tight. Install leakage control materials in accordance with the manufacturer's installation instructions, and in a manner that will maintain a smooth continuity of plane between abutting form panels and which will resist displacement by concreting operations. Align and secure joints in a manner that will preclude offsets.

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3. Kerf wood inserts for forming keyways, reglets, and recesses in a manner that will prevent swelling and ensure ease of removal.
 4. Maintain forms clean and free from indentations and warpage. Do not use rust-stained steel surfaces for forms in contact with concrete. Do not sandblast steel form surfaces to remove rust or mill scale; remove these imperfections by grinding.
 5. Brace temporary closures to prevent warpage or displacement and set tightly against forms in a manner that will prevent loss of concrete mortar.
 6. Support joints with extra studs or girts, and in a manner that will ensure true, square intersections.
 7. Assemble forms in a manner that will facilitate their removal without damage to the concrete.
 8. Construct molding shapes, recesses, and projections with smooth finish materials and install in forms with sealed joints.
 9. Provide camber in formwork as required to compensate for deflections caused by weight and pressures of fresh concrete and construction loads and as otherwise indicated. Provide camber strips to compensate for deflections due to permanent loads and long-term deflections due to shrinkage and creep as required.
 10. Provide construction openings in forms where required for concrete pour pockets, vibrator access holes, and inspection openings to aid in proper placement and consolidation of concrete and close up openings during placement of concrete as applicable.
 11. Provide inspection and cleanout openings in forms at bottom of walls and columns and elsewhere as required. Do not close cleanouts until inspected and accepted by the Owner's Representative just before placing concrete.
 12. Drill air escape holes in bottom members of block outs.
 13. Provide formed openings where required for installation of concrete pump ports and vent ports for placement of formwork in enclosed applications. Install pump ports and vent ports.
 14. Install concrete accessories in accordance with manufacturer recommendations and keep straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- B. Corner Treatment: Form chamfers for all exposed edges to match existing concrete member chamfer. If it is not possible to match existing member chamfers, form chamfers with 3/4 inch on each leg, unless otherwise indicated. Accurately shape and surface chamfers in a manner which will produce uniformly straight lines and edge joints and which will prevent mortar runs. Extend terminal edges to limits, and miter chamfer strips at changes in direction.

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C. Construction Joints:

1. Locate joints as indicated. Support forms for joints in concrete so as to rigidly maintain their positions during placement, vibration, and curing of concrete. Install keys in all joints.
2. Locate and install construction joints, for which locations are not indicated, so as not to impair strength and appearance of the structure and indicate such joints on Shop Drawings. Locations of construction joints require approval of the Owner's Representative.
3. Position joints perpendicular to longitudinal axis of wall or deck as the case may be.

3.4 EMBEDDED ITEMS AND OPENINGS IN CONCRETE

- A. Provide openings in concrete for passage of ducts, and provide clearances therefor as indicated on approved Shop Drawings.

3.5 FORM RELEASE MATERIAL

- A. Coat form contact surfaces with approved form release material before reinforcement is placed and in accordance with ACI 347R. Do not allow excess form release material to accumulate in the forms or to come into contact with surfaces that are required to be bonded to fresh concrete such as concrete reinforcement and embedded items. Apply form release material in compliance with manufacturer's application instructions.
- B. Coat steel forms with non-staining, rust-preventive form release material or otherwise protect against rusting.
- C. Apply form release material to bolts and rods that are to be removed or that are to be free to move.

3.6 REMOVAL OF FORMS

- A. Formwork shall be removed after completion of the work except as otherwise specified.
- B. Remove forms by methods which will not injure, mar, gouge, or chip concrete surfaces, overstress concrete members, or distort formwork. Use air pressure or other approved methods. Do not pry against concrete. Cut off nails flush. Leave surfaces clean and unblemished.
 1. Where early form removal is not necessary and will not impact the Contractor's schedule, leave forms in place at least 72 hours, unless otherwise approved by the Owner or Owner's Representative.
- C. When repair of surface defects or finishing is required at an early age, forms may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations and its own weight.

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1. Concrete work that is damaged by removal operations shall be repaired as specified in Section 03 35 00 - Concrete Finishing. Where exposed surfaces are damaged beyond acceptable repairing measures, the damaged concrete shall be removed and replaced with new concrete.
- D. Top forms on sloping surfaces of concrete may be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and shall be followed by the specified curing.
- E. Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.
- F. Forms and shoring in the formwork used to support the weight of concrete in handrails, pier side walls, beams, girders, and other structural members shall remain in place until the concrete has reached adequate strength and stiffness to support itself. Forms shall not be removed before the concrete has reached a minimum of 70 percent of the indicated design compressive strength, unless otherwise approved in writing by the Owner or Owner's Representative.
- G. When shores and other vertical supports are so arranged that the non-load-carrying form-facing material may be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age provided the concrete surfaces are not damaged by such earlier removal.
- H. Plan reshoring operations in a manner that will ensure that areas of new construction will not be required to support their own weight. Reshoring shall be in place before shoring is removed. During reshoring, do not permit live loads on new construction. Do not locate reshores in a manner and location that will overstress members or induce tensile stresses where reinforcing bars have not been provided.
- I. When removal of formwork or reshoring is based on the concrete reaching a specified strength, the concrete shall be presumed to have reached this strength when test cylinders, field cured along with the concrete they represent, have reached the strength specified for removal of formwork or reshoring. Except for the field curing and age at test, the cylinders shall be molded and tested as specified in Section 03 30 00 - Cast-in-Place Concrete.

3.7 FIELD QUALITY CONTROL

- A. Before placing concrete, check lines and grades of erected formwork and positioning of embedded inserts, block outs, and joints for correctness. Verify that embedded piping and conduit are free from obstructions. Make corrections or adjustments to ensure proper size and location of concrete members and stability of forming systems.
- B. While placing concrete, provide quality control to assure that formwork and related supports have not been displaced, that loss of cement paste through joints is prevented, and that completed work will be within specified tolerances.
- C. During form removal, verify that architectural features meet the form and texture requirements of the samples approved by the Owner or Owner's Representative.

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3.8 DETECTION OF MOVEMENT

- A. Check movement using methods, such as plumb lines, tell tales, and survey equipment, to detect movement of formwork during concrete placement.

3.9 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable. Remove such material from the site. Apply form release coating as specified for new formwork.
- B. Do not use patched forms for exposed concrete surfaces.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcing bars.
2. Welded steel wire fabric.
3. Accessories.
4. Tie wire.
5. Mechanical Splice Coupler
6. Grouted Sleeve Splicing System

1.2 RELATED SECTIONS

- A. Section 03 30 00 Cast in Place Concrete
- B. Section 03 41 00 Precast Structural Concrete

1.3 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 Specifications for Structural Concrete
2. ACI SP-066 Detailing Manual
3. ACI 318 Building Code Requirements for Structural Concrete
4. ACI 439.3R Types of Splices for Reinforcing Bars

B. American Society for Testing and Materials (ASTM):

1. ASTM A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
2. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

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3. ASTM A706 Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
4. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

C. Concrete Reinforcing Steel Institute (CRSI):

1. CRSI Manual of Standard Practice
2. CRSI Placing Reinforcing Bars

1.4 SUBMITTALS

A. Section III – Special Provision Submittal Procedures

B. Shop Drawings:

1. Submit bar lists, bending diagrams and schedules, and placement plans and details for all reinforcing steel. Bar lists shall include weights.
2. Indicate descriptions, details, dimensions, arrangements and assemblies, and locations of reinforcing steel. Include number of pieces, sizes, spacing, and markings of reinforcing steel, laps and splices, supporting devices and accessories, and any other information required for fabrication and placement.
3. Check Contract Drawings for anchor bolt schedules and locations, anchors, hangers, inserts, conduits, sleeves, block outs, and any other items to be cast in concrete for possible interference with reinforcing steel. Indicate required clearances on Shop Drawings.
4. Detail reinforcing steel in accordance with requirements of the ACI SP-066. Indicate individual weight of each bar, total weight of each bar size, and total weight of all bars on the list. Base calculated weights upon nominal weights specified in ACI 318, Appendix on Steel Reinforcement Information.

C. Product Data:

1. Submit manufacturers' product data and installation instructions for proprietary manufactured materials and reinforcement accessories.
2. Submit manufacturers' product data and installation instructions for proprietary mechanical coupler splicing systems when such splicing methods are permitted.
3. For mechanical splice couplers and grouted sleeve splice systems, furnish the following:
 - a. Certified test reports showing that the couplers meet all of the specified requirements.

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- b. Written assembly and installation instructions for each type, model and bar size for which the coupler is designed. Installation instructions shall include typical installation sequence, recommended installation tools, guidelines for laboratory testing of couplers and coupler size designations with corresponding range of bar sizes.
- c. Reports showing the results of all tests.
- d. Mechanical couplers shall be Erico International Corporation (nVent) Lenton Wedge Coupler System, Dayton Superior Barlock Coupler System, or approved equal. Refer to California Department of Transportation 'Authorized List of Couplers for Reinforcing Steel', for authorized list of couplers for reinforcing steel.
- e. Grouted sleeve splice system shall be Dayton Superior D410 Sleeve-Lock Grout Sleeve, NMB Splice Sleeve U-X, or approved equal. Grouted sleeve splice system shall be hot-dip galvanized and filled with non-shrink grout recommended by the manufacturer of the corresponding sleeve system.
- f. Provide manufacturer's recommended testing and special inspection requirements and procedures.

D. Certificates:

- 1. For each lot or load of reinforcing steel delivered to the jobsite, furnish mill affidavits and test reports of compliance, certifying the grades and physical and chemical properties of the reinforcing steel and conformance with applicable ASTM Specifications, including ASTM A370, Method A9.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver reinforcing bars to the fabricator in bundles, limited to one size and length of bar, securely tied and identified with plastic tags in an exposed position indicating the mill, the melt or heat number, and the grade and size of bars.
- B. Deliver steel reinforcement to the jobsite, store, and cover in a manner which will ensure that no damage shall occur to it from moisture, dirt, grease, oil, or other cause which might impair bond with concrete.
- C. Deliver steel reinforcement to the jobsite properly tagged and identified, as specified herein in and, in accordance with approved Shop Drawings.
- D. Maintain identification of steel reinforcement after bundles are broken.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Reinforcing Bars:

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1. Deformed Carbon Steel Bars: ASTM A615.
 2. Low-Alloy Steel Bars: ASTM A706.
 3. Weights of Bars: Refer to ACI 318, Appendix on Steel Reinforcement Information.
- B. Welded Steel Wire Fabric - Plain Wire: ASTM A1064, wire sizes and center-to-center spacing as indicated.
- C. Accessories: Provide reinforcement accessories, consisting of bar supports, spacers, hangers, chairs, ties, and similar items as required for spacing, assembling, and supporting reinforcement in place. Conform with CRSI referenced standards and the following requirements:
1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms or are in close proximity to finish surfaces, provide supports with legs which are galvanized, plastic-protected, or stainless steel.
- D. Tie Wire: No. 16 gage or heavier, black or galvanized, soft or commercial grade steel tie wire. For galvanized reinforcement, provide zinc-coated wire. Where tie wire is in close proximity to finish surfaces of exposed-to-view concrete, provide soft stainless-steel wire.
- E. Mechanical Splice Coupler:
1. System Description: Provide bar-splicing connections, produced by threaded reinforcing bar ends and threaded coupler, or by sleeves hydraulically pressed or forged onto butt- ended reinforcing bars, or by other proprietary mechanical splicing method as proposed by the Contractor and approved by Owner or Owner's Representative. Mechanical splice couplers shall be capable of being installed in the clear space indicated and to provide the required clearances.
 2. Spliced Strength in Tension: Minimum 125 percent of the yield strength of connected reinforcing bars, unless otherwise indicated.
 3. Provide splices in compliance with ACI 439.3R.
 4. Install per manufacturer's instructions.

2.2 FABRICATION

- A. Fabrication Standards: Fabrication of steel reinforcement shall be in accordance with the Contract Drawings and approved Shop Drawings. Where specific details are not indicated, comply with applicable requirements of ACI 301, ACI 318, and CRSI Manual of Standard Practice.
- B. Cutting and Bending: Cutting and bending shall be performed at a central location, equipped and suitable for the purpose. Bars shall be accurately cut and bent as indicated. Bars shall be bent cold. Heating of bars for bending or straightening will not be permitted. Bars shall not be

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bent or straightened in any manner which will injure the material. Replace bars that are damaged while bending. Label all bars in accordance with bending diagrams and schedules, and secure like pieces in bundles when appropriate.

- C. Tolerances: Fabricate bars to meet the following tolerances
1. Sheared length: +/- 1 inch.
 2. Depth of truss bars: +0, -1/2 inch.
 3. Overall dimensions of stirrups, ties and spirals: +/- 1/2 inch.
 4. All other bends: +/- 1 inch.
 5. Fabrication tolerances not indicated on the Contract Drawings or specified above shall comply with the applicable requirements of ACI 301 and CRSI Manual of Standard Practice, Chapter 7.

2.3 IDENTIFICATION

- A. Reinforcing steel shall be bundled and tagged with grades and sizes, heat numbers, and suitable identification marks for checking, sorting, and placing. Sizes and mark numbers shall correspond to placing Shop Drawings and schedules. Tags and markings shall be water-resistant and shall not be removed until steel reinforcement is placed in position.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that surfaces, over or against which concrete is to be placed, are clean and in proper condition for placing reinforcement.
- B. Verify that items to be embedded in concrete inserts, sleeves, and block-outs are secured in place as required.

3.2 PLACING

- A. Placing Standards: Reinforcing steel shall be placed in accordance with the Contract Drawings, approved Shop Drawings, and the applicable requirements of ACI 301, ACI 318, CRSI Manual of Standard Practice, and CRSI Placing Reinforcing Bars. Install reinforcement accurately and secure against movement, particularly under the weight of workers and the placement of concrete.
1. Reinforcing steel shall be spaced and positioned as close to the original rebars as possible where applicable.
- B. Reinforcing Supports: Bars shall be supported on metal or plastic chairs, spacers, and hangers, accurately placed and securely fastened to steel reinforcement in place. Support legs of

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accessories in forms without embedding in the form surface. Hoops and stirrups shall be accurately spaced and wired to the reinforcement.

- C. Placing and Tying: Reinforcing steel shall be installed in place, spaced, and securely tied or wired with tie wire at all splices and at crossing points and intersections in the positions indicated.
- D. Comply with requirements of CRSI Placing Reinforcing Bars, Chapter 10. Welding to secure or support rebar replacement is prohibited. Snap ties are acceptable for intermediate intersections. Bending of bars on the job to fit different conditions will not be permitted. Point ends of wire ties away from adjacent form surfaces.
- E. Spacing: Center-to-center distance between parallel bars shall be in accordance with the Contract Drawings or, where not indicated, the minimum clear spacing shall be in accordance with ACI 318.
- F. Longitudinal Location of Bends and Ends of Bar: A maximum of plus or minus 3 inches from the indicated location will be permitted, provided that specified protective concrete cover at ends of members is not reduced by more than 1/2 inch.
- G. Splices:
 - 1. Lapped Splices:
 - a. Laps of splices shall be securely tied together to maintain the alignment of the bars, to provide the required minimum clearances, and to transfer stress by bond. Lapped splices and development lengths not shown shall be detailed to develop Class B lapping lengths and development lengths in tension, respectively, in accordance with ACI 318.
 - b. Splices of alternate bars shall be staggered a minimum clear offset of 2 feet between splices. Splices shall be tied with tie wire.
 - 2. Mechanical Coupler Splices:
 - a. Perform installation of coupler and tightening of joint assembly in accordance with the coupler manufacturer's installation instructions and recommendations.
- H. Dowels: Provide dowels where indicated or required for connecting construction and for maintaining structural and reinforcement continuity. Dowels shall be tied securely in place before concrete is deposited. Provide additional bars for proper support and anchorage where required. Do not bend dowels after embedment.
- I. Welded Wire Fabric:
 - 1. Wire fabric shall be installed in lengths as long as practicable and shall be wire-tied at all laps and splices. End laps shall be offset in adjacent widths. Lap welded wire fabric in accordance with applicable requirements of ACI 318.

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2. Where required welded wire fabric shall be secured in position with suitable supports, accessories, and tie wire as indicated and required to ensure against movement from workers and placement of concrete lift fabric as concrete is placed to assure proper embedment at position indicated.

3.3 PROTECTIVE CONCRETE COVER

- A. Minimum concrete coverage for steel reinforcement shall be in ACI 301, ACI 318, or CRSI Manual of Standard Practice, unless noted on the plans. If there is a conflict between the standards specified, the thicker concrete coverage shall govern.

3.4 CLEANING:

- A. Reinforcement at time of depositing concrete shall be free of corrosion and coatings that may impair bond with concrete, such as form oil, mill scale, or loose deposits of rust and other corrosion.

3.5 TOLERANCES

- A. Placement: Place bars to the following tolerances:
 1. Clear distance to formed surfaces: +/- 1/4 inch.
 2. Minimum spacing between bars: - 1/4 inch.
 3. Top bars in slabs and beams:
 - a. Member 8 inches deep or less: +/- 1/4 inch.
 - b. Member greater than 8 inches, but less than 2 feet deep: +/- 1/2 inch.
 - c. Members 2 feet or more deep: +/- 1 inch.
 4. Crosswise of members: spaced evenly within 2 inches.
 5. Lengthwise of members: +/- 2 inches.
 6. Placement tolerances not indicated on the Contract Drawings or specified above shall comply with the requirements of ACI 301, ACI 318, or CRSI Manual of Standard Practice, as applicable.
- B. Adjustments: Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter, or in excess of the above tolerances, the resulting arrangement of bars shall require Owner's approval. Minimum spacing shall not be decreased, and the required number of bars shall be placed. Bars moved to permit access for cleanup operations shall be properly replaced and secured before the start of concrete placement.

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3.6 FIELD QUALITY CONTROL

- A. Quality control inspections and tests to be performed by the Contractor include the following:
1. Placement of Reinforcing Steel: Visual inspection of reinforcing steel in place, including bar supports, tied laps and intersections, welded wire fabric, and bar mats.
 2. Mechanical Coupler Splices: Test 100 percent of the couplers per manufacturer's recommendation.
 3. Grouted Sleeve Splice System: For each batch of grout mixed, take, at minimum the following quantity of 2-inch cube samples for laboratory testing / special inspections:
 - a. 3 cubes to test before removing temporary brace and supports (+/- 24 hours).
 - b. 3 to test at 28 days.
 - c. 3 to hold in reserve.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. The work under this Section consists of furnishing all labor, materials, equipment, services and other items necessary for the surface preparation of concrete members, furnishing and placing concrete repair material, and repairing incidental items related to defects on concrete members to restore them to their original geometry.
2. Cast-in-place concrete.
3. Concrete spall repair.

1.2 RELATED SECTIONS

- A. Section 03 11 00 Concrete Forming.
- B. Section 03 20 00 Concrete Reinforcing
- C. Section 03 35 00 Concrete Finishing

1.3 REFERENCES

A. American Concrete Institute (ACI)

1. ACI Concrete Repair Manual
2. ACI 117 Specification Tolerances for Concrete Construction and Materials
3. ACI 301 Specifications for Structural Concrete
4. ACI 304R Guide for Measuring, Mixing Transporting, and Placing Concrete
5. ACI 305R Guide to Hot Weather Concreting
6. ACI 306R Guide to Cold Weather Concreting
7. ACI 318 Building Code Requirements for Structural Concrete and Commentary

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8. ACI 347R Guide to Formwork for Concrete
9. ACI 546R Guide to Concrete Repair
10. ACI 546.2R Guide to Underwater Repair of Concrete

B. American Society for Testing and Materials (ASTM):

1. ASTM C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. ASTM C33 Standard Specification for Concrete Aggregates
3. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
4. ASTM C94 Standard Specification for Ready-Mixed Concrete
5. ASTM C143 Standard Test Method for Slump of Hydraulic Cement Concrete
6. ASTM C150 Standard Specification for Portland Cement
7. ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
8. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete
9. ASTM C172 Standard Practice for Sampling Freshly Mixed Concrete
10. ASTM C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
11. ASTM C192 Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
12. ASTM C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
13. ASTM C260 Standard Specification for Air-Entraining Admixtures for Concrete
14. ASTM C494 Standard Specification for Chemical Admixtures for Concrete
15. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
16. ASTM C685 Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing

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17. ASTM C928 Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs
18. ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

1.4 COORDINATION OF WORK

- A. Contractor shall coordinate the sequence and schedule of concrete repairs with the Owner or Owner's Representative.

1.5 SUBMITTALS

- A. Section III – Special Provision Submittal Procedures
- B. Submit drawings indicating the locations of all structural construction joints. The location of these joints shall be approved prior to pouring of concrete.
- C. Submit mix design, of each type and strength of concrete being used, a minimum of three weeks prior to first scheduled placement of concrete on site.
- D. Submit the name of concrete supplier and source of aggregates.
- E. Submit the names of concrete admixtures and admixture manufacturer with verification of conformance to chloride ion content requirements.
- F. For pre-packaged concrete repair materials,
 1. Product data sheets for concrete repair mix
 2. Name, address, telephone number and contact name of proposed repair mix supplier
- G. Contractor shall submit the following for review and approval:
 1. Batch information for each batch prepared at site shall show the following information:
 2. Date of batch
 3. Batch number
 4. Volume of produced repair mix (cubic yards)
 5. Strength (class) of repair mix (psi)
 6. Water content (or w/c ratio)
 7. Maximum size and weight of aggregates and weight of fines

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8. Type and amount of other admixtures
 9. Record of beginning and completion time of placement of concrete
 10. Location where the concrete batch used
- H. Certifications by manufacturers or suppliers that materials meet contract specifications and job requirements. Include certifications for admixtures.
- I. Cement and Aggregates:
1. Furnish the following data:
 - a. Mill certificates from cement manufacturer certifying that cement meets Specifications and is suitable for purpose intended.
 - b. Proof of aggregate's compatibility with cement to be used and certification that aggregates meet Specifications. The Owner or Owner's Representative reserves the right to have its testing agency perform any additional tests on cement and aggregates that may be deemed advisable.

1.6 QUALITY INSURANCE

- A. Perform all concrete repair work in accordance with ACI Concrete Repair Manual, ACI 301, ACI 546R, and ACI 546.2R.
- B. Conform to ACI 305R when concreting during hot weather.
- C. Conform to ACI 306R when concreting during cold weather.
- D. Contractor shall maintain one (1) copy of each submittal specified in in this Section on the jobsite.
- E. Repair and restoration of existing concrete surfaces shall be performed by a skilled and experienced subcontractor specializing in the restoration of concrete with at least five years of experience in the type of work involved.
- F. Repair and restoration of existing concrete work shall successfully duplicate undisturbed adjacent finishes, colors, textures, and profiles. Where there is a dispute as to whether or not duplication is successful or has been achieved to a reasonable degree, the judgment by Owner or Owner's Representative shall be final.

1.7 PACKAGING, HANDLING AND STORING

- A. Cement may be delivered in bags or in bulk. The storage building, bin or silo shall be weatherproof and shall be located convenient to the work. Storage in the open may be permitted at discretion of the Owner or Owner's Representative in which case raised platforms and adequate waterproof coverings shall be provided.

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PART 2 PRODUCTS

2.1 MATERIALS

- A. Cement: ASTM C150, Type II - Portland cement. Use one brand of cement throughout project unless otherwise acceptable to Owner or Owner's Representative.
- B. Fine and Coarse Aggregates: ASTM C33. Source shall be constant unless 10 days prior notice is given for approval after recheck of mix design. Aggregate shall be free of chemicals and minerals deleterious to concrete.
- C. Mixing Water: Clean, potable, and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete, reinforcement or embedded items.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260 – Minimum air entrainment shall be 5% by volume. Air entrainment agents shall not exceed 6% by volume.
- B. Water Reducing: ASTM C494, Type A - Water Reducing. Accelerating Admixtures are not permitted except on written permission of Owner or Owner's Representative.
- C. Prohibited Admixtures: Calcium Chloride, Thiocyanates or Admixtures containing more than 0.05% chloride ions are not permitted.
- D. Calcium Nitrate Corrosion Inhibitor Admixtures: ASTM C494 and shall contain 32% calcium nitrate by weight.
 - 1. Acceptable Materials: DCI or DCI-S manufactured by W.R. Grace & Company
 - 2. Alternate Materials: Rheocrete CNI manufactured by Mater Builders. Inc.
 - 3. Mix Proportion: The above-referenced Calcium Nitrate Admixture shall be added at a rate of four gallons per cubic yard of concrete.
- E. Pozzolan Admixtures: ASTM C618.
- F. Silica Fume Admixture: acceptable at a replacement rate of 5-10% with addition of water reducing agent.

2.3 CAST-IN-PLACE CONCRETE MIX

- A. Concrete mix shall have a minimum compressive strength at 28 days of $f'c = 5,000$ psi.
- B. Miscellaneous concrete shall have a minimum compressive strength at 28 days of $f'c = 2,500$ psi.
- C. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C94.

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- D. Select proportions for normal weight concrete in accordance with ACI301.
- E. Structural Drawings indicate minimum 28-day compressive strengths and minimum cement contents.
- F. If a concrete batching plant has a record, based on at least 30 consecutive strength tests that represent similar materials and conditions to those expected, required average compressive strength at 28-day test age shall be determined in accordance with ACI 318 Section 5.3.
- G. When laboratory trial batches are used as the basis for selecting concrete proportions, a curve shall be established showing relationship between water-cement ratio (or cement content) and compressive strength.
- H. Maximum water – cementitious material ratio of 0.40.
- I. Concrete shall have a slump not exceeding 4 inches with a tolerance of +/-2 inch. Specified slump shall apply at time when concrete is discharged at job site. This applies to durable and low permeable concrete. Alternate materials specification is allowed upon approval of the engineer.
- J. Add air entraining agent to normal weight concrete mix for work exposed to exterior. Air content to be 4-6%.
- K. Maximum aggregate size shall be 1" unless otherwise permitted by the Owner.
- L. Use accelerating admixtures in cold weather only when approved by the Owner. Use of admixtures will not relax cold weather placement requirements.
- M. Use set retarding admixtures during hot weather only when approved by the Owner.
- N. All cast-in-place concrete slabs shall be designed to have a shrinkage not exceeding 0.048%, +25% tolerance for field samples.
- O. For corrosion protection, the maximum water-soluble chloride ion concentration in hardened concrete at an age of 28 days contributed from ingredients including water, aggregates, Portland cement and admixtures shall not exceed 0.06 percent by weight of cement.
- P. The following data shall be submitted to the Owner for each mix design prepared:
 - 1. Proportions, by weight of all materials.
 - 2. Sieve analysis for fine and coarse aggregate.
 - 3. Moisture content of fine and coarse aggregates at time of mixing.
 - 4. Water absorption of fine and coarse aggregate.
 - 5. Mill certificate for cement.

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6. Water and cement quantities showing conformance to ACI stipulated maximum water-cement ratios.
7. Slump, air content and unit weight of the prepared trial mixes.
8. The results of 7-day and 28-day compressive strength tests. A minimum of 2 cylinders for the 7-day and 2 for the 28-day test shall be required. Cylinders shall be made in accordance with ASTM C192 and tested in accordance with ASTM C39.

2.4 REJECTION

- A. The entire contents of the sack or bulk container which contains cement that does not meet the requirements of this Specification or has been damaged, is partially set, lumpy or caked shall be rejected. Bagged cement which varies more than 5% from the designated weight, or if the average weight of 50 sacks, taken at random, is less than the designated weight, the cement shall be rejected.

2.5 AGGREGATES

- A. General: Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags and other extraneous material. All natural aggregates shall be thoroughly and uniformly washed before use. The Contractor, at its expense, shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates. Aggregates shall have not more than 10 percent loss when tested for soundness in accordance with California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index, D_f, of the fine aggregate is 60, or greater.

2.6 COARSE AGGREGATES

- A. General: Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, crushed air-cooled iron blast furnace slag, or combinations thereof. Crushed air-cooled iron blast furnace slag shall not be used in any reinforced or prestressed concrete.
- B. Quality: Coarse aggregate shall conform to the following quality requirements:
 1. Tests: California Test Requirements Loss in Los Angeles Rattler (after 500 revolutions)California Test 211, 45% Max.
 2. Cleanness Value..... California Test 227, 76 Min.
 3. If the result of a single test, of the "Cleanness Value," falls below 76 but not below 71, two additional samples representative of material entering the work shall be taken immediately for testing. The average of the three test results shall be a minimum of 76. The minimum acceptable result for any single test shall be 71.

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- 4. Aggregate containing more than 10 percent of inferior materials, flat or elongated particles, cracked or laminated rock, or rock which can readily be broken after immersion in water for one hour, will be rejected. When shaken or washed in water, the volume of silt settling in one hour shall not exceed 3 percent of the volume of the sample.
- C. Gradation: Coarse aggregate for Portland cement concrete shall be in accordance with the applicable requirements of ASTM C33 and shall be 1”max.

2.7 FINE AGGREGATE

- A. General: Fine aggregate shall be natural sand or a combination of natural and manufactured sand, consisting of material of siliceous, granite or igneous origin, and shall be hard and durable. It shall be free from oil and injurious amounts of clay, shale, mica or other objectionable materials.
- B. Fine aggregate shall conform to the following quality requirements:

Test	California Test Method No.	Requirements
Organic Impurities	213	Satisfactory
Mortar strengths relative to Ottawa Sand	515	95% Min.
Sand equivalent	217	76 Min.

- 1. Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Owner or Owner’s Representative, from mortar strength tests, that a darker color is acceptable.
- 2. If the results of a single "Sand Equivalent" test falls below 76, not below 71, two additional samples representative of material entering the work shall be taken immediately for testing. The average of the three test results shall be a minimum of 76. The minimum acceptable result for any single test shall be 71.
- C. Gradation: The dry sand or fine mineral aggregate shall have a particle size distribution such that the percentage composition by weight, determined by test using standard sieves of square mesh wire construction, will conform to the, following grading requirements:

Sieve Sizes	Percentage by Weight Passing
3/8”	100
No. 4	95-100
No. 8	75-90
No. 16	55-75
No. 30	30-50

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No. 50	10-25
No. 100	2-10
No. 200	0-5

1. In addition to the required grading analysis set forth herein before, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the No. 16 sieve and the total percentage passing the No. 30 sieve shall be between 10 and 40 percent; and the difference between the percentage passing the No. 30 and No. 50 sieves shall be between 10 and 40 percent.
2. The gradation of the fine aggregate furnished for the work shall be of such uniformity that the material passing the Nos. 16, 30, and 50 sieves will not vary from an approved gradation by more than the following:

Max. Variation of Percentage of Material Passing	
Sieve Size	Percent Passing
No. 16	+/- 10
No. 30	+/- 9
No. 50	+/- 6
No. 16	±10
No. 30	±9
No. 50	±6

3. The variations shown immediately hereinbefore are the maximum allowable and will be reduced by the amount necessary to meet the grading requirements set forth in the preceding table.
4. Fine aggregate may be separated into 2 or more sizes and stored separately, provided that when the materials are combined they will conform to the grading requirements specified in this Section.

2.8 EQUIPMENT, AND FACILITIES

- A. Requirements: Provide all materials, equipment, tools, appurtenances, facilities, and services as required for performing and completing all repair and restoration of existing concrete as indicated.
- B. Equipment, Tools, and Materials: Provide appropriate and proper equipment, tools, and materials for saw cutting and chipping, for sandblasting or water-blasting of concrete surfaces, and for hose cleaning of concrete.

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- C. Contractor shall provide repair mix in accordance with the concrete repair mix manufacturer's specifications for repairs shown in the Contract Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 MIXING FOR CAST-IN-PLACE CONCRETE

- A. Concrete shall be ready mixed as per ASTM C94. Equipment shall be adequate for the purpose and kept in good mechanical condition at all times.
- B. The rate of delivery, haul time, mixing time and hopper capacity shall be such that mixed concrete delivered shall be placed in the forms within 90 minutes or 300 revolutions of the drum from the time of introduction of cement and water to the mixer. Any interruption in placing in excess of 90 minutes or 300 revolutions will be cause for the wasting of any remaining mixed concrete in hoppers or mixers. In case such interruption occurs, the Contractor shall provide construction joints where and as directed and cut concrete back to such line, cleaning forms and reinforcing as herein specified. Delivery tickets shall show departure time from plants.
- C. No water shall be added to the mix after the initial introduction of mixing water for the batch except when, on arrival at the job site, the slump of the concrete is less than that required. In this case, additional water may be added from the truck system to bring the slump within required limits. The drum or blades shall then be turned an additional 30 revolutions or more until mix is uniform.
- D. Mixers shall be equipped with an automatic device for recording number of revolutions of drum or blades prior to completion of mixing operation.
- E. Concrete shall be kept continuously agitated until discharged into the hopper at the job site.
- F. No concrete shall be placed for any element until reinforcing for same is fastened in place or until forms are complete. No concrete shall be placed before work that is to be embedded has been set. Notify other crafts so they may deliver anchors, inserts, etc., or other work, to be embedded in ample time and also notify them when their assistance in setting is required. Reinforcing or other materials that have been set in place shall not be disturbed.
- G. Remove debris, mud and water from places to receive concrete. Verify depths of any depressed slab conditions for suitability with type and method of surfacing to be applied over concrete.
- H. Install various inserts, anchorages, etc., required by public and private utility companies to accommodate miscellaneous metal items and equipment furnished by them.

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- I. Place no concrete in water unless permission has been obtained from the Owner or Owner's Representative.
- J. Maintain continuous and accurate log of placing of concrete in structure.
- K. Notify the Owner or Owner's Representative 24 hours minimum prior to placing of any concrete.
- L. Concrete shall be thoroughly compacted by means of internal mechanical vibrators. Such compaction shall be produced as will be obtained by placing the vibrator directly in concrete at 18"-30" intervals for a period of approximately 5 to 15 seconds and withdrawing slowly or as directed, depending on the consistency of concrete. One vibrator will be required for each location where simultaneous placing takes place, to ensure thorough vibrating of all sections. Provide sufficient spare vibrators on the job so as to have them readily available in case any vibrator in use should suddenly cease to function properly. Where spare vibrators are employed provide additional spares. Under no condition shall vibrator be placed against reinforcing steel or attached to forms. Use no vibrators to transport material.
- M. Vibrator shall be of the flexible immersion type having a frequency of not less than 7,000 rpm.
- N. Spading will not be permitted on architectural concrete surfaces.

3.3 PLACING CAST-IN-PLACE CONCRETE

- A. The concrete repair mix shall be batched, mixed, and placed by equipment that is expressly designed for that purpose.
- B. Place concrete in accordance with ACI 304, ACI 301, ACI 318.
- C. Notify the Owner or Owner's Representative minimum 24 hours prior to commencement of operations.
- D. Ensure reinforcement, inserts, embedded parts, formed joint fillers and joint devices are not disturbed during concrete placement.
- E. Placing of concrete shall be done immediately after mixing. No concrete shall be placed or used after it has begun to set and no retempering will be allowed. The method used in placing shall be such that concrete is conveyed to place and deposited without separation of the ingredients. No concrete shall be placed with a free unconfined fall in excess of five (5) feet nor shall it be allowed to cascade through reinforcing steel in such manner as to promote segregation. Do not support runways on reinforcing steel.
- F. Place concrete in accordance with ACI 301 Section 5. Repairing and patching of existing concrete work shall be expertly performed with specified mortar and grout materials. At completion, patched surfaces shall match adjacent existing surfaces as closely as possible. Where necessary to build out cut, spalled, or chipped concrete surfaces, follow mix design manufacturers instruction for placing multiple lifts. Float, trowel, or texture surfaces to match adjacent existing surfaces.

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- G. Splash or accumulations of hardened or partially hardened concrete shall be removed. Contact faces of forms for exposed concrete shall be protected from splash during placing of adjacent concrete. Concrete containing piping shall be placed in a manner that will prevent damage to pipes.
- H. Deposit concrete in approximate horizontal layers not exceeding 24 inch in thickness, unless otherwise authorized. Placing of concrete shall be carried on in a continuous operation without interruption until placing of course, section, panel or monolith is completed. At least two (2) hours shall elapse after depositing concrete in walls or columns before depositing concrete in heads over openings, supported beams or slabs.
- I. Distribution of concrete shall be even and continuous and no pour joints shall show. Before a pour is started, make certain that adequate equipment, men, and concrete will be available to pour in cycles which will permit proper and thorough integration of each layer of concrete. Upon stopping of a pour, the top surface shall be on a level. Points of deposit in walls shall be so spaced that it will not be necessary for concrete to flow laterally more than 24 inches.
- J. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- K. Do not interrupt successive placement; do not permit cold joints to occur.

3.4 TOLERANCES

- A. Tolerances shall comply with ACI 117.

3.5 CONCRETE CURING AND FINISHING

- A. Refer to Section 03 35 00 - Concrete Finishing for repairing of surface defects, finishing of formed surfaces, curing and protection of concrete surfaces.

3.6 EXECUTION QUALITY CONTROL

- A. Field inspection and testing will be performed in accordance with ACI 301. Tests and inspections shall be performed by qualified individuals, engineering companies or testing laboratories who shall perform those special inspections required by Contract Plans, those tests and inspections specified below and such other tests and inspections as the Owner or Owner's Representative may require to establish the acceptability of the work.
- B. Testing and inspection services will be retained by the Owner at its expense, except when tests or inspections reveal failure of materials to meet contract requirements, costs for subsequent tests and inspections will be deducted from the Contract Price.
- C. Provide free access to Work and cooperate with Owner's Representative.
- D. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of work.

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- E. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.
- F. Furnish material and handling for test cylinders and any other samples which testing agency requires for analysis of concrete work. Batch tickets for each ready-mix truck shall be given to testing agency at time of discharge of concrete.
- G. Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 100 cubic yards of concrete or for each 1,600 square feet of surface areas placed, whichever is smaller.
- H. Testing agencies shall supervise preparation and selection of samples taken at the job site. Samples for strength tests shall be obtained in accordance with ASTM C172. Samples shall not be obtained until after all of the water has been added to the mixer. Samples shall not be obtained from the very first or last portions of the batch discharge.
- I. Cylinders for strength tests shall be made and laboratory-cured in accordance with ASTM C31 and tested in accordance with ASTM C39.
- J. A minimum of four standard cylinders shall be made for strength tests. One cylinder shall be tested at 7 days and two at 28 days. The 28-day strength shall be the average of the two cylinders tested. Cylinders will be numbered in sets (1A, 1B, 1C, 1D, 2A, 2B, etc.) and an accurate record kept of extent of placement represented by each set and type of concrete tested.
- K. The unit weight and the temperature of the concrete shall be measured at same time cylinders are made.
- L. Slump and air-content tests shall be made at the time of placement of concrete at the option of the Owner or Owner's Representative as often as is necessary for control checks and acceptance purposes, and always when strength specimens are made.
- M. Slump tests will be performed as per ASTM C143 (slump cone) at time of taking test cylinders.
- N. Entrained air content will be tested as per ASTM C231 or C173.
- O. Drying shrinkage tests will be performed at per ASTM C157 (21 days of drying after 7 days of moist curing).
- P. During the first 24 hours after molding, all test specimens shall be stored under conditions that maintain the temperature immediately adjacent to the specimens in the range of 60 degrees F to 80 degrees F and prevent loss of moisture from the specimens.
- Q. Compressive strength test reports shall be submitted to the Owner or Owner's Representative and Contractor and shall contain the following information:
 - 1. Individual test specimen strength and type of failure
 - 2. Slump

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3. Air content
 4. Unit weight
 5. Concrete and air temperature
 6. Specimen number
 7. Portion of structure represented by the concrete tested, as given to laboratory by Owner or Owner's Representative
 8. Date cast
 9. Date tested
 10. Concrete properties specified
- R. Notice if tested concrete is not in conformance with specifications.
- S. The Owner or Owner's Representative may require strength tests of cylinders cured under field conditions to check adequacy of curing and protection of concrete in the structure.
- T. Procedures for protecting and curing concrete shall be improved if 28-day strength of field-cured cylinders is less than 85 percent of that of companion laboratory-cured cylinders.
- U. Cost of additional field-cured cylinders shall be paid by the Owner should tests indicate that curing and protection of the concrete structure is adequate.
- V. The following is subject to Special Inspection as per CBC, Section 1705A.3.
1. Taking of compression test specimens.
 2. Placement of reinforced structural concrete as required by CBC, Section 1705A.3

3.7 ACCEPTANCE

- A. Strength level of each type of concrete shall be considered satisfactory if the following requirements are met:
1. The average of any 3 consecutive strength tests shall be equal to or greater than the 28-day design compressive strength.
 2. Not more than 10 percent of the strength tests shall have values less than the 28-day design compressive strength.
 3. No individual strength test falls below the 28-day design compressive strength by more than 500 psi.

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4. If any of these requirements are not met, tests of cores obtained from the area in question shall be performed.
 5. Concrete in the area represented by core tests shall be considered structurally adequate if the average of 3 cores is equal to at least .85 times the 28-day design compressive strength and if no single core is less than 0.75 times the 28-day design compressive strength.
- B. If these criteria are not met, a structural strength investigation in accordance with ACI 318 shall be performed. Cost of the investigation, as well as cost of deficient concrete replacement shall be paid by the Contractor.
 - C. Should results of the compressive strength tests not meet the preceding requirements, the Contractor may be required to submit revised mix design data for concrete that will conform to the Specifications.
 - D. Concrete not conforming to required lines, dimensions, tolerances or specified requirements may be considered defective and repair or replacement of defective concrete shall be determined by the Owner or Owner's Representative.

END OF SECTION

SECTION 03 35 00
CONCRETE FINISHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Repair of surface defects
2. Finishing of formed surfaces
3. Curing

1.2 RELATED SECTIONS

- A. Section 03 11 00 Concrete Forming.
- B. Section 03 30 00 Cast-In-Place Concrete.
- C. Section 03 41 00 Precast Structural Concrete.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO M182 Burlap Cloth Made from Jute or Kenaf

B. American Concrete Institute (ACI):

1. ACI 117 Specification for Tolerances for Concrete Construction and Materials
2. ACI 301 Specifications for Structural Concrete
3. ACI 308R Guide to External Curing of Concrete
4. ACI 503.4 Standard Specification for Repairing Concrete with Epoxy Mortars

C. American Society for Testing and Materials (ASTM):

1. ASTM C33 Standard Specification for Concrete Aggregates
2. ASTM C150 Standard Specification for Portland Cement
3. ASTM C171 Standard Specification for Sheet Materials for Curing Concrete

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4. ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
5. ASTM C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

1.4 SUBMITTALS

A. Section III – Special Provision Submittal Procedures

B. Shop Drawings:

1. Submit drawings, or diagrams to scale, that indicate the location in plan and elevation of all concrete finishes.

C. Product Data:

1. Submit manufacturers' product data for manufactured products.
2. Provide data on curing compounds, product characteristics, compatibility, and limitations.

D. Samples:

1. Submit 1/2-pint sample container of aluminum oxide and silicon carbide abrasive grit for review and acceptance where "non-slip finish" is indicated.
2. Submit samples not less than 12 inches by 12 inches in size of each type of sand blast finish, indicating materials and methods used to produce the sand blast finishes.
 - a. Review by the Owner or Owner's Representative will be for color and texture only. Approved samples will become the Owner or Owner's Representative's control samples.

E. Curing Procedures:

1. Submit description of proposed curing procedures for approval.

1.5 QUALITY INSURANCE

A. Finishes:

1. Finishing of formed concrete surfaces shall conform to applicable requirements of ACI 301.

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PART 2 PRODUCTS

2.1 TOOLS AND EQUIPMENT

- A. The Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required concrete-finishing work.

2.2 MATERIALS

- A. Portland Cement: ASTM C150, Type II, of same brand as used in the work. Furnish white Portland cement where required to produce color matching color of surrounding concrete.
- B. Aggregate:
 - 1. For Bonding Grout: ASTM C33, washed clean sand passing a No. 30 sieve.
 - 2. For Patching Mortar: ASTM C33, washed clean, graded fine aggregate of suitable size for areas to be repaired. Clean coarse aggregate up to Size No. 8 may be added for repair of larger pockets and voids.
- C. Commercial Patching Mortar: A structural repair mortar may be furnished if appropriate for the use and approved by the Owner or Owner's Representative.
- D. Epoxy Patching Mortar: As specified in ACI 503.4 for Epoxy Mortar.
- E. Epoxy Adhesive: ASTM C881, Type II or Type V, epoxy-based bonding agent.

2.3 CURING MATERIALS

- A. Damp Curing Materials:
 - 1. Waterproof Sheet Materials: ASTM C171, waterproof paper with white paper face, polyethylene film pigmented white, or white burlap-polyethylene sheeting.
 - 2. Burlap: AASHTO M182, of class or weight suitable for the use and location. Do not use burlap where concrete is exposed to direct sunlight.
- B. Curing Compound: ASTM C309, liquid membrane-forming curing compound, Type 1, Class A or B as appropriate for the use or location.
 - 1. Where concrete surfaces will receive architectural finishes, such as resilient floor coverings or paint, or membrane waterproofing, membrane-forming curing compound shall not leave a coating or residue that will impair bond of adhesives, paints, and coatings with concrete.

PART 3 EXECUTION

3.1 REPAIR OF SURFACE DEFECTS

A. Repair Standards: Repair of surface defects shall conform with applicable requirements of ACI 301. When using epoxy mortar, conform with applicable requirements of ACI 503.4.

B. Surface Defects:

1. Repair of surface defects shall begin immediately after form removal. For repair with epoxy mortar, concrete shall be dry.
2. Surface defects are defined to include: form-tie holes, injection ports, air voids or pockets, bug holes with a nominal diameter or depth greater than 1/4-inch, honeycombed areas, rock pockets, visible construction joints, fins and burrs.
3. Repair of surface defects shall be tightly bonded and shall result in concrete surfaces of uniform color and texture, matching adjacent surfaces, and free of shrinkage cracks.

C. Repair Work:

1. Remove honeycombed and other defective concrete down to sound concrete. Saw-cut the edges perpendicular to the surface or slightly undercut. Feather-edges will not be permitted. Dampen the area to be patched and an area at least 6 inches wide surrounding it to prevent absorption of water from the patching mortar.
2. Where rock pockets or similar defects or voids expose steel reinforcement, cutout to solid surface behind the reinforcing steel to provide suitable key-lock for patching mortar. Patching mortar shall envelope the exposed reinforcing bar.
3. Bond patching mortar to concrete with bonding grout or epoxy adhesive. Bonding grout shall consist of 1 part Portland cement to 1 part No. 30 mesh sand, mixed to the consistency of a thick cream, and then well brushed onto the concrete. Bond commercial patching mortar to concrete in accordance with the manufacturer's instructions.
4. Make the patching mortar of the same materials and of approximately the same proportions as used for the concrete, except omit the coarse aggregate. Use not more than 1 part Portland cement to 2-1/2 parts sand by damp loose volume, and substitute white Portland cement for a portion of the regular gray Portland cement to produce patching mix matching the surrounding concrete in color when dry. Determine the proportion of white Portland cement by trial mixes and test areas, prior to repair of actual defective areas.
5. After surface water has evaporated from the area to be patched, brush the bond coat well into the surface. When the bond coat begins to lose the water sheen, apply the patching mortar. Compact the mortar into place and strike off so as to leave the patch slightly higher than the surrounding surface. To permit initial

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shrinkage, leave the patch undisturbed for at least 1 hour before being finally finished. Keep the patched area damp for 7 days.

6. Neatly finish patched surfaces to match adjacent surrounding surface texture of concrete. Grind or fill surfaces to produce level and plumb, true planes.
7. Form tie holes shall be patched and finished flush with adjacent surface.
8. Patching of honeycombed areas or rock pockets that are too large and unsatisfactory for mortar patching shall be cut out to solid surface, keyed, and packed solid with matching concrete to produce firm bond and flush surface. Patching shall match texture of adjacent surfaces where exposed in the finished work.
9. Repair work in exposed locations that does not match the texture and color of surrounding adjacent surfaces or that was not well performed shall be removed and performed again until the repair work conforms with Specification requirements.
10. Surfaces to receive membrane waterproofing shall have fins and loose material removed, and voids and cracks patched flush with adjacent surfaces.
11. Completed repairs shall be cured as herein specified under Article 3.04, Curing.

3.2 FINISHING OF FORMED SURFACES

- A. Unexposed surfaces: Concrete to receive membrane waterproofing shall receive a "smooth form finish" in accordance with ACI 301.
- B. Exposed Surfaces: Unless indicated otherwise, concrete that will be exposed in the completed structure shall receive the following finishes as indicated: Smooth Form Finish: Conform to ACI 301.
- C. Construction Joints: Use technique acceptable to the Owner or Owner's Representative to achieve uniform treatment of construction joints.
- D. Protection and Repair:
 1. Protect adjacent materials and finishes from dust, dirt, and other surface or physical damage during abrasive blast finishing operations. Provide protection as required and remove from site at completion of the work.
 2. Repair or replace other work damaged by finishing operations.
- E. Clean-up: Maintain control of concrete chips, dust, and debris in each area of the work. Clean up and remove such material at the completion of each day of operation. Prevent migration of airborne materials by use of tarpaulins, wind breaks, and similar containing devices.

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3.3 TOLERANCES

- A. Tolerances shall comply with ACI 117.

3.4 CURING

- A. Curing Standards: Curing of concrete shall conform with applicable requirements of ACI 301 and ACI 308R, except that the duration of the curing period shall be ten days. Curing with earth, sand, sawdust, straw, and hay will not be permitted.

B. Curing Requirements:

1. Concrete shall be cured with waterproof sheet materials, damp burlap, or curing compounds.
2. Curing compounds shall not be used on surfaces when their use may be detrimental to bonding of concrete, mortar, membrane waterproofing, caulking and sealants, adhesives, plaster, paint, or the specified surface finish or coating.
3. When applying compound, the surfaces shall be damp but shall be free from standing water.
4. Surfaces shall be covered with a uniform and even film of compound, as supplied. Using pressurized spray equipment; apply in a single coat to achieve total coverage as recommended by the manufacturer.
5. Vertical surfaces shall be cured by keeping the forms wet at all times and by leaving the forms in place as long as possible. After removal of forms, concrete shall be kept continuously damp by fog spraying or otherwise washing down the concrete in an accepted manner until ten days after placing. Protect exposed surfaces by covering with sheet materials or burlap kept continuously moist.
6. Horizontal surfaces shall be cured and protected by covering the finished surfaces with waterproof sheet materials or damp burlap, left in place for a minimum of ten days and kept continuously moist.
7. Curing Compound: Application of curing compound shall conform to applicable requirements of ACI 308.

3.5 PROTECTION

- A. Protect fresh concrete from drying winds, rain, damage, or soiling.

END OF SECTION

SECTION 03 41 00
PRECAST STRUCTURAL CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. The work under this Section consists of furnishing all labor, materials, equipment, services and other items necessary for the precast concrete headwall and wing walls.
2. Precast Headwall and Wing Walls.

1.2 RELATED SECTIONS

- A. Section 03 11 00 Concrete Formwork
- B. Section 03 20 00 Concrete Reinforcing
- C. Section 03 30 00 Cast in Place Concrete
- D. Section 03 35 00 Concrete Finishing

1.3 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 301 Specifications for Structural Concrete
2. ACI SP-066 Detailing Manual
3. ACI 318 Building Code Requirements for Structural Concrete
4. ACI 439.3R Types of Splices for Reinforcing Bars

B. American Society for Testing and Materials (ASTM):

1. ASTM A370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
2. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. ASTM A706 Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement

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4. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- C. Concrete Reinforcing Steel Institute (CRSI):
1. CRSI Manual of Standard Practice
 2. CRSI Placing Reinforcing Bars
- D. Precast / Prestressed Concrete Institute (PCI):
1. PCI MNL-116 Manual for Quality Control form Plants and Production of Structural Precast Concrete Products
 2. PCI MNL-120 PCI Design Handbook: Precast and Prestressed Concrete
 3. PCI MNL-123 Design and Typical Details of Connections for Precast and Prestressed Concrete

1.4 SUBMITTALS

- A. Section III – Special Provision Submittal Procedures
- B. Submit qualifications and certifications for the precast manufacturer.
- C. Shop Drawings:
1. Submit complete shop drawings for all precast concrete headwall and wing wall.
 2. Indicate descriptions, details, dimensions, arrangements and assemblies, locations of reinforcing steel, connection details, openings, and surface finishes. Include details of anchorage, lifting inserts and devices. Include designated lifting and support points.
- D. Submit mix design, of each type and strength of concrete being used, a minimum of three weeks prior to first scheduled placement of concrete.
- E. Submit the name of concrete supplier and source of aggregates.
- F. Submit the names of concrete admixtures and admixture manufacturer with verification of conformance to chloride ion content requirements.
- G. For pre-packaged concrete repair materials,
1. Product data sheets for concrete repair mix.
 2. Name, address, telephone number and contact name of proposed repair mix supplier.

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- H. Certifications by manufacturers or suppliers that materials meet contract specifications and job requirements. Include certifications for admixtures.
- I. Cement and Aggregates:
 - 1. Furnish the following data:
 - a. Mill certificates from cement manufacturer certifying that cement meets Specifications and is suitable for purpose intended.
 - b. Proof of aggregate's compatibility with cement to be used and certification that aggregates meet Specifications. The Owner or Owner's Representative reserves the right to have its testing agency perform any additional tests on cement and aggregates that may be deemed advisable.

1.5 QUALITY INSURANCE

- A. Conform to PCI MNL-116, PCI MNL-120, and PCI MNL-123.

1.6 QUALIFICATIONS

- A. Fabricator: Company specializing in fabricating products specified in this Section must present minimum five years of documented experience.
 - 1. Certifications shall include PCI Grade B1 or C1. Alternatively, supplier qualified and preapproved for Caltrans projects are acceptable. Equivalent qualifications and certifications may be submitted for review and approval at sole discretion of the Owner.
- B. Erector: Company specializing in performing Work of this Section with minimum of five years of documented experience and approved by the manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store all materials used to manufacture precast members according to the manufacturer instructions.
- B. Storage areas for precast members must be stabilized, and suitable foundation must be provided so differential settlement or twisting of member will not occur.
- C. Avoid stacking precast members. When stacking is necessary, stack members with adequate dunnage and bracing to control cracking, distortion, warping or other physical damage. Stacking members such that lifting devices are undamaged and will be accessible.
- D. Handling:
 - 1. Handle precast members in position consistent with their shape and design.
 - 2. Lift and support only from designated support points shown in Shop Drawings.

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3. Use lifting or handling devices capable of supporting members in positions anticipated during manufacture, storage, transportation, and erection.
- E. Transport precast members in a manner to avoid excessive stresses that could cause cracking or other damage.
- F. Protect members to prevent staining, chipping or spalling of concrete.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cement: ASTM C150, Type II - Portland cement. Use one brand of cement throughout project unless otherwise acceptable to Owner or Owner's Representative.
- B. Fine and Coarse Aggregates: ASTM C33. Source shall be constant unless 10 days prior notice is given for approval after recheck of mix design. Aggregate shall be free of chemicals and minerals deleterious to concrete.
- C. Mixing Water: Clean, potable, and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete, reinforcement or embedded items.

2.2 ADMIXTURES

- A. Air Entrainment: ASTM C260 – Minimum air entrainment shall be 5% by volume. Air entrainment agents shall not exceed 6% by volume.
- B. Water Reducing: ASTM C494, Type A - Water Reducing. Accelerating Admixtures are not permitted except on written permission of Owner or Owner's Representative.
- C. Prohibited Admixtures: Calcium Chloride, Thiocyanates or Admixtures containing more than 0.05% chloride ions are not permitted.
- D. Calcium Nitrate Corrosion Inhibitor Admixtures: ASTM C494 and shall contain 32% calcium nitrate by weight.
 1. Acceptable Materials: DCI or DCI-S manufactured by W.R. Grace & Company
 2. Alternate Materials: Rheocrete CNI manufactured by Mater Builders. Inc.
 3. Mix Proportion: The above-referenced Calcium Nitrate Admixture shall be added at a rate of four gallons per cubic yard of concrete.
- E. Pozzolan Admixtures: ASTM C618.
- F. Silica Fume Admixture: acceptable at a replacement rate of 5-10% with addition of water reducing agent.

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2.3 CONCRETE MIX

- A. See Specification 03 30 00 Cast in Place Concrete, Section 2.6 Concrete Mix

2.4 AGGREGATES

- A. See Specification 03 30 00 Cast in Place Concrete, Section 2.8 Aggregates

2.5 COARSE AGGREGATES

- A. See Specification 03 30 00 Cast in Place Concrete, Section 2.9 Coarse Aggregate

2.6 FINE AGGREGATE

- A. See Specification 03 30 00 Cast in Place Concrete, Section 2.10 Fine Aggregate

2.7 REINFORCEMENT

- A. See Specification 03 20 00 Concrete Reinforcement.

2.8 FABRICATION

- A. Comply with PCI MNL-116, ACI 318 and applicable codes for concrete.
- B. Maintain plant records and quality control program during production of precast members and make records available upon request by the Owner or Owner's Representative.
- C. Ensure that reinforcing steel, anchors, inserts and other cast items are embedded, located, and secured in place as indicated on the Contract plans or as approved in Shop Drawings. Sleeves and inserts to be used for lifting or erection of precast members shall be protected from damage and blockage.
- D. Lifting inserts shall be hot-dipped galvanized or stainless steel. The exposed ends of the lifting inserts should be accessible to cut or removed after erection of precast members. The recess after cutting or removing the inserts shall be filled with non-shrinking cementitious grout and trowel flush.
- E. Minimum concrete coverage for steel reinforcement shall be as specified in the contract plans and noted on the shop drawings.
- F. Concrete Curing: Commence curing immediately following the initial set and completion of surface finishing. Provide curing procedures to keep the temperature of the concrete between 50 and 190 degrees F. When accelerated curing is used, apply heat at controlled rate and uniformly along the casting beds. Monitor temperatures at various points in a product line in different casts

2.9 EXTERIOR JOINT SEALS

- A. Seals: The Contractor shall provide external joint seals for all openings. External joint seals for the headwall pipe opening shall be an external rubber sleeve, Infi-Shield Seal Wrap, or equal.

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- B. The seal shall be made of ethylene propylene diene monomer (EPDM) rubber with a maximum thickness of 60 mils. Each unit shall have a 2-inch-wide mastic strip on the top and bottom edge of the rubber wrap. The mastic shall be non-hardening butyl rubber sealant, with a minimum thickness of 1/4 inch. The seal shall be designed to prevent leakage of water into the manhole.

2.10 IDENTIFICATION

- A. Mark each member for identification, orientation, and date of production on the unexposed face of the concrete.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify site conditions are ready to receive work and field measurements are as instructed by fabricator.
- B. Prepare support equipment for erection procedure, temporary bracing, and induced loads during erection.

3.2 ERECTION

- A. Precast members shall be erected after the concrete has attained the specified compressive strength, unless otherwise approved by the precast manufacturer.
- B. Erect in accordance with the approved shop drawings.
- C. Place precast members level, plumb, square and true within tolerances. Attain joint gaps between precast members with plastic spacers.
- D. Provide temporary brace and support for the precast members.

3.3 CLEANING

- A. Reinforcement at time of depositing concrete shall be free of corrosion and coatings that may impair bond with concrete, such as form oil, mill scale, or loose deposits of rust and other corrosion.
- B. Clean dirt or blemishes from exposed surfaces.

3.4 TOLERANCES

- A. Tolerances shall comply with PCI MNL-116.

3.5 FINISHES

- A. Exposed to view finished surfaces of precast members shall be uniform in color and appearance.

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B. Curing:

1. Cure members under identical conditions to develop required concrete quality.
2. Minimize appearance blemishes including non-uniformity, staining and surface cracking.

C. Provide PCI MBL-116 – Standard grade surface finish.

3.6 FIELD QUALITY CONTROL

- A. Prior to erection, and again after installation, precast members shall be checked for damage, such as cracking, spalling and honeycombing and repaired for acceptance by the Owner or Owner's Representative.
- B. Repairs shall require removal of all unsound concrete prior to applying concrete bonding agent, mortar, and grout in accordance with the manufacturer's instructions and recommendations. The repaired surfaces shall match the color and finish of the adjacent concrete.
- C. Any surface that does not meet the surface finish requirement must be repaired, or the member be removed and replaced with new precast members.

END OF SECTION

SECTION 15 00 00
GENERAL PIPING SYSTEM AND APPURTENANCES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section describes the requirements and procedures for piping systems (gravity sewer pipe) and appurtenances that apply to a number of other complimentary Specification Sections. The items are listed in this section to avoid repetition in sections elsewhere. This section includes, but is not limited to, temporary pipelines, field touch up, warning/identification tape, tracer wire, abandonment and removal of existing facilities, water stop gasket salvage, and disposal.

1.2 REFERENCE STANDARDS

- A. The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.
1. AWWA Guidelines for Distribution of Non-Potable Water
 2. ASTM D 2000 Standard Classification System for Rubber Products in Automotive Applications
 3. ASTM C-932 Resilient Connector between Reinforced Concrete Manhole Structure, Pipe, and Laterals
 4. ASTM C-1244 Standard Test Method for Concrete Sewr Manholes by the Negative Air Pressure (Vacuum) Test
 5. ASTM 1478 Resilient Connectors between Reinforced Concrete Storm Sewer Structures, Pipes, and Laterals

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 15066 HDPE Pipe

1.4 LINING CONTAMINATION PREVENTION

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

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1.5 TEMPORARY PIPELINES

- A. Temporary pipelines, where shown on the Approved Plans or required by the City Representative, provide temporary service to customers during construction.

1.6 WARNING/IDENTIFICATION TAPE

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

1.7 TRACER WIRE

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

1.8 WATER STOP CONNECTOR

- A. A water stop connector shall be installed as a cold joint connector, where shown on the Approved Plans.

1.9 SUBMITTALS

- A. Product Data - Provide data, indicating conformance to ASTM/ANSI codes, material, and accessories, information on the performance and operation of the water-stop gasket, materials of construction, dimensions and weights, elastomer characteristics, and pressure ratings

PART 2 MATERIALS

2.1 TEMPORARY PIPELINES

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

2.2 WARNING/IDENTIFICATION TAPE

- A. Warning/identification tape shall be as indicated below and in accordance with the Approved Materials List.
 - 1. Tape shall be an inert, non-metallic plastic film formulated for prolonged underground use that will not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil.
 - 2. Tape shall be puncture-resistant and shall have an elongation of two times its original length before parting.

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

<u>Printed Message</u>	<u>Tape Color</u>
Caution: Sewer line Buried Below	Green

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

1. Tape shall be minimum 4 mil thick x 6" wide with a printed message on one side. Tape used with the installation of onsite potable and recycled water irrigation systems shall be a minimum of 3" wide.

2.3 TRACER WIRE

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

1. Tracer wire shall be #14 AWG solid copper UF type wire with cross-linked polyethylene insulation. The insulation shall be white or yellow in color. Wire splices (at pipe tees, crosses and laterals) shall be accomplished using a direct bury silicone-filled capsule tube with standard wire nut or silicone-filled wire nut connectors of the appropriate size selected from the Approved Materials List.

2.4 WATERSTOP

- A. The water-stop gasket shall be an A-lok Water-Stop Gasket, manufactured by A-lok Products, Inc, Tullytown, PA or similar.

- B. Gasket

1. Material: The gasket shall be manufactured using polyisoprene SBR blend materials or equal.
2. Size: The gasket shall be ± 1 " of the nominal pipe outer diameter.
3. Type: The gasket shall be a one-piece spliced connector.

- C. Take Down Clamp

1. Material: Stainless steel
2. Type: The clamp shall use a double clamp connector for pipes larger than 18 inches

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PART 3 EXECUTION

3.1 TEMPORARY PIPELINES

- A. All temporary piping, fittings, and service connections shall be furnished, installed, and maintained by the Contractor, and the Contractor shall make connections to a water source designated by the City Representative.
- B. All pipe, valves, fittings, hose and connections furnished by the Contractor shall be of good quality, clean, and suitable for conveying potable water in the opinion of the City Representative.
- C. The temporary pipe shall be installed in such a manner that it will not present a hazard to traffic and will not interfere with vehicle access along its route.
- D. Upon completion of the work, the Contractor shall remove the temporary piping and appurtenances and shall restore all surfaces to the satisfaction of the City Representative.
- E. If repairs to temporary piping are necessary, Contractor shall make such repairs in a timely manner as directed by the City Representative. If progress in making repairs is inadequate, or in the event of emergency, the City Representative may take immediate corrective measures, which may include the performance of repair work by City of Petaluma forces or another contractor. All costs for corrective measures shall be borne by the Contractor.

3.2 WARNING/IDENTIFICATION TAPE

- A. Warning/Identification Tape shall be installed as described below and in accordance with the City of Petaluma Standards.
- B. Tape shall be placed at the top of the pipe zone 12" above and centered over the utility intended for identification. Tape used with onsite potable and recycled water irrigation systems shall be installed at 6" above the pipe.
- C. Tape shall be installed with the printed side up and run continuously along the entire length of the utility intended for identification. Tape shall be installed on the main piping and all appurtenant laterals, including blowoffs, air valve assemblies, fire hydrants, and services. Tape splices shall overlap a minimum of 24" for continuous coverage.
- D. Tape shall be installed prior to placement of the Trench Zone Backfill.

3.3 TRACER WIRE

- A. Tracer wire shall be installed as described below and in accordance with the City of Petaluma Standards.
- B. Tracer wire shall be installed with the new pipeline.
- C. Wire shall be placed on the top centerline of the pipeline and shall run continuously along the entire length of pipe prior to placement of trench backfill. Wire shall be mechanically and electrically continuous throughout the pipeline, including within pipe casings.

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- D. Tracer wire shall be secured to the pipe at 6' intervals with plastic adhesive tape, duct tape or plastic tie straps. The wire may alternately be secured to the pipe by looping the tracer wire around itself such that tracer wire remains continuous atop the pipe during backfill operations.
- E. Wire shall extend into the access port and shall terminate with a coiled 24" length of wire. All tracer wire not attached to piping shall be installed, without splices, within a conduit at a minimum depth of 24" in accordance with the Standard Drawings.
- F. Splices shall be installed only when necessary and shall be made using wire connectors selected from the Approved Materials List.
- G. The Contractor shall test tracer wire for electrical continuity in the presence of the City Representative prior to the installation of any paving over atop pipelines or appurtenances. Testing shall be accomplished using a device capable of detecting improper connections or ground fault interruptions.

3.4 WATERSTOP

A. Examination

- 1. All gaskets which have been damaged in transit or which are obviously deformed or refinished in any way shall be rejected, marked, and removed from the site of the work. The rejected gasket shall be clearly tagged in such manner as not to deface or damage it, and the gasket shall then be removed from the job site by the Contractor at his own expense.

B. Installation of Waterstop

- 1. Cast or core an opening in the structure 5" larger than the O.D. of the pipe.
- 2. Center one piece Water-Stop CPP over the pipe. Gasket and clamp shall be straight and perpendicular to the pipe.
- 3. Torque clamp(s) to 60 in.- lbs. with Torque wrench.
- 4. Align pipe and connector in center of structure opening and mortar completely around annular space with non-shrink grout.
- 5. If pouring in place, vibrate properly to insure complete compaction around seal.

3.5 INSTALLATION OF TEMPORARY END CAPS TO MAINTAIN SERVICE

- A. Before excavating for new mains that are to replace existing pipes or services, it may be necessary to install temporary end caps on existing pipes that are later to be abandoned or connected to in order to maintain service to customers or fire protection during construction. When indicated on the Approved Plans or when directed by the City Representative, Contractor shall install and maintain such temporary end caps as indicated below and in accordance with the Drawings.

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3.6 PERMANENT ABANDONMENT OF PIPELINES AND APPURTENANCES

- A. When indicated on the Approved Plans or when directed by the City Representative, existing pipelines to be abandoned shall be disconnected from all source pipelines and shall remain in place in accordance with the Drawings and the modifications and instructions listed below:
- B. All above-ground appurtenances connected to pipelines to be abandoned shall be removed and disposed of or salvaged in accordance with this Section.
- C. Pipe 12” and larger to be abandoned shall be abandoned per details on the drawings.

3.7 REMOVAL OF PIPELINES AND APPURTENANCES

- A. Existing pipe and appurtenances shall be completely removed when indicated on the Approved Plans or as directed by the City Representative. All materials removed during construction operations shall be salvaged or disposed of in accordance with this Section.
- B. When fittings, appurtenances, or pipe segments are removed from pipelines that are to remain in service, the removed portions shall be replaced with straight segments of pipe and appropriate couplings selected from the Approved Materials List.
- C. Contractor shall provide measures that allow for the removal of existing sewer mains and appurtenances with no leakage of raw sewage. Transportation of sewer mains and appurtenances removed from service shall be in waterproof trucks to prevent raw sewage from leaking on public streets.
- D. Removal of asbestos-cement pipe (ACP) and sewer mains and appurtenances shall be in accordance with all applicable State and Federal requirements, and disposal shall be in accordance with the requirements of this Section.
- E. Backfill, compaction, and surface repair of all excavations for removal of pipe and appurtenances shall be made in accordance with the Approved Plans, these Standard Specifications, and in accordance with the requirements of the agency of jurisdiction or as directed by the City Representative.

3.8 RECONNECTIONS

- A. Existing service laterals or appurtenances shall be connected to new pipelines as shown on the Approved Plans or as directed by the City Representative. Contractor may encounter unused service laterals or piping appurtenant to an existing pipeline being replaced. Laterals and appurtenant piping that will not be connected to new pipelines shall be abandoned in accordance with the requirements of this Section.

3.9 SALVAGE

- A. When the Contractor is required to remove existing pipe and appurtenances, such materials may, when shown on the Approved Plans or directed by the City Representative, be considered salvage. All materials identified as salvage are considered property of the City of Petaluma. The Contractor shall temporarily stockpile all material identified as salvage in a

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location that will not disrupt traffic or otherwise create an unsafe condition and shall deliver such materials as directed by the City Representative.

3.10 DISPOSAL

- A. All materials removed during construction operations and not identified by the City Representative as salvage shall be legally disposed of in accordance with all applicable Local, State, and Federal requirements.
- B. Disposal of asbestos-cement pipe requires special handling and attention, including but not limited to, encapsulation within airtight packaging, submittal of certification letters and/or waste profile statements, and the use of a Cal-OSHA registered asbestos abatement contractor to transport and dispose of such wastes. The City Representative shall be provided with copies of all applicable documentation regarding the transportation and disposal of asbestos-cement pipe. Contractor shall comply with all applicable regulations and all requirements of the disposal site. Contractor is responsible for all costs associated with disposal of materials, specifically including any materials that may contain asbestos.

END OF SECTION

SECTION 15 06 60
HIGH DENSITY POLYETHYLENE (HDPE) Pipe

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section describes outfall main piping (open-cut trench), including fittings, accessories and materials, pipe assembly, connection of mains to existing piping and valves, installation, and testing of the pipe.

1.2 RELATED SECTIONS

- A. Section 02200 Earthwork
- B. Section 15103 Outfall Check Valve

1.3 REFERENCES

A. ASME

- 1. ASME B16.1/ASME B16.5, Pipe Flanges and Fittings Package
- 2. ASME B16.5-2013, Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard

B. ASTM

- 1. ASTM A36 / A36M – 12, Standard Specification for Carbon Structural Steel
- 2. ASTM A276 – 13, Standard Specification for Stainless Steel Bars and Shapes
- 3. ASTM A283/A283M-12a Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
- 4. ASTM A307-12 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
- 5. ASTM A325-10e1 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- 6. ASTM D1248 – 12, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- 7. ASTM D3035 - 12e1, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter

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8. ASTM D3261 – 12, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
9. ASTM D3350 - 12e1, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
10. ASTM F714 – 13, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter

1.4 SUBMITTALS

- A. Provide in accordance with Section 01300 Contractor Submittals and as supplemented herein. Submittals shall include, but not be limited to, the following:
- B. Product Data - Provide data describing conformance to ANSI/AWWA/ASTM codes, material, sizes, class, dimensions, joint type, fittings, pipe, and accessories.
 1. Shop Drawings
 - a. Layout Drawings: Show complete piping layout, including materials, sizes, classes, locations, dimensions, adapters, couplings, expansion joints, and pipe support details.
 - b. Manufacturer's Certificates of Compliance.
 - c. Solvent cement chemical compatibility with conveyed fluid.
 - d. Certification of gasket material compatibility with conveyed fluid.
 - e. Certification of UV inhibitors in plastic piping for piping that will be outdoors and aboveground or inside process tanks.
 - f. Compatibility of shop coatings with specified field coatings.
 - g. Line stop and wet tap working drawings showing required work spaces and clearances
 - h. Welder Qualifications
 - i. Welder/welding operator qualifications.
 - j. Welding inspector's report.
 - k. Current welder certificates of welders that are utilized in fabrication, erection, and installation. Each welder shall have a permanent identifying mark next to each weld.
 2. Samples

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- a. Provide one two feet long sample of piping when requested by Engineer at no additional cost to Owner.
 - b. Engineer will keep sample.
 - 3. Shop test results if shop testing is required.
 - 4. Field testing results including leakage testing specified in other sections.
- C. Manufacturer's Installation Instructions - Indicate special procedures required to install products specified.
- D. Results of shop tests, if required.
- E. Manufacturer's Certificate - Certify that products meet or exceed specified requirements.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit documents under provisions of Section 01720, Project Record Documents.
- B. Identify and locate (horizontally and vertically) on record drawings the exposed unmapped utilities or services.
- C. Mark up detail drawing(s) to indicate as-built conditions.

1.6 REGULATORY REQUIREMENTS

- A. Conform to requirements of regulatory agencies having jurisdiction over the work.
- B. Conform to permit requirements obtained by the City of Petaluma.

1.7 COORDINATION

- A. Coordinate field work under provisions of Sections 01311 Coordination, including field engineering, maintenance of traffic, access to private driveways, and emergency vehicle access.
- B. Coordinate work with local utility companies private and municipal, including the organization identified in Section 01530 Protection of Existing Facilities, for location of existing utilities and protection thereof.

1.8 QUALITY CONTROL

- A. HDPE Fusion Quality: Ensure proper field set up and operation of the fusion equipment, and the fusion procedures used while on Site. Upon request by Owner, verify field fusion quality by making and testing a trial fusion. The trial fusion shall be allowed to cool completely. After complete cooling, test straps shall be cut out and bent straps tested in accordance with ASTM D2657. If the bent strap test of the trail fusion fails at the joint, the filed fusions represented by the trail fusion will be rejected. Make all necessary corrections to equipment, set up, operation and fusion procedures, and redo the rejected fusions.

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PART 2 PRODUCTS

2.1 GENERAL

- A. Identification: Each pipe segment, fitting, and special shall be clearly marked with the following:
 - 1. Manufacturer's name and trademark.
 - 2. Nominal pipe size and class.
 - 3. Material designation.
- B. All products included in this section shall conform to the requirements of the standard specifications referenced herein.
- C. Pipe material, pipe class, and pipe sizes shall be furnished and installed as listed in the pipe schedule or as shown on the drawings.

2.2 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. The resin material will meet the specifications of ASTM D3350, PE4710 resin, Cell Classification 445574C, as specified in the Plastic Pipe Institute (PPI) publication TR-4.
- B. Pipe shall have an HDB rating of 1,600 psi at 73 F.
- C. Outfall HDPE pipe and fittings shall be DR-32.5.
- D. 4-Inch Diameter to 63-Inch Diameter
 - 1. Pipe shall have a manufacturing standard of ASTM F714.
 - 2. Pipe shall meet requirements of AWWA C906.
 - 3. IPS sizes.
 - 4. Pipe shall be Carbon Black for UV Resistance.
 - 5. Fittings
 - a. Fittings shall be PE4710 HDPE, Cell Classification of PE:445574C as determined by ASTM D3350, and approved for AWWA use.
 - b. Fittings and custom fabrications shall be pressure rated for a minimum same internal pressure rating as the mating pipe.
 - c. Molded fittings shall be manufactured and tested in accordance with ASTM D3261 and shall be so marked and also tested in accordance with AWWA C906.

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- d. Fabricated fittings shall be made by heat fusion joining specially machined shapes cut from pipe, polyethylene sheet stock or molded fittings. Fabricated fittings shall be rated for internal pressure service at least equal to the full service pressure rating of the mating pipe. Fabricated fittings shall be tested in accordance with AWWA C906.
6. Diffuser Assembly piping and any associated fittings shall be DR-17, including the riser pipes. Fittings shall have a beveled edge to fuse to DR-32.5.

E. Manufacturers

1. JM Eagle
2. ISCO Industries

2.3 PIPE ACCESSORIES

A. Fittings

1. Same materials, class, coatings and linings as pipe unless under Article 2.02 unless it was specifically described otherwise.
2. Fittings molded or formed to suit pipe size and end design and in required tee, bends, elbow, couplings, adapters, and other configurations.

2.4 IDENTIFICATION

A. Each pipe length and fitting shall be clearly marked with:

1. Manufacturer's name and trademark.
2. Nominal pipe size and class.
3. Material designation.

2.5 UNDERGROUND WARNING TAPE

- A. Provide 4-inch wide metallic detectable-type underground warning tape over all non-metallic buried piping installed by trenching.
- B. Tape shall be colored purple with warning legend describing buried Outfall piping.
- C. Tape shall be manufactured by Seton; EMED Company; THOR Industries; Panduit; or equal.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. For trench installation verify that trench cut, excavated base and pipe bedding are ready to receive pipe and that excavations and pipe bedding dimensions and elevations are as shown on Drawings.
- B. All pipe or fittings which have been damaged in transit or which are obviously deformed or refinished in any way shall be rejected, marked, and removed from the site the work.
 - 1. Any pipe or fitting which the Engineer suspects is improper for the job shall be temporarily rejected, marked, and set aside for subsequent investigation to determine its conformity with the specifications.
- C. All pipe fittings and specials shall be carefully inspected in the field before lowering into the trench. Cracked, broken, gouged, warped, out-of-round, damaged pipe joints including damaged pipe lining or coatings or specials, as determined by the Engineer, shall be culled out and not installed.
 - 1. Such rejected pipe shall be clearly tagged in such manner as not to deface or damage it, and the pipe shall then be removed from the job site by the Contractor at his own expense.
- D. The drawings and specifications may contain information relating to conditions below the ground surface at the site of proposed work, but such information is furnished without guarantee as to it being complete or correct. The Contractor shall assume all risk and responsibilities and shall complete the work in whatever manner and under whatever conditions he may encounter or create without extra cost to the Owner. Location of existing underground facilities at or contiguous to the site is based upon information and data furnished to the Engineer by owners of such underground facilities or others, and Owner and Engineer do not assume responsibility for the accuracy or completeness thereof.
 - 1. The Contractor shall perform exploratory excavations in advance of this work to verify the location, depth, size, and material of existing utilities which may interfere with the work to be performed under this contract. All damage to existing utilities shall be the Contractor's cost to repair or replace.

3.2 PREPARATION

- A. The Contractor shall have on the job site with each pipe laying crew, all the proper tools, gauges, pipe cutters, lubricants, etc. to handle, cut and join the pipe.
- B. Existing pond levees/roads to be given care and protected when delivery of piping occurs.
- C. Flat-bottom trenches of required width shall be excavated to the necessary depth as required.
- D. Prior to installing the pipe foundation material, trenches shall have all water removed and all work performed in a dry trench.

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- E. All pipes, fittings and specials which are to be installed in the open trench excavation shall be properly bedded in and uniformly supported as shown on the Drawings.
- F. In particular, stones 2 inches and larger shall be removed from the bearing surface of the pipe foundation.
- G. Pipe foundation bedding material shall be spread in maximum 8-inch layers and each layer shall be compacted up to the spring line of the pipe.
- H. Compaction methods include hand tamping with T-bars, flat heads, shovel slicing as well as mechanical compactors.
- I. The Contractor shall perform his bedding operations with care to maintain line and grades.
- J. Suitable holes or depressions shall be provide in the pipe bedding to permit adequate bedding of bells, couplings, or similar pipe projections.
- K. For Open-Cut trench installations, pipe shall be prepared in accordance with Section 02200 Earthwork.

3.3 LINES AND GRADES

- A. The Contractor shall furnish all labor, materials, surveying instruments, and tools to establish and maintain all lines and grades shown on the Drawings. The Contractor shall have personnel on duty or on standby call, at all times, who are qualified to check line and grade of pipe lines as they are installed.
- B. During construction, the Contractor shall be responsible for field stakeout.
- C. The Contractor shall carefully preserve bench marks, reference points and stakes established by the Engineer or Owner, and in case of willful or careless destruction by his own operations he will be charged with the resulting expense to reestablish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the unnecessary loss or disturbance of such control data.
- D. The Contractor may use laser equipment to assist in setting the pipe provided he can demonstrate satisfactory skill in its use.
- E. The use of string levels, hand levels, carpenter's levels, or other relatively crude devices for transferring grade or setting pipe are not to be permitted.

3.4 TOLERANCES

- A. Pipes shall be installed at the lines and grades shown on the Drawings.
- B. Minimum depth of cover shall be maintained shown on the Drawings or as described herein.

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3.5 INSTALLATION

- A. Installation of HDPE pipe to be in conformance with AWWA M55, C906 or ASTM D3035, respectively, except as modified in this Section or referenced Sections or as shown on the Drawings.
- B. The Contractor shall furnish slings, straps and/or approved devices to provide satisfactory support of the pipe when it is lifted. Transportation from storage areas to the trench shall be restricted to operations which can cause no damaged to the pipe or lining or castings.
- C. The pipe shall not be dropped from trucks onto the ground or into the trench.
- D. Each pipe section shall be placed into position in the trench on the pipe bedding in such manner and by such means required to cause no injury to the pipe, persons or to any property.
- E. The method of laying and jointing the pipe shall be in accordance with the recommendations of the manufacturer and as approved by the Engineer. Each pipe shall be aligned with that already in place, forced home completely with horizontal axial movement and held securely in position. The bell of each pipe length to be laid in the same direction the installation is proceeding.
- F. At the joints, enough depth and width shall be provided to permit the pipe layer to reach entirely around the pipe so that the joints may be made in accordance with the manufacturer's recommendations. Mechanical type joints shall be tightened within the AWWA recommended torque range.
- G. Pipe laid in normal trench excavation shall not be laid on wood blocking.
- H. Backfill material within 12 inches of the pipe shall be free of stones greater than 2 inches in any dimension.
- I. Pipes, fittings, and specials shall be firmly bedded in the pipe foundation and shall have full bearing throughout their entire length, which shall be accomplished by combination of shaping the bedding and adequately compacting the pipe bedding and backfill under and around the pipe to the spring line of the pipe. The remaining backfill placed in 12-inch lifts to 1-foot above the crown or the pipe in accordance with Section 02200 Earthwork. The remaining backfill installed in accordance with Section 02 20 00 Earthwork.
- J. Unless otherwise shown on the Drawings, the minimum total finished cover over the top of the pipe barrel of all pressure pipe shall be 3 feet.
- K. To deflect a pipe joint, first join the pipe in the proper manner and then deflect the pipe within the allowable deflection recommended by the manufacturer.
- L. Manufactured pipe plugs or temporary bulkheads shall be placed in the open ends of sewer pipes whenever pipe installation is stopped overnight, over weekends, or whenever dirt or debris could enter the pipe during construction. Newly installed pipe shall not be used to remove groundwater from trench.
- M. Installation of polyethylene sleeves to be preformed in accordance with the manufacturers instructions and ANSI A21.4/AWWA C105.

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3.6 PIPE CONNECTIONS

- A. Blair Model 441 or 442, or equal with stainless steel bolts and nuts. The couplings shall receive two coats of coal tar epoxy paint on all exterior surfaces prior to installation.
- B. Fused Joints - Butt fusion or electrofused joining methods shall be used in accordance with manufacturer's written instructions.
- C. Flanged coupling adapters shall be used when connecting PVC or ductile iron force mains to tees in manholes for cleanouts, pigging connections, air release valve assemblies, etc.
- D. Flanged Coupling Adapters
 - 1. Flanged coupling adapters for pipe sizes up to 42 inches shall meet ASTM A512.
 - 2. Flanges for pipes 6 inches and larger shall be AWWA C207 Class D, ANSI 150-lb.
 - 3. Followers 3 inches through 12 inches shall be ductile iron ASTM A536, and for 14 inches and larger shall be heavy rolled steel AISI C1018.
 - 4. The gasket shall be Grade 60 rubber.
 - 5. Bolts and nuts shall be 304 stainless steel high strength low alloy steel with heavy semi-finished hexagon nuts to AWWA C-111 standards. All submerged installed bolts and nuts shall be Standard Duplex 2205.
 - 6. Studs shall be 316 stainless steel. All marine installed studs shall be Standard Duplex 2205.
 - 7. The assembly shall be finished with fusion bonded epoxy.
 - 8. When connecting HDPE, a Standard Duplex 2205 stainless steel stiffener shall be provided.
 - 9. Flanged coupling adapters shall be Model 913 by Smith-Blair, Dresser Style 128, or equal.

3.7 TEMPORARY PLUGGING

- A. At all times when pipe laying is not actually in progress, the open ends of the pipes shall be closed temporarily with pipe plugs or by other means such that there is no possibility of any water or foreign material entering the line. If water is in the trench when work is resumed, the plugs shall not be removed until the water has been removed and work can proceed in a dry stable trench.

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3.8 CLEANING PIPELINE

- A. At the conclusion of the work, the Contractor shall thoroughly clean all new pipes by flushing with water or other means to remove all dirt, stones, pieces of wood, etc., which may have entered during the construction period.
 - 1. If, after this cleaning, any obstructions remain, they shall be corrected to the satisfaction of the Engineer. Pipes shall be flushed at a rate of 2.5 feet per second for a suitable duration.
- B. Where required the Contractor shall use mechanical methods to clean pipes when flushing does not remove all obstructions or material.

3.9 TESTING

- A. Testing of the force main pipelines shall be performed in accordance with Section 15044 Hydrostatic Testing of Pressure Pipelines.
- B. Any section of pipe that fails the pressure or leakage test shall be dug up and replaced or permanently repaired as approved by the Engineer. The replaced or repaired section shall be retested.

3.10 PIPING SCHEDULE

Pipe No.	Identify Location	Predominant Size	Type Of Pipe	Schedule Or Class	Joints	Remarks
1	Buried Pipe	42-inch	HDPE	DR-32.5	Butt-heat fusion	See Contract Drawings for Locations

END OF SECTION

SECTION 15 10 30
RUBBER CHECK VALVE

PART 1 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all tools and equipment, and shall perform all labor necessary for installing the outfall check valves specified herein and shown on the Contract Drawings.

1.2 RELATED SECTIONS

- A. Section 15066 HDPE Pipe

1.3 REFERENCES

ASTM D2000-90 BA515C1221	EPDM Rubber
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1.4 SUBMITTALS

- A. The Contractor shall submit complete shop drawings for approval in accordance with specification Section 01300 Contractor Submittals. The rubber check valve is to be made to order based on the pressure requirements located at the project site.
- B. Product Data - Provide data, indicating conformance to ASTM/ANSI codes, material, and accessories, information on the performance and operation of the valve, materials of construction, dimensions and weights, elastomer characteristics, and pressure ratings.
- C. Equipment Certification - The Contractor shall submit as part of the shop drawings of the check valve specified, a statement from the manufacturer certifying that the check valve is fabricated in accordance with these specifications and will perform as outlined in these specifications.
- D. Provide complete assembly-disassembly and maintenance instructions, including factory testing data, diagrams and parts list.

1.5 QUALITY ASSURANCE

- A. The manufacturer of the equipment specified herein (as named) shall be regularly engaged in the design and manufacture of the type of equipment described herein for at least fifteen (15) years. The manufacturer's experience shall include at least twenty (20) installations of similar design as that specified herein at municipal wastewater treatment facilities that have been in operation for at least 5 years.
- B. Manufacturer shall have conducted independent hydraulic testing to determine headloss and jet velocity characteristics on a minimum of eight sizes of duckbill valves ranging from 2" through 48". The testing must include multiple constructions (stiffness) within each size and

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must have been conducted for free discharge (discharge to atmosphere) and submerged conditions.

- C. Manufacturer shall have conducted an independent hydraulic test where multiple valves (at least four) of the same size and construction (stiffness) were tested to validate the submitted headloss characteristics and to prove the repeatability of the manufacturing process to produce the same hydraulic characteristics.
- D. Manufacturer to have conducted Finite Element Analysis (FEA) on various duckbill valves to determine deflection, stress and strain characteristics under various load conditions. Modeling must have been done for flowing conditions (positive differential pressure) and reverse differential pressure.
- E. The bill slit of the duckbill valve must be at least 1.57 times the nominal pipe diameter.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. The elastomer check valves shall be placed on a pallet with the cuff portion seated flush against the surface of the pallet and the bill portion facing upward; shipping the check valve on its side in any manner will not be accepted. The manufacturer shall provide supplemental supports and bracing to the interior and/or exterior to maintain the shape and form of the check valve through the packaging and shipping process. The check valve shall be adequately strapped to the pallet to prevent movement while handling and moving the entire pallet assembly; strapping shall not cause deflection or deformation of the nozzle. The nozzle shall be externally covered in clear plastic static wrap prior to leaving the manufacturing facility.
- B. The elastomer check valves shall be stored in a cool, dry location and remained packaged on the shipping pallets for storage periods prior to installation. Do not remove any bracing or shipping rings until the check valve is to be installed. During the storage period, avoid exposure to UV light, corrosive chemicals, and concentrated noxious gases such as ozone.
- C. Refer to the “manufacturer’s installation”, operation and maintenance manual for handling procedures of the check valve during installation and proper use of lifting clevis and clamp rings, if provided.

1.7 SPARE PARTS

- A. Spare parts shall be provided in accordance with the manufacturer’s recommendation.

1.8 WARRANTY

- A. The manufacturer shall provide a written warranty to the Client certifying that the equipment complies with these specifications and is free from defects in material and workmanship. The manufacturer shall warrant the equipment to the City against defects in workmanship and materials for a period of two (2) years under normal use and service.
- B. The warranty shall become effective after start-up and acceptance by Owner.

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- C. Components failing to perform as specified or proven to be defective during the warranty period shall be replaced by the manufacturer without cost of parts or labor to the Owner.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Outfall check valve shall be Tideflex® Series 35-1, manufactured by Tideflex® Technologies/Red Valve Company, Carnegie, PA or similar.

2.2 PERFORMANCE REQUIREMENTS

- A. Check Valves are to be all rubber and the flow operated check type with an integral flanged end connection. The port area shall contour down to a duckbill which shall allow passage of flow in one direction while preventing reverse flow. The flange and flexible duckbill sleeve shall be one-piece rubber construction with nylon reinforcement. The duckbill shall be offset so that the bottom line of the valve is flat, keeping the invert of the pipe parallel with the invert of the valve. The top of the valve shall rise to form the duckbill shape. The bill portion shall be thinner and more flexible than the valve body and formed into a curve of 180°.
- B. The flange drilling shall conform to ANSI B16.1 Class 125/ANSI B16.5, Class 150 standards. The valve shall be furnished with galvanized or stainless steel back-up rings for installation.
- C. Manufacturer must have available flow test data from an accredited hydraulics laboratory to confirm pressure drop data. Company name, plant location, valve size and serial number shall be bonded to the check valve.

2.3 DESIGN REQUIREMENTS

A. General

1. All products included in this section shall conform to the requirements of the standard specifications referenced herein.
2. When line pressure inside the valve exceeds the backpressure outside the valve, the line pressure forces the bill of the valve open, allowing flow to pass. When backpressure exceeds the line pressure, the bill of the valve is forced closed preventing backflow
3. The check valve shall be elastomeric duckbill type constructed of fabric reinforced elastomer in accordance with the operational conditions defined within this specification section. The diffuser shall be installed onto the carrier pipe by means of a flanged end connection to the pipe outlet.
4. The check valve shall be configured as a concentric type where the bottom and the top of the diffuser is flared equally to provide the specified bill opening to diameter ratio dimension.

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PART 3 EXECUTION

3.1 EXAMINATION

- A. All check valve which has been damaged in transit or which is obviously deformed or refinished in any way shall be rejected, marked, and removed from the site of the work. The rejected check valve shall be clearly tagged in such manner as not to deface or damage it, and the check valve shall then be removed from the job site by the Contractor at his own expense.

3.2 SHOP TESTING

- A. Not used.

3.3 EQUIPMENT INSTALLATION

- A. Furnish and install the equipment according to manufacturer's written Installation instructions and Operation Manual and approved submittals.
- B. Contractor shall field verify all dimensions and elevations and shall notify the Engineer of any discrepancies.

3.4 SERVICES OF MANUFACTURER'S REPRESENTATIVE

- A. Provide services of the equipment manufacturer or their approved representative to assist in the installation of the diffusers and to conduct a site inspection of the installed unit. The manufacturer's representative shall submit documentation to the Engineer that the diffusers have been installed in accordance with the manufacturer's recommendation.

END OF SECTION

SECTION 31 41 33
SHORING AND TRENCH SAFETY

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section is intended to provide specifications for the minimum requirements for trench safety. The Contractor shall endeavor to insure the safety of their employees working in and around trenches and other excavations in accordance with current Occupation and Safety Health Administration (OSHA) standards and in particular, Excavations, Trenching and Shoring, Federal OSHA Standards, 29 C.F.R. part 1926, Subpart P, as amended including Final Rule, published in Federal Register Vol. 54, No. 209 Tuesday October 31, 1989 and latest amendment thereto. These specifications outline minimum standards of construction safety to be followed, but should not be construed as the means, methods and operations of construction. Where the Contractor deviates from these outlined minimum standards, the Contractor is required to submit for approval by the Owner sealed engineering plans designed by a Registered Professional Engineer in the State of California showing the proposed method of trench protection. A copy of the approved design shall be kept at the site.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02 14 00 Dewatering
- B. Section 02 20 00 Earthwork
- C. Section 15 00 00 General Piping System and Appurtenances
- D. Section 15 06 60 High Density Polyethylene (HDPE) Pipe

PART 2 PRODUCTS

- A. Materials used for sheeting, sheet piling, cribbing, bracing, shoring, underpinning, and other structural retaining systems shall be in good serviceable condition, of good quality, of a suitable condition and grade to perform the intended use. Wood shall be sound, free from large or loose knots, and of the proper dimensions. The Contractor shall be responsible for maintaining the systems in a manner consistent with the intended design and in a manner that will prevent exposure of workers to hazards.

PART 3 EXECUTION

3.1 GENERAL SAFETY REQUIREMENTS

- A. The work area shall be kept free of hazards to the employees. All surface encumbrances which may create a hazard shall be removed, supported or otherwise isolated as necessary to safeguard employees.

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- B. The Contractor shall take special precautions to locate existing utilities and to protect those systems as required. The Contractor shall call the Utility Coordinating Committee as required 24 hours prior to excavating around existing utilities.
- C. The Contractor shall provide safe access and egress to excavations. Ramps or stairways shall be structurally sound and capable of providing a safe means of escape from the excavation. Trenches in excess of four (4) feet in depth shall have a safe means of egress from the trench spaced such that no more than 25 feet of lateral travel would be required to reach the egress system.
- D. The employees shall be protected from work place hazards such as vehicular traffic, falling loads, and hazardous atmosphere. Excavations shall be marked so that employees and equipment are clearly warned of the location of the excavations. Trenches shall be kept free of water accumulations that would present a hazard to employees. Adjacent structures shall be stabilized as necessary so as not to present a possible hazard to the employees. Equipment shall be kept sufficiently clear of excavations so as not to create a potential overburden stress to trench walls causing cave-ins. Safe access shall be provided with handrails where access over trenches is required.
- E. Emergency rescue equipment as required by OSHA shall be readily available at the site and shall be maintained to good working condition.
- F. Daily inspections of excavations, the adjacent areas, and the protective systems shall be made by a person or persons competent to make such inspections to keep the Contractor notified of unsafe conditions so that necessary precautionary actions can be taken.

3.2 TRENCH WALL LAYBACK

A. General

- 1. In areas where no pavement or other structural elements are to be constructed, the sides of the trenches over five (5) feet deep may be sloped to provide protection from cave ins. If written approval is given by the Owner, trenches beneath pavement or other structures may also be laid back. Backfill for laid back trenches shall be as provided for a vertical wall trench for the full width of the excavation.

B. Layback Slope Requirements

- 1. The Contractor shall be responsible for providing the proper lay back slopes for all soil conditions encountered. Where soils data is provided for the Contractor's use, that information is intended as a sampling of the types of soils materials that may be encountered; however, the Contractor shall be diligent in observing the actual soil conditions as the work proceeds and shall be responsible for providing a safety system adequate to meet the minimum standards for the actual types of soils encountered. Special precautions shall be taken to monitor conditions when working in fill areas, areas subject to surcharge and areas exposed to vibrations from nearby equipment and machinery.

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2. At the Contractor’s option where a layback trench system is approved for use, the Contractor may layback the sides of the trench at a slope of one and one-half (1-1/2) feet horizontal to one (1) foot vertical without testing for the soil’s stability. When this method is used, it does not preclude the removal of unsuitable materials encountered and replacement with suitable materials. This method shall not be used in unsuitable soils such as wet sands, silts, peat or in other areas which require special procedures, equipment and materials.
3. The Contractor may engage a competent person in the means of soil classification to determine the soil classification as a means of reducing the trench wall slopes. Layback slopes may be sloped up to the maximum allowable slopes as follows for the given types of soil.

MAXIMUM ALLOWABLE SLOPES

Soil Materials	For Excavations Less than 20 Feet Deep [c] Slope H:V	
Stable Rock	Vertical	(90°)
Type A-[b]	3/4:1	(53°)
Type B	1:1	(45°)
Type C	1 1/2:1	(34°)

- a. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
 - b. A short-term maximum allowable slope of 1/2H:1V (63°) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth shall be 3/4H:1V (53°).
 - c. Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
4. The types of soil given in paragraph 3.2.B are defined as follows:
 - a. Stable Rock - Natural solid mineral matter that can be excavated with vertical sides and remain in tract while exposed.
 - b. Type A - Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam cemented soils such as caliche and hard pan are also considered Type A. However, no soil is Type A if:
 - 1) The soil is fissured.
 - 2) The soil is subject to vibration from heavy traffic, piling driving, or similar effects.

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- 3) The soil has been previously disturbed.
 - 4) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater.
 - 5) The soil is subject to other factors that would require it to be classified as a less stable material.
- c. Type B - Soil that meets one of the following:
- 1) Cohesive soil with an unconfined compressive strength greater than 0.5 tons per square foot, but less than 1.5 tons per square foot.
 - 2) Granular cohesionless soils including: angular gravel, silt, silt loam, sandy loam and in some cases, silty clay loam and sandy clay loam.
 - 3) Previously disturbed soils except those which would otherwise be classified as Type C soil.
 - 4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration.
 - 5) Dry rock that is not stable.
 - 6) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical, but only if the soil would otherwise be classified as Type B.
- d. Type C - Soil that meets one of the following:
- 1) Cohesive soil with an unconfined compressive strength of 0.5 tons per square foot or less.
 - 2) Granular soils including: gravel, sand and loamy sand.
 - 3) Saturated or submerged soil.
 - 4) Submerged rock that is not stable.
 - 5) Soil in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical or greater.
5. Unconfined compressible strength shall mean the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, estimated in the field using a pocket penetrometer, or other previously approved methods.
 6. Wet soil shall mean soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to

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flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

7. Layered systems shall be classified in accordance with its weakest layer; however, each layer may be classified individually where a more stable layer lies under a less stable layer.
8. Previously classified material whose properties, factors, or conditions affecting its classification change in any way shall be reclassified as necessary and changes to the trench safety plan shall be accomplished before continuing any work in or near the trench where there may be potential danger to workers due to trench failure.
9. The slope of a laid back trench wall shall be less steep than the maximum allowable slope when there are signs of distress. The maximum allowable slope for a material in distress shall be 1/2 horizontal to one vertical or less steep than the maximum allowable slope for the material in a non-distressed condition. Distress shall mean a condition in which a cave-in is imminent or likely to occur.
10. When surcharge loads from adjacent structures, stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such a reduction is achieved.
11. An adequate means of exit such as a ladder or steps shall be provided and located so as to require no more than 25 feet of lateral travel to exit the trench.

3.3 TIMBER SHORING

A. General

1. Timber shoring may be used as a means of trench protection from cave-ins in trenches that do not exceed 20 feet in depth. The timber shoring system may be used in lieu of sloping and benching systems, or in conjunction with those systems. Good judgment shall be used by the Contractor in selecting the proper system when alternative designs are given.

B. Soil Classification

1. The timber shoring system designs are subject to soil classifications outlined in 3.2.B.4 of this section. Classification shall be conducted by a competent person using the proper means and methods of classification as described in this section.

C. Basis and Limitations

1. Dimension of Timber Members
 - a. The sizes of the timber members shown in the details are taken from the National Bureau of Standards (NBS) report, "Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations." In addition where NBS did not recommend specific sizes for members, member

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sizes are based upon an analysis of the sizes required for use by existing codes and an empirical practice.

- b. The required dimensions of the members listed in the tables refer to actual dimensions and not nominal dimensions of the timber.

2. Limitation of Application

- a. It is not intended that the timber shoring specification apply to every situation that may be experienced in the field. This data was developed to apply to situations that are anticipated to be present at the site. Where the system provided does not meet the requirement of the actual conditions in the field, the Contractor shall either notify the Owner of the situation and present an engineered solution designed and sealed by the Registered Professional Engineer, or shall notify the Owner of the unanticipated conditions and await instructions.

- b. When any of the following conditions are present, the members specified and shown in the details are not considered adequate.

- 1) When loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by a two foot soil surcharge. Adjacent shall mean the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

- 2) When vertical loads imposed on crossbraces exceed a 240 pound gravity load distributed on a one foot section of the center of the crossbrace.

- 3) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

- 4) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless:

- a) The sloped portion is sloped at an angle less steep than 3H:1V;

- b) The members are selected from the tables based upon the total trench depth from the top of the overall trench and not the toe of the slope.

3. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling or kickouts.

4. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

5. An adequate means of exit shall be provided such as a ladder or steps and shall be located so as to require no more than 25 feet of lateral travel to exit the trench.

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6. Where necessary due to wet soils or other similar conditions, the shoring system shall use tight sheeting such that material is contained behind the sheeting.

3.4 ALTERNATIVE SHORING SYSTEMS

A. General

1. Alternative shoring systems may be used when approved by the Owner. Steel, aluminum or other approved materials may be used in lieu of wood for shoring where the system is designed, constructed and maintained in a manner that will give equal to or greater protection than the wood system.

B. Sheet Piling

1. Sheet piling may be used when approved by the Owner to shore the sides of the trench. Sheet piles shall be removed at the completion of the work unless otherwise directed by the Owner. When piling is to remain, the piling shall be cut off at least three feet from the top of the excavation or at least three feet from the top of the proposed finished grades, whichever is lower. The sheet piling system shall be designed by a Registered Professional Engineer and shall provide equal or greater protection than the specified wood shoring system. Materials for the piling shall be approved by the Owner.

C. Trench Boxes

1. Trench boxes that provide equal or greater protection as the specified wood shoring system may be used. The Contractor shall be responsible for insuring the adequacy, maintenance, and design of the trench box used. The Contractor shall also be responsible for the proper use and operation of the trench box.

D. Shield Systems

1. General

- a. Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.
- b. Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.
- c. Workers shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.
- d. Workers shall not be allowed in trenches or shields when shields are being installed, removed, or relocated.

2. Excavations of earth material to a level not greater than two feet below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench and there are no

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indications while the trench is open of a possible cave-in below the bottom of the shield.

3. Use of shields shall be subject to approval by the Owner.

END OF SECTION

SECTION 32 12 16
ASPHALT PAVING

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes placing of base course, placing of asphalt concrete, sealant, field quality control, and maintenance of pavement.

1.2 RELATED SECTIONS

- A. Section 02 20 00 - Earthwork.

1.3 REFERENCES

- A. Except as otherwise indicated in this section of the specifications, the contractor must comply with the Standard Specifications for Public Works Construction (SSPWC).

1.4 REGULATORY REQUIREMENTS

- A. Asphaltic products and solvents shall be compliant with the latest City and permit requirements regarding regulations governing permissible content of volatile organic compounds (VOC).

1.5 SUBMITTALS

- A. Mix Design: Submit proposed mix design for each asphaltic concrete mixture and seal coat to be used in the work, covering the specific materials to be used in the mixes. Include test data in support of each proposed mix design.
- B. Test Reports: Submit test results of sampling and testing, and inspection records within 24 hours of asphaltic concrete placement.

1.6 PROTECTION

- A. Protect concrete pavements and walks, curbs and bases, and other improvements adjacent to the operations with suitable materials. The Contractor shall be responsible for any damage caused by the Contractor's employees or equipment and shall make necessary repairs. All damage caused by the Contractor's operations shall be repaired or replaced as required.

PART 2 PRODUCTS

2.1 MATERIAL REQUIREMENTS

- A. Base: Materials for aggregate base shall be crushed rock and rock dust complying with SSPWC Subsection 301-2.1.

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- B. Tack Coat: Tack coat material shall comply with SSPWC Subsection 302-5.4.
- C. Asphalt Concrete: Asphalt concrete shall comply with SSPWC Subsection 400-4. Where construction of the pavement is to be accomplished in a single course, Class C2 grading shall be used. Where construction consists of two or more courses, the surface course shall be Class C2 grading, and the lower courses shall be Class B3 grading. Paving asphalt of viscosity grade AR 4000 shall be used.
- D. Emulsified Asphalt Slurry Coat: The slurry coat shall meet the requirements of SSPWC Subsection 203-5 and shall have the composition and grading indicated for Type II material.

2.2 SOURCE QUALITY CONTROL

- A. The Contractor shall perform sampling and tests of materials in accordance SSPWC:
 - 1. Frequency of Tests: Minimum testing frequency shall be one test for every five hundred tons, or fraction thereof, for each graded aggregate placed each day.
 - 2. Asphalt Content: Asphalt content shall be within plus or minus 0.50 percent of the mix design content

PART 3 EXECUTION

3.1 PLACING OF BASE COURSE

- A. The Contractor shall call for an inspection by the Engineer and obtain written approval of the sub grade before proceeding with the base course.
- B. Base course shall be minimum uniform thickness after compaction of dimensions indicated. Where not indicated, compacted thickness shall be six inches for parking stalls and eight inches forroads, driveways, and aisles of parking areas.
- C. Base course shall be placed over finished/prepped sub grade and compacted to 95% compaction requirements per SSPWC
- D. After base course has been completed, the Contractor shall call for an inspection by the Engineer and obtain written approval before proceeding with application of the asphalt-wearing surface.

3.2 PLACING OF TACK COAT

- A. A tack coat shall be applied in accordance with the requirements of SSPWC Subsection 302-5.4.

3.3 PLACING ASPHALT CONCRETE

- A. Areas to be paved shall be covered with a layer of hot asphalt concrete surfacing not less than the thickness indicated after compaction. Where not indicated, compacted thickness shall be twoinches for parking stalls and 2-1/2 inches for roads, driveways, and aisles of parking areas.

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- B. Asphalt concrete paving shall be constructed in accordance with SSPWC Subsection 302-5.

3.4 PLACING OF SEAL COAT

- A. An emulsified asphalt slurry coat shall be applied to surfaces of existing asphaltic-concrete pavement as indicated. Mixing and spreading of the slurry coat shall conform to applicable portions of SSPWC Subsection 302-4. Slurry shall be applied at a rate of 1350 square feet per extra long ton.

3.5 FIELD QUALITY CONTROL

- A. The Contractor shall control the quality of the Work and shall provide adequate testing to assure compliance with these Specifications.
- B. After completion of paving work, all paving shall be flooded with water, and any resulting "ponds" shall be ringed with chalk. Such hollows shall be corrected with addition of asphalt paving materials and re-rolling until all paving is completely level and free from hollows and high spots.
- C. The Contractor shall perform in-place density and compaction tests of the completed pavement. Recompaction shall be 96 percent.

3.6 MAINTENANCE OF PAVEMENT

- A. Upon completion of final rolling, traffic shall not be permitted on the finished pavement for at least six hours, and until the asphalt concrete has cooled sufficiently to withstand traffic without being deformed.
- B. Finished pavement shall be maintained in finished clean condition until the Work is accepted by the Engineer.

END OF SECTION

SECTION V

CONSTRUCTION AGREEMENT

CONSTRUCTION AGREEMENT

FY 22/23 Fund _____ Cost Center _____ Object Code _____ Project # C66501838 Amount \$ _____

For multi-year contracts or contracts with multiple accounts:

FY _____ Fund _____ Cost Center _____ Object Code _____ Project # _____ Amount \$ _____

FY _____ Fund _____ Cost Center _____ Object Code _____ Project # _____ Amount \$ _____

FY _____ Fund _____ Cost Center _____ Object Code _____ Project # _____ Amount \$ _____

THIS AGREEMENT is dated as of the _____ day of _____ in the year 20____, by
(city use only)

and between CITY OF PETALUMA (hereinafter called “CITY”) and _____ (hereinafter called “CONTRACTOR”).

CITY and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK

CONTRACTOR shall complete the WORK as specified or indicated in the CITY’S Contract Documents entitled Ellis Creek Water Recycling Facility Outfall Replacement Project.

ARTICLE 2. COMPLETION OF WORK

The WORK shall be completed to the satisfaction of CITY within forty-five (45) working days from the commencement date stated in the Notice to Proceed. In no event, however, shall the WORK to be performed under this contract be considered to be complete until all construction items called for on the drawings, and specifications have been completed and the contract price paid in full.

ARTICLE 3. LIQUIDATED DAMAGES

A. CITY and the CONTRACTOR recognize that time is of the essence of this Agreement and that the CITY will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. It is hereby understood and agreed that it is and will be difficult and/or impossible to ascertain and determine the actual damage which the CITY will sustain in the event of and by reason of the CONTRACTOR’s failure to fully perform the WORK or to fully perform all of its contract obligations that have accrued by the time for completion as specified in Article 2 herein and/or as specified for completion of any scheduled operations or works described in the Special Provisions. It is, therefore, agreed in accordance with California Government Code Section 53069.85 that the CONTRACTOR will forfeit and pay to the CITY liquidated damages in the sum of Fifteen Hundred Dollars (\$1,500) per day for each and every calendar day that expires after the time for completion specified in Article 2 herein and/or as specified for completion of any scheduled operations or works described in the Special Provisions

except as otherwise provided by extension of time pursuant to Article 12 of the General Conditions. It is further understood and agreed in accordance with California Government Code Section 53069.85 that the liquidated damages sum specified in this provision is not manifestly unreasonable under the circumstances existing at the time this contract was made, and that the CITY may deduct liquidated damages sums in accordance with this provision from any payments due or that may become due the CONTRACTOR.

- B. Liquidated damages will continue to accrue at the stated rate until final completion of the WORK. Accrued liquidated damages may be deducted by the CITY from amounts due or that become due to the CONTRACTOR for performance of the WORK. Liquidated damages may not be waived or reduced by CITY unless expressly waived or reduced in writing by the ENGINEER.

ARTICLE 4. PREVAILING WAGES

- A. Pursuant to California Labor Code Section 1771, CONTRACTOR and any subcontractor shall pay all workers employed in execution of the WORK in accordance with the general rate of per diem wages specified for each craft, classification, or type of worker needed to execute the WORK. Copies of the prevailing rates of per diem wages are on file at the City Clerk's office and shall be made available to any interested party on request.
- B. CONTRACTOR is required to pay all applicable penalties and back wages in the event of violation of prevailing wage law, and CONTRACTOR and any subcontractor shall fully comply with California Labor Code Section 1775, which is incorporated by this reference as though fully set forth herein.
- C. CONTRACTOR and any subcontractor shall maintain and make available for inspection payroll records as required by California Labor Code Section 1776, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section. CONTRACTOR and any subcontractor shall maintain and make available for inspection payroll records as required by California Labor Code Section 1776, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section. In addition, CONTRACTOR and any subcontractor shall submit certified payroll records to the Labor Commissioner online: <http://www.dir.ca.gov/Public-Works/Certified-Payroll-Reporting.html>.
- D. CONTRACTOR and any subcontractor shall fully comply with California Labor Code Section 1777.5, concerning apprentices, which is incorporated by this reference as though fully set forth herein. CONTRACTOR is responsible for ensuring compliance with this section.
- E. In accordance with California Labor Code Section 1810, eight (8) hours of labor in performance of the WORK shall constitute a legal day's work under this Agreement. CONTRACTOR and any subcontractor shall pay workers overtime pay as required by California Labor Code Section 1815. CONTRACTOR and any subcontractor shall, as a

penalty to the CITY, forfeit twenty-five dollars (\$25) for each worker employed in the execution of the contract by the respective contractor or subcontractor for each calendar day during which the worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in any one calendar week in violation so the provisions of Article 3 of Chapter 1 of Part 7, Division 2 of the California Labor Code, which is incorporated by this reference as though fully set forth herein.

ARTICLE 5. CONTRACT PRICE

- A. CITY shall pay CONTRACTOR for completion of the WORK the sum of _____ Dollars (\$_____), based on the bid price of same and in accordance with the Contract Documents.
- B. Notwithstanding any provisions herein, CONTRACTOR shall not be paid any compensation until such time as CONTRACTOR has on file with the City Finance Department a current W-9 form available from the IRS website (www.irs.gov) and has obtained a currently valid Petaluma business license pursuant to the Petaluma Municipal Code.
- C. In no case shall the total contract compensation exceed _____ Dollars (\$_____) without the prior written authorization by the City Manager. Further, no compensation for a section or work program component attached with a specific budget shall be exceeded without the prior written authorization of the City Manager.

ARTICLE 6. BONDS

- A. Before entering upon the performance of the WORK, the CONTRACTOR shall furnish Performance and Labor and Materials Bonds, each in the amount of one hundred percent (100%) of the contract price, as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date of Completion, except as otherwise provided by Law or Regulation or by the Contract Documents. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.
- B. The CONTRACTOR shall guarantee the WORK to be free of defects in material and workmanship for a period of one (1) year following the CITY's acceptance of the WORK. The CONTRACTOR shall agree to make, at the CONTRACTOR's own expense, any repairs or replacements made necessary by defects in material or workmanship which become evident within the one-year guarantee period. The CONTRACTOR's guarantee against defects required by this provision shall be secured by a Maintenance Bond, in the amount of ten percent (10%) of the contract price, which shall be delivered by the CONTRACTOR to the CITY prior to acceptance of the WORK. The Maintenance Bond shall remain in force for one (1) year from the date of acceptance of the contracted WORK. The CONTRACTOR shall make all repairs and replacements within the time required during the guarantee period upon receipt of written order from the ENGINEER. If the CONTRACTOR fails to make the repairs and replacements

within the required time, the CITY may do the work and the CONTRACTOR and the CONTRACTOR's surety for the Maintenance Bond shall be liable to the CITY for the cost. The expiration of the Maintenance Bond during the one-year guarantee period does not operate to waive or void the one-year guarantee, as set forth herein.

- C. The form of the Performance, Labor and Materials, and Maintenance Bonds are provided by the CITY as part of the Contract Documents. Only such bond forms provided by the CITY are acceptable and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.
- D. If the surety on any Bond furnished by the CONTRACTOR is declared a 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 days thereafter substitute another Bond and surety, which must be acceptable to the CITY.
- E. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of California to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

ARTICLE 7. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

ARTICLE 8. RETENTION

- A. Pursuant to Section 22300 of the California Public Contract Code, the CONTRACTOR may substitute securities for any money withheld by the CITY to ensure performance under the Contract. At the request and expense of the CONTRACTOR, securities equivalent to the amount withheld shall be deposited with the CITY or with a state or federally chartered bank in California as to the escrow agent, who shall return such securities to the CONTRACTOR upon satisfactory completion of the Contract.
- B. Alternatively, the CONTRACTOR may request and the CITY shall make payment of retentions earned directly to the escrow agent at the expense of the CONTRACTOR. At the expense of the CONTRACTOR, the CONTRACTOR may direct the investment of the payments into securities and the CONTRACTOR shall receive the interest earned on the investments upon the same terms provided for in this section for securities deposited by the CONTRACTOR. The CONTRACTOR shall be responsible for paying all fees for the expenses incurred by the escrow account and all expenses of the CITY. These expenses and payment terms shall be determined by the CITY's Finance Director of

his/her designee and the escrow agent. Upon satisfactory completion of the Contract, the CONTRACTOR shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from the CITY, pursuant to the terms of this section. The CONTRACTOR shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to ensure the performance of the CONTRACTOR.

- C. Securities eligible for investment under Section 22300 shall be limited to those listed in Section 16430 of the Government Code and to bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the CONTRACTOR and the CITY.

ARTICLE 9. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between the CITY and the CONTRACTOR concerning the WORK consist of this Agreement and the following attachments to this Agreement:

- Notice Inviting Bids
- Instructions to Bidders
- Bid Forms including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits
- Labor and Materials Bond
- Performance Bond
- Maintenance Bond
- General Conditions
- Supplementary General Conditions (if any)
- Specifications
- Special Provisions
- Drawings
- Federal Wage Rates dated _____ (if applicable)
- Form FHWA-1273 (if applicable)
- Addenda (if any)
- Change Orders which may be delivered or issued after Effective Date of the Agreement and are not attached hereto.

There are no Contract Documents other than those listed in this Article 9. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.5 of the General Conditions.

ARTICLE 10. INSURANCE

The applicable insurance requirements, as approved by the City's Risk Manager, are set forth in **Exhibit B**, attached hereto and incorporated by reference herein. *[City use: check one.]*

ARTICLE 11. INDEMNIFICATION

- A. CONTRACTOR shall indemnify, defend with counsel acceptable to CITY, and hold harmless to the full extent permitted by law, CITY and its officers, officials, employees, agents and volunteers from and against any and all alleged liability, loss, damage, claims, expenses and costs (including, without limitation, attorney fees and costs and fees of litigation) (collectively, "Liability") of every nature arising out of or in connection with CONTRACTOR's performance of the WORK or its failure to comply with any of its obligations contained in this Agreement, except such Liability caused by the active negligence, sole negligence or willful misconduct of the CITY. Such indemnification by the CONTRACTOR shall include, but not be limited to, the following:
1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its subcontractors, employees, or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, or agents;
 2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR's, or Supplier's own employees, or agents engaged in the WORK resulting in actions brought by or on behalf of such employees against the CITY and/or the ENGINEER;
 3. Liability or claims arising directly or indirectly from or based on the violation of any Laws or Regulations, whether by the CONTRACTOR, its subcontractors, employees, or agents;
 4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its subcontractors, employees, or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specified stipulated in this Agreement;
 5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the CITY or any other parties by the CONTRACTOR, its subcontractors, employees, or agents;
 6. Liability or claims arising directly or indirectly from the willful misconduct of the CONTRACTOR, its subcontractors, employees, or agents;
 7. Liability or claims arising directly or indirectly from any breach of the obligations assumed in this Agreement by the CONTRACTOR;
 8. Liability or claims arising directly or indirectly from, relating to, or resulting from a hazardous condition created by the CONTRACTOR, Subcontractors, Suppliers, or any of their employees or agents, and;
 9. Liability or claims arising directly, or indirectly, or consequentially out of any action, legal or equitable, brought against the CITY, the ENGINEER, their consultants, subconsultants, and the officers, directors, employees and agents of each or any of them, to the extent caused by the CONTRACTOR's use of any premises acquired by permits, rights of way, or easements, the Site, or any land or area contiguous thereto or its performance of the WORK thereon.

- B. The CONTRACTOR shall reimburse the CITY for all costs and expenses, (including but not limited to fees and charges of engineers, architects, attorneys, and other professionals and court costs of appeal) incurred by said CITY in enforcing the provisions of this Paragraph.
- C. The indemnification obligation under this Article 11 shall be in addition to, and shall not be limited in any way by any limitation on the amount or type of insurance carried by CONTRACTOR or by the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts. The CONTRACTOR's responsibility for such defense and indemnity obligations shall survive the termination or completion of this Agreement for the full period of time allowed by law.
- D. Pursuant to California Public Contract Code Section 9201, City shall timely notify Contractor of receipt of any third-party claim relating to this Agreement.

ARTICLE 12. DISCLAIMER AND INDEMNITY
CONCERNING LABOR CODE SECTION 6400

By executing this agreement the CONTRACTOR understands and agrees that with respect to the WORK, and notwithstanding any provision in this contract to the contrary, the CONTRACTOR, and/or its privities, including, without limitation, subcontractors, suppliers and other engaged by the CONTRACTOR in the performance of the WORK shall be "employers" for purposes of California Labor Code Section 6400 and related provisions of law, and that neither CITY nor its officials, officers, employees, agents, volunteers or consultants shall be "employers" pursuant to California Labor Code Section 6400 with respect to the performance of the WORK by the CONTRACTOR and/or its privities.

The CONTRACTOR shall take all responsibility for the WORK, shall bear all losses and damages directly or indirectly resulting to the CONTRACTOR, any subcontractors, the CITY, its officials, officers, employees, agents, volunteers and consultants, on account of the performance or character of the WORK, unforeseen difficulties, accidents, or occurrences of other causes predicated on active or passive negligence of the CONTRACTOR or of any subcontractor, including, without limitation, all losses, damages or penalties directly or indirectly resulting from exposure to hazards in performance of the WORK in violation of the California Labor Code. The CONTRACTOR shall indemnify, defend and hold harmless the CITY, its officials, officers, employees, agents, volunteers and consultants from and against any or all losses, liability, expense, claim costs (including costs of defense), suits, damages and penalties (including, without limitation, penalties pursuant to the California Labor Code) directly or indirectly resulting from exposure to hazards in performance of the WORK in violation of the California Labor Code, except such liability or costs caused by the active negligence, sole negligence or willful misconduct of the CITY.

ARTICLE 13. INDEPENDENT CONTRACTOR

It is understood and agreed that in the performance of this Agreement, CONTRACTOR (including its employees and agents) is acting in the capacity of an independent contractor, and not as an agent or employee of the CITY. CONTRACTOR has full control over the means and methods of performing said services and is solely responsible for its acts and omissions, including the acts and omissions of its employees and agents.

ARTICLE 14. SUBCONTRACTORS

CONTRACTOR must obtain the CITY's prior written consent for subcontracting any WORK pursuant to this Agreement. Any such subcontractor shall comply, to the extent applicable, with the terms and conditions of this Agreement. Any agreement between CONTRACTOR and a subcontractor pursuant to this Agreement shall provide that the subcontractor procure and maintain insurance coverage as required herein and which shall name CITY as an additional insured.

ARTICLE 15. COMPLIANCE WITH LAWS/NON-DISCRIMINATION

CONTRACTOR shall comply with all applicable local, state and federal laws, regulations and ordinances in the performance of this Agreement. CONTRACTOR shall not discriminate in the provision of service or in the employment of persons engaged in the performance of this Agreement on account of race, color, national origin, ancestry, religion, gender, marital status, sexual orientation, age, physical or mental disability in violation of any applicable local, state or federal laws or regulations.

ARTICLE 16. NOTICES

All notices required or permitted by this Agreement, including notice of change of address, shall be in writing and given by personal delivery or sent postage prepaid and addressed to the parties intended to be notified, as set forth herein. Notice shall be deemed given as of the date of delivery in person or as of the date deposited in any post office or post office box regularly maintained by the United States Postal Service, unless otherwise stated herein. Notice shall be given as follows:

CITY:	City Clerk City of Petaluma Post Office Box 61 Petaluma, California 94953 Telephone: (707) 778-4360
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CONTRACTOR:	_____ (Contact Name)
	_____ (Business Name)
	_____ (Address)

(City, State, Zip)

(Telephone)

(E-mail)

ARTICLE 17. GOVERNING LAW/VENUE

This Agreement shall be construed and its performance enforced under California law. Venue shall be in the Superior Court of the State of California in the County of Sonoma.

ARTICLE 18. NON-WAIVER

The CITY's failure to enforce any provision of this Agreement or the waiver of any provision in a particular instance shall not be construed as a general waiver of any part of such provision. The provision shall remain in full force and effect.

ARTICLE 19. THIRD PARTY BENEFICIARIES

The Parties do not intend, by any provision of this Agreement, to create in any third party any benefit or right owed by one party, under the terms and conditions of this Agreement, to the other party.

ARTICLE 20. ASSIGNMENT

No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

CITY and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

ARTICLE 21. SEVERABILITY

If any term or portion of this Agreement is held to be invalid, illegal, or otherwise enforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.

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

CITY

CONTRACTOR _____

City Manager

By _____
(CORPORATE SEAL)

ATTEST:

Attest: _____

City Clerk

Address for giving notices:

APPROVED AS TO FORM:

City Attorney

Agent for service of process:

License Number

Taxpayer I.D. Number

Petaluma Business Tax Certificate Number

file name:

END OF AGREEMENT

FAITHFUL PERFORMANCE BOND

WHEREAS, the City Council of the City of Petaluma, State of California, and _____
_____ (hereinafter designated as "Principal") have entered into an agreement whereby Principal agrees to install and complete certain designated public improvements, which said agreement, dated _____, 2022, and identified as project Ellis Creek Water Recycling Facility Outfall Replacement Project, is hereby referred to and made a part hereof; and,

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

NOW, THEREFORE, WE, the Principal and _____, duly authorized to transact business under the laws of the State of California, as Surety, are held and firmly bound unto the City of Petaluma, hereinafter called "City," in the penal sum of _____ Dollars (\$_____) lawful money of the United States, for payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors, and administrators, jointly and severally, firmly by these present. The conditions of this obligation are such that if the above-bound Principal, the Principal's heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said agreement and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless the City of Petaluma, its officers, agents, employees, and volunteers, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of this obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of this agreement or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to the specifications.

And the said Surety, for value received, hereby stipulates and agrees that upon termination of the Contract for cause, the Obligee reserves the right to refuse tender of the Principal by the Surety to complete the Contract work.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on _____, 2022.

PRINCIPAL

SURETY

By _____

By _____

Name and Title

Name and Title

Address

City State Zip

Phone Number

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

City Manager

City Attorney

END OF FAITHFUL PERFORMANCE BOND

LABOR AND MATERIALS BOND

WHEREAS, the City of Petaluma, State of California, and _____ (hereinafter designated as “Principal”) have entered into an agreement whereby the Principal agrees to install and complete certain designated public improvements, which said agreements, dated _____, 2022, and identified as project Ellis Creek Water Recycling Facility Outfall Replacement Project, is hereby referred to and made a part hereof; and,

WHEREAS, under the terms of said agreement Principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the City of Petaluma, to secure the claims to which reference is made in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code of the State of California.

NOW, THEREFORE, said Principal and the undersigned, duly authorized to transact business under the laws of the State of California, as corporate surety, are held firmly bound unto the City of Petaluma, and all contractors, subcontractors, laborers, materialmen and other persons employed in the performance of the aforesaid agreement and referred to in the aforesaid Civil Code of the State of California, in the sum of _____ Dollars (\$_____) for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, that said surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by City in successfully enforcing such obligation, to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies and corporations entitled to file claims under Title 15 (commencing with section 3082) of Part 4 of Division 3 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

THE SURETY hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said agreement or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and surety above named, on _____, 2022.

PRINCIPAL

SURETY

By _____

By _____

Name and Title

Name and Title

Address

City State Zip

Phone

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk)..

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

City Manager

City Attorney

END OF LABOR AND MATERIALS BOND

MAINTENANCE BOND

WHEREAS, the City Council of the City of Petaluma (“City”) and _____, (hereinafter designated as “Principal”) have entered into an agreement whereby Principal agrees to install and complete certain designated public improvements, which said agreement, dated _____, 2022, and identified as project Ellis Creek Water Recycling Facility Outfall Replacement Project, is hereby referred to and made a part hereof; and,

WHEREAS, said Principal is required under the terms of said contract to furnish a maintenance bond for the correction of any defects due to defective materials or workmanship in the work performed under said agreement.

NOW, THEREFORE, we the Principal and _____ as Surety, are held and firmly bound unto the City of Petaluma in the penal sum of _____ Dollars (\$ _____), lawful money of the United States for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if, during a maintenance period of one (1) year from the date of acceptance of the contracted work, the Principal upon receiving written notice of a need for repairs which are directly attributable to defective materials or workmanship, shall diligently take the necessary steps to correct said defects within seven (7) days from the date of said notice, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

As part of this obligation secured hereby and in addition to the face amount specified therefor, there shall be included costs and reasonable expenses and fees, including reasonable attorney’s fees, incurred by the City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of this agreement or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety above named, on _____, 2022.

PRINCIPAL

SURETY

By _____

By _____

Name and Title

Name and Title

Address

City State Zip

Phone Number

###

NOTE: No substitution or revision to this bond form will be accepted. Be sure that all bonds submitted have a certified copy of the bonding agent's power of attorney attached. Also verify that Surety is an "Admitted Surety" (i.e., qualified to do business in California), and attach proof of verification (website printout from the California Department of Insurance website (<http://www.insurance.ca.gov/docs/index.html>) or certificate from County Clerk).

APPROVED AS TO AMOUNT:

APPROVED AS TO FORM:

City Manager

City Attorney

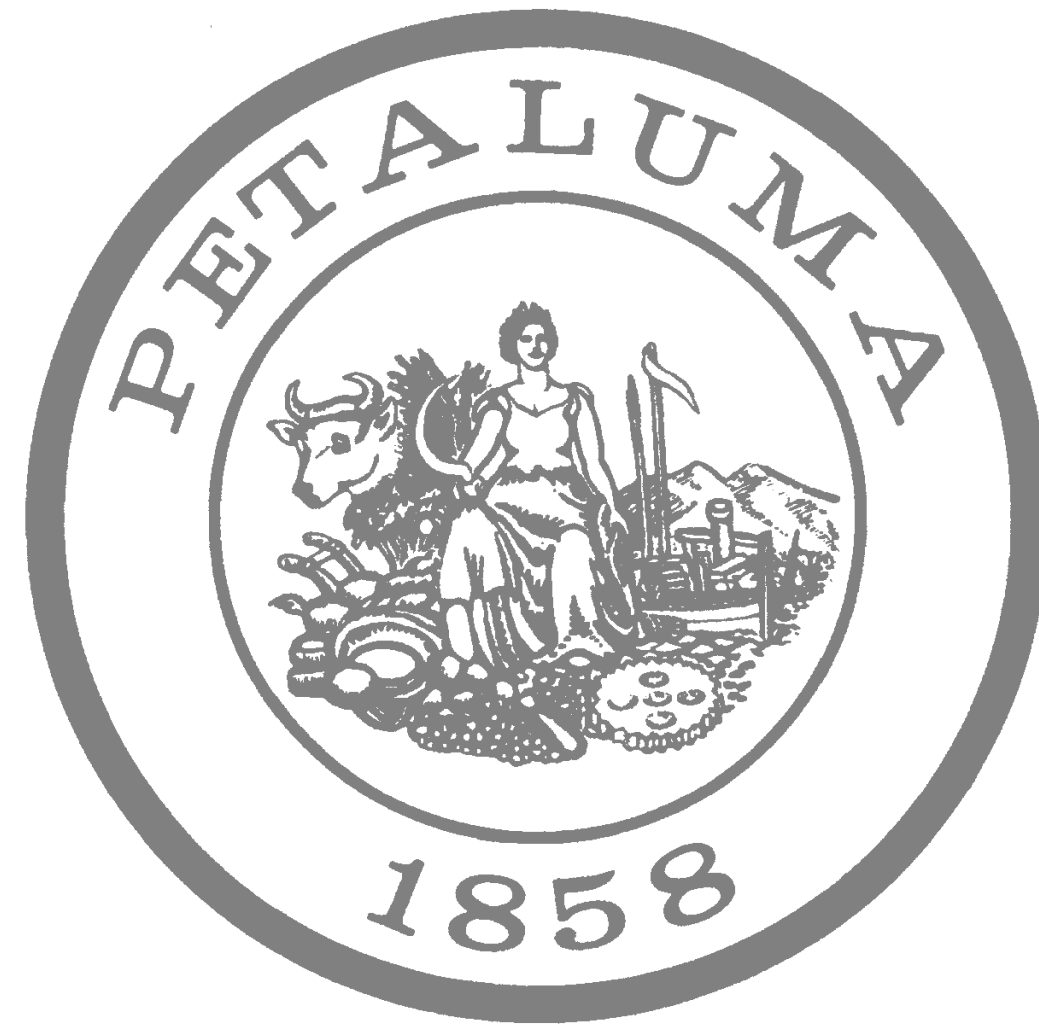
END OF MAINTENANCE BOND

SECTION VI

PLANS

City of Petaluma, California

ELLIS CREEK WATER RECYCLING FACILITY OUTFALL RELOCATION PROJECT



MAYOR
Teresa Barrett

COUNCIL MEMBERS
Brian Barnacle
D'Lynda Fischer
Mike Healy
Dave King
Kevin McDonnell

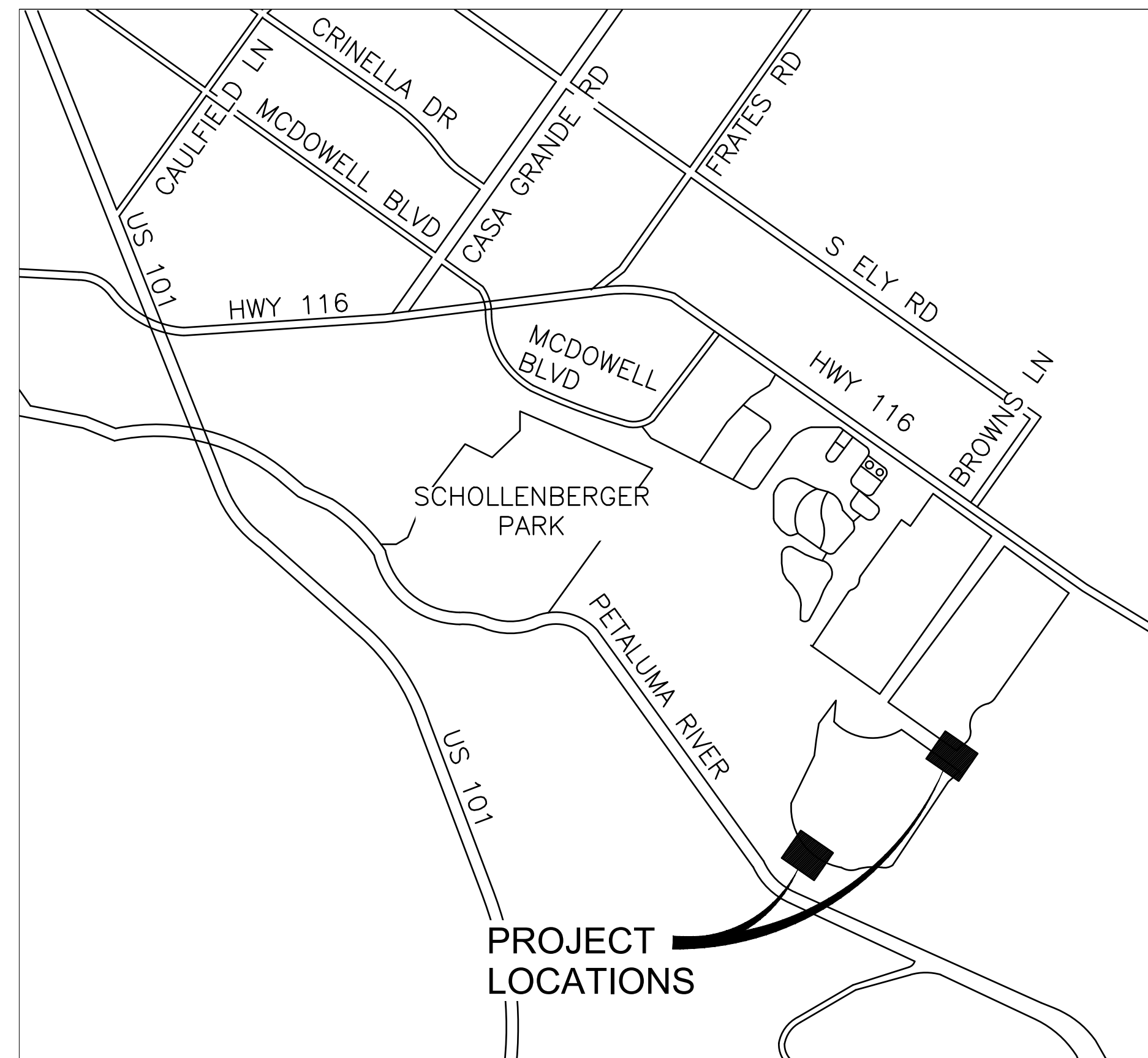
CITY MANAGER
Peggy Flynn

DIRECTOR OF PUBLIC WORKS & UTILITIES
Christopher Bolt, P.E.

PREPARED BY



C66501838



LOCATION MAP
SCALE: N.T.S.

RECORD PLAN

I _____ HEREBY STATE THAT THESE RECORD PLAN CHANGES ARE COMPLETE FROM INFORMATION FURNISHED BY THE PROJECT CONTRACTOR, SOILS ENGINEER AND MY OFFICE. I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE THE THE WORK WAS DONE IN ACCORDANCE WITH THE FINAL APPROVED PLANS. THE ENGINEER AND THE CITY WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT. FIELD VERIFICATION OF CRITICAL FACTS AND DATA SHOULD BE MADE IF THESE DOCUMENTS ARE TO BE USED AS A BASIS FOR FUTURE WORK. ENGINEER'S SIGNATURE _____ DATE: _____

SHEET INDEX

- G-001 COVER SHEET
- G-002 GENERAL NOTES, ABBREVIATIONS & LEGEND
- G-003 EXISTING SITE PLAN
- G-004 HORIZONTAL CONTROL PLAN
- D-101 DEMOLITION SITE PLAN
- D-501 DEMOLITION DETAILS
- D-502 EXISTING PHOTOS
- C-101 OUTFALL IMPROVEMENT PLAN AND PROFILE
- C-501 CIVIL DETAILS 1 OF 2
- C-502 CIVIL DETAILS 2 OF 2
- C-503 EROSION CONTROL AND SEDIMENT PLAN & DETAILS
- S-001 STRUCTURAL GENERAL NOTES
- S-002 STRUCTURAL SCHEDULE OF SPECIAL INSPECTIONS
- S-501 STRUCTURAL DETAILS 1 OF 2
- S-502 STRUCTURAL DETAILS 2 OF 2

ALL PROJECT PLANS HAVE BEEN PREPARED AND REVIEWED TO COMPLY WITH CURRENT AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS AND/OR THE CALIFORNIA BUILDING STANDARDS CODE (CBCS).

THESE PROJECT PLANS CONTAIN ELEMENT(S) THAT ARE NOT "TECHNICALLY FEASIBLE" AND/OR CAN'T MEET THE APPLICABLE CBCS BECAUSE IT WOULD CREATE AN "UNREASONABLE HARDSHIP." PLEASE SEE THE WRITTEN ANALYSIS SUPPORTING THIS DETERMINATION FILED UNDER THE PROJECT FILE.

DESIGNED BY: [Signature] 06/24/2022
SIGNATURE DATE

APPROVED BY:

[Signature]
MATT KENNEDY P.E. C68304
PROJECT DIRECTOR

[Signature]
GIUSEPPE TOMASINO P.E. C86552
PROJECT MANAGER

DESIGNED BY:

[Signature]
MITCH DURAN P.E. C87319
CIVIL ENGINEER

DATE: JUNE 24, 2022
DESIGNED BY: MD - Civil, MMM - Structural
DRAWN BY: CM
CHECKED BY: VT & SC

PROJECT NO.
C66501838



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
PH. 707-778-4546 FAX. 707-778-4508



**ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT
COVER SHEET**

GENERAL NOTES

- CONTRACTOR SHALL POSSESS A CLASS "A" LICENSE.
- EXCAVATIONS OVER FIVE FEET (5') DEEP REQUIRE AN EXCAVATION PERMIT FROM THE STATE DEPARTMENT OF INDUSTRIAL SAFETY.
- CONTRACTOR SHALL CALL "UNDERGROUND SERVICE ALERT" AT (800) 227-2600 AT LEAST 7 BUSINESS DAYS PRIOR TO START OF CONSTRUCTION FOR LOCATING UNDERGROUND UTILITIES. NOTE THAT WATER SERVICES, SEWER LATERALS, AND OTHER UTILITIES MAY NOT BE FIELD MARKED NOR IDENTIFIED ON THE PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATION OF UNDERGROUND UTILITIES.
- UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE ENGINEER OF RECORD.
- ALL MATERIAL WORKMANSHIP AND CONSTRUCTION SHALL CONFORM TO THE CITY OF PETALUMA DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AND CONFORM TO THE LATEST EDITION OF THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS AND STANDARD PLANS EXCEPT AS NOTED ON PLANS.
- CONTRACTOR IS RESPONSIBLE TO CONFIRM ALL EXISTING CONDITIONS OF THE SITE AND SHALL CONFIRM SURVEY INFORMATION BEFORE COMMENCING WORK.
- CONTRACTOR IS RESPONSIBLE TO CONFIRM LOCATIONS FOR ALL EXISTING UTILITIES AND GRADES BEFORE COMMENCING WORK.
- CONTRACTOR SHALL INDEPENDENTLY REVIEW GROUND & TOPOGRAPHY, AND ASSUME WHOLLY AND UNCONDITIONALLY THE RISK OF COMPLETING THE WORK SET OUT ON THESE PLANS, REGARDLESS OF ROCK, TIDAL ACTIVITY, WATER TABLE, OR OTHER CONDITIONS WHICH CONTRACTOR MAY ENCOUNTER IN THE COURSE OF THE WORK.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING FACILITIES AND IMPROVEMENTS FROM DAMAGE RESULTING FROM HIS WORK. ANY DAMAGE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND TO THE SATISFACTION OF THE CITY.
- NO GUARANTEE IS INTENDED THAT ALL UNDERGROUND OBSTRUCTIONS ARE SHOWN ON THE PLANS. THOSE SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE AND THE CONTRACTOR IS CAUTIONED THAT THE CITY ASSUMES NO RESPONSIBILITY FOR ANY OBSTRUCTIONS EITHER SHOWN OR NOT SHOWN ON THESE PLANS.
- PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE CITY WITH A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE CITY REQUIREMENTS.
- THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION. MAIL AND GARBAGE SERVICE SHALL BE MAINTAINED THROUGHOUT THE COURSE OF THIS PROJECT.
- ALL CONSTRUCTION ACTIVITY SHALL CONFORM TO PROJECT MITIGATION MEASURES, AS APPLICABLE AND AS STATED IN THE PERMIT DOCUMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH ALL CONSTRUCTION OPERATIONS.
- CONTRACTOR SHALL NOTIFY PROPERTY OWNERS AT LEAST 72 HOURS IN ADVANCE OF DRIVEWAY CLOSURES FOR CONSTRUCTION OF C/G, DRIVEWAY APRONS AND DRIVEWAY TRANSITIONS. DRIVEWAY CLOSURES SHALL BE LIMITED TO 48 HRS MAXIMUM. CONTRACTOR SHALL CLOSE ONLY ONE DRIVEWAY AT A TIME FOR PROPERTIES WITH MORE THAN ONE DRIVEWAY ACCESS, & SHALL PROVIDE ALTERNATE ACCESS WHERE POSSIBLE FOR SINGLE DRIVEWAY PROPERTIES.
- CONSTRUCTION WITHIN AND ADJACENT TO THE SLOUGH/MARSH WILL BE LIMITED TO SEPTEMBER 1 TO JANUARY 31. WORK WITHIN THE PETALUMA RIVER WILL BE LIMITED TO SEPTEMBER 1 TO OCTOBER 15. PER SECTION 22-301 OF THE CITY OF PETALUMA'S ZONING ORDINANCE, CONSTRUCTION WORK HOURS WOULD BE 7:00 A.M. TO 10:00 P.M. ON WEEKDAYS AND 9:00 A.M. TO 10:00 P.M. ON WEEKENDS AND HOLIDAYS. 48 HOURS PRIOR NOTIFICATION IS REQUIRED FOR WEEKEND WORK.
- CONTRACTOR TO MAINTAIN SUITABLE SITE CONDITIONS, PER SPECIFICATIONS INCLUDING BUT NOT LIMITED TO SHEETPILE AND COFFERDAM FOR PROPER INSTALLATION OF HEADWALL AND PIPE. COFFERDAM WITHIN THE SLOUGH IS NOT PERMITTED. CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED IF OBSTRUCTIONS, AREA DISCREPANCIES AND/OR GRADE DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. SUCH CONDITIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE CITY REPRESENTATIVE. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATIONS. CONTRACTOR TO PROVIDE DEWATERING AND TEMPORARY SHORING WORK PLANS AS REQUIRED BY PROJECT TECHNICAL SPECIFICATIONS.
- WRITTEN SPECIFICATIONS ARE PART OF THE CONSTRUCTION DOCUMENTATION PACKAGE. CONTRACTOR IS RESPONSIBLE FOR BEING FAMILIAR WITH WRITTEN SPECIFICATIONS AND THE DRAWING PACKAGE. CONTRACTOR IS RESPONSIBLE FOR BRINGING TO CITY REPRESENTATIVE'S ATTENTION ANY DISCREPANCIES OR CONFLICTS THAT MIGHT EXIST IN THE DOCUMENTS FOR CLARIFICATION BEFORE PROCEEDING WITH WORK. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY COSTS, CONSTRUCTION DELAYS, OR REVISION DUE TO FAILURE TO GIVE SUCH NOTIFICATIONS.
- CONTRACTOR SHALL REMOVE FROM THE SITE ALL DEBRIS, SPOILS FROM EXCAVATION, AND UNSUITABLE MATERIAL GENERATED BY THE CONTRACTOR'S OPERATIONS AT THEIR OWN COST.
- CONSTRUCTION SITE SHALL BE MAINTAINED AT ALL TIMES SO THAT NO OBSTRUCTION, CONSTRUCTION EQUIPMENT OR CONSTRUCTION PROCESS CAUSES POTENTIAL HARM OR DANGER TO CITY, PUBLIC OR CONSTRUCTION SITE WORKERS. CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR NEGLIGENCE.
- TIDAL DATUM:








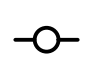
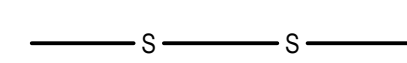


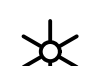





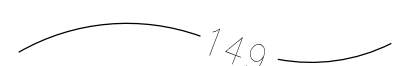







LOCATION		COORDINATES (UTM ZONE 10N - METERS)		TIDAL DATUM					
COUNTY	POINT ID	EASTING	NORTHING	FEET - NAVD88					
				MLLW	MLW	MSL	MTL	MHW	MHHW
SONOMA	131	5990245.99	2232317.35	-0.31	0.67	3.42	3.28	5.88	6.35

TIDAL DATUMS FROM NOAA STA 9415584, PETALUMA RIVER A DISTANCE AWAY FROM THE PROJECT SITE.

DEMOLITION NOTES

- DEMOLITION SHALL BE IN ACCORDANCE WITH CONTRACT DOCUMENTS.
- DEMOLITION SHALL INCLUDE ONLY ITEMS SPECIFICALLY OUTLINED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL VERIFY BY WRITTEN REQUEST ANY STRUCTURES WHICH ARE NOT LISTED IN THE CONTRACT DOCUMENTS. DEMOLITION OF THESE STRUCTURES SHALL NOT OCCUR UNTIL WRITTEN APPROVAL FROM CITY REPRESENTATIVE IS OBTAINED.
- CONTRACTOR SHALL PROTECT IN PLACE ALL STRUCTURES, UTILITIES, ETC. NOT INDICATED FOR DEMOLITION ON PLANS.
- THE CONTRACTOR SHALL PROVIDE, ERECT AND MAINTAIN ALL TEMPORARY BARRIERS AND SECURITY DEVICES AS NECESSARY FOR THE PROTECTION OF ADJACENT FACILITIES AND ACTIVITIES.
- CONTRACTOR MUST REPAIR/REPLACE ALL PAVEMENT WITHIN DEMOLITION OR DAMAGED THROUGH THE PROJECT.
- CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SITE CONDITIONS PRIOR TO THE COMMENCEMENT OF WORK AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
- COORDINATES SHOWN ON PLANS ARE APPROXIMATE CONTRACTOR TO VERIFY.
- EXISTING FOUND UTILITIES ARE SHOWN IN THEIR APPROXIMATE ON THE DRAWINGS. ADDITIONAL UTILITIES MAY BE ENCOUNTERED. PRIOR TO PERFORMING ANY EXCAVATION ACTIVITIES, THE CONTRACTOR MUST PERFORM UTILITY RESEARCH INCLUDING BUT NOT LIMITED TO:
 - VERIFY THE ELEVATIONS OF EXISTING PIPING, UTILITIES, AND ANY TYPE OF UNDERGROUND OR ENCASED OBSTRUCTION NOT INDICATED OR SPECIFIED TO BE REMOVED BUT INDICATED OR DISCOVERED IN LOCATIONS TO BE TRAVERSED BY PIPING, DUCTS, AND OTHER WORK TO BE CONDUCTED OR INSTALLED.
- HAND EXCAVATION IS REQUIRED WITHIN 2 FEET AROUND EXISTING UTILITIES THAT ARE TO REMAIN.
- ANY EXCESS MATERIALS SHALL BE CONSIDERED THE PROPERTY OF THE CONTRACTOR AND BE DISPOSED AWAY FROM THE JOB SITE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO EXISTING UTILITIES RESULTING FROM THE CONTRACTOR'S ACTIVITIES.
- NOTIFY THE CITY REPRESENTATIVE IMMEDIATELY IF DEMOLITION WILL AFFECT UTILITY SERVICE.
- COORDINATE WITH CITY REPRESENTATIVE AND ENGINEER FOR ALL DISRUPTIONS OF UTILITIES AS A RESULT OF REQUIRED DEMOLITION AND NEW WORK ASSOCIATED WITH THE PROJECT. A 21-DAY NOTIFICATION IS REQUIRED PRIOR TO ALL UTILITY OUTAGES.
- SEE REFERENCE DRAWINGS FOR ADDITIONAL INFORMATION ON EXISTING STRUCTURE.

LEGEND

	(E) MINOR CONTOUR		(E) STORM DRAIN MANHOLE
	(E) MAJOR CONTOUR		(E) CATCH BASIN
	(E) WOOD FENCE		(E) DROP INLET
	(E) STORM DRAIN		(E) POWER POLE, JOINT POLE
	(E) SANITARY SEWER		(E) SIGN
	(E) GATE VALVE		(E) LIGHT POLE
	(E) GAS VALVE		(E) UTILITY CABINET
	(E) TREE		(E) STREET LIGHT
	(E) CONCRETE		MINOR CONTOUR
	(E) ELECTRIC VAULT		MAJOR CONTOUR
	(E) FIRE HYDRANT		
	(E) ELECTRICAL VAULT		
	(E) TELEPHONE VAULT		
	(E) ELECTRICAL MANHOLE		
	(E) SEWER MANHOLE		

ISSUED FOR BID

ABBREVIATIONS

AB	AGGREGATE BASE, ABANDONED	MAG	MAGNOLIA
ABAN	ABANDONED	MAX	MAXIMUM
AC	ASPHALTIC CONCRETE	MH	MANHOLE
ACP	ASBESTOS CONCRETE PIPE	MHHW	MEAN HIGHER HIGH WATER
AVE	AVENUE	MISC	MISCELLANEOUS
		MLLW	MEAN LOWER LOW WATER
		MIN	MINIMUM
BLDG	BUILDING	MON	MONUMENT
CB	CATCH BASIN	(N)	NEW, NORTH
CCW	CARLISLE COATINGS & WATERPROOFING	(NE)	NORTHEAST
		(NW)	NORTHWEST
C CL	CENTERLINE	No	NUMBER
CLR	CLEAR	NAVD	NORTH AMERICAN VERTICAL DATUM
CO, C/O	CLEANOUT	NTS	NOT TO SCALE
CONC	CONCRETE		
CPI	CONTROL POINT		
CTRL	CONTROL	OD	OUTSIDE DIAMETER
		PCC	PORTLAND CEMENT CONCRETE
D	DEMOLISH	PIP	PROTECT IN PLACE
DI	DROP INLET		
DIA, Ø	DIAMETER	R	RADIUS
DIP	DUCTILE IRON PIPE	RD	ROAD
DR	DIMENSION RATIO	ROW	RIGHT-OF-WAY
DWG	DRAWING	RSP	ROCK SLOPE PROTECTION
		R/W	RIGHT OF WAY
(E)	EAST, EXISTING	S	SLOPE, SEWER
EG	EXISTING GRADE	(S)	SOUTH
EL, ELEV	ELEVATION	SCH	SCHEDULE
EOR	ENGINEER OF RECORD	SD	STORM DRAIN
EQ	EQUAL	SDMH	STORM DRAIN MANHOLE
(E), EXIST	EXISTING	SHT	SHEET
		SLR	SEA LEVEL RISE
FE	FERROUS	SS	STAINLESS STEEL
FG	FINISH GRADE (UNPAVED)	ST	STREET
FL	FLOWLINE	STA	STATION
FND	FOUNDATION	STD	STANDARD
FS	FINISHED SURFACE (AC OR CONCRETE)	(SE)	SOUTHEAST
		(SW)	SOUTHWEST
		S/W	SEWALK
GB	GRADE BREAK	SWR	SEWER
HDPE	HIGH DENSITY POLYETHYLENE	TF	TOP OF FOOTING
		TOC	TOP OF CONCRETE
INV	INVERT	TOE	TOE OF FEATURE
IPS	IRON PIPE SIZE	TOP	TOP OF PIPE
		TOW	TOP OF WALL
L	LENGTH	TT	TRUCK TRAIL
LF	LINEAR FEET	TYP	TYPICAL
		UNO	UNLESS NOTED OTHERWISE
		VAR	VARIES
		VERT, VT	VERTICAL
		W/	WITH

NOTE:
SOME ABBREVIATIONS MAY BE USED IN COMBINATION.

REFERENCE DRAWINGS

DRAWINGS PROVIDED FOR REFERENCE PURPOSES INCLUDE:

- EFFLUENT DISCHARGE FACILITIES PAVING, GRADING, AND PIPING, METCALF & EDDY, INC. ENGINEERS, 1982.
- WATER POLLUTION CONTROL FACILITIES, YODER - TROTTER - ORLOB & ASSOCIATES, 1973.
- JUNCTION BOX NO.2 DEMOLITIONS/MODIFICATIONS PLANS, SECTIONS AND DETAIL, 2009.

DATE: JUNE 24, 2022

DESIGNED BY: MD - Civil, MMM - Structural

DRAWN BY: CM

CHECKED BY: VT & SC

PROJECT NO.
C66501838



CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
PH. 707-778-4546 FAX. 707-778-4508



**ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT
GENERAL NOTES, ABBREVIATIONS & LEGEND**

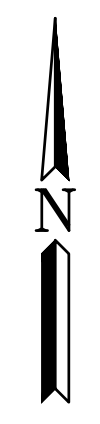
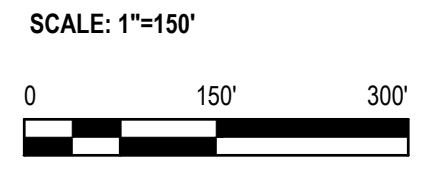
SHEET

G-002

2 of 15



EXISTING SITE PLAN



FILE NAME: \\ghn\shared\p\JUS\Santa Rosa\Projects\81112275\8\Digital_Design\CAD 2018\Sheets\11227516-G-003.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022 - 8:47am USER: cmarinazi

DATE: JUNE 24, 2022
DESIGNED BY: MD - Civil, MMM - Structural
DRAWN BY: CM
CHECKED BY: VT & SC

PROJECT NO.
C66501838



CITY OF PETALUMA
 PUBLIC WORKS & UTILITIES
 202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
 PH. 707-778-4546 FAX. 707-778-4508



**ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 EXISTING SITE PLAN**

SHEET
G-003
 3 OF 15

ISSUED FOR BID

SHEET NOTES

SURVEYOR'S STATEMENT
 THIS MAP REPRESENTS A FIELD SURVEY MADE BY CINQUINI & PASSARINO, INC. LAND SURVEYING ON MARCH 1, 2022 AND REPRESENTS THE VISUAL SURFACE CONDITIONS AS OF AFORESAID DATE.

BENCH LEVEL DATA

VERTICAL DATUM: NAVD 88

BASIS OF BEARING

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM, ZONE [X], NAD 83, EPOCH 2017.50 AS DETERMINED LOCALLY BY A LINE BETWEEN CONTINUOUS GLOBAL POSITIONING SYSTEMS (CGPS) STATION [A B C] AND STATION [A B C]; BEING SOUTH 45°35'13" WEST AS DERIVED FROM GEODETIC VALUES PUBLISHED BY THE CALIFORNIA SPATIAL REFERENCE CENTER (CSRC).

BENCHMARK



CINQUINI & PASSARINO CONTROL POINT NO. 102, BEING A FOUND REBAR WITH CAP. ELEVATION = 13.21' (NAVD 88)

SURVEY CONTROL POINTS

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
CPI #25	1840556.35	6396531.42	13.60'	SET CPI CTRL MAG NAIL
CPI #26	1840487.58	6396486.27	8.27'	SET CPI CTRL MAG NAIL
CPI #100	1840884.01	6396226.31	13.50'	REPAIR AND CAP
CPI #101	1840587.37	6396488.28	13.89'	MAG AND TT
CPI #102	1840767.27	6396692.78	13.21'	BENCHMARK REBAR/CAP
CPI #104	1840622.29	6396544.79	14.18'	SET MAG NAIL & TT

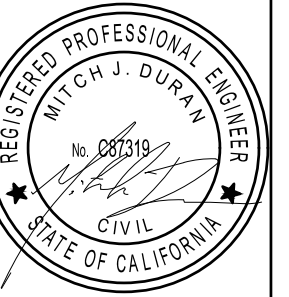
- FIELD SURVEY WAS COMPLETED BY CINQUINI & PASSARINO, INC. LAND SURVEYING, MARCH 1, 2022.

LEGEND

-  VERTICAL BENCHMARK
-  SURVEY CONTROL POINT

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MMM - Structural
 DRAWN BY: CM
 CHECKED BY: VT & SC

PROJECT NO.
 C66501838



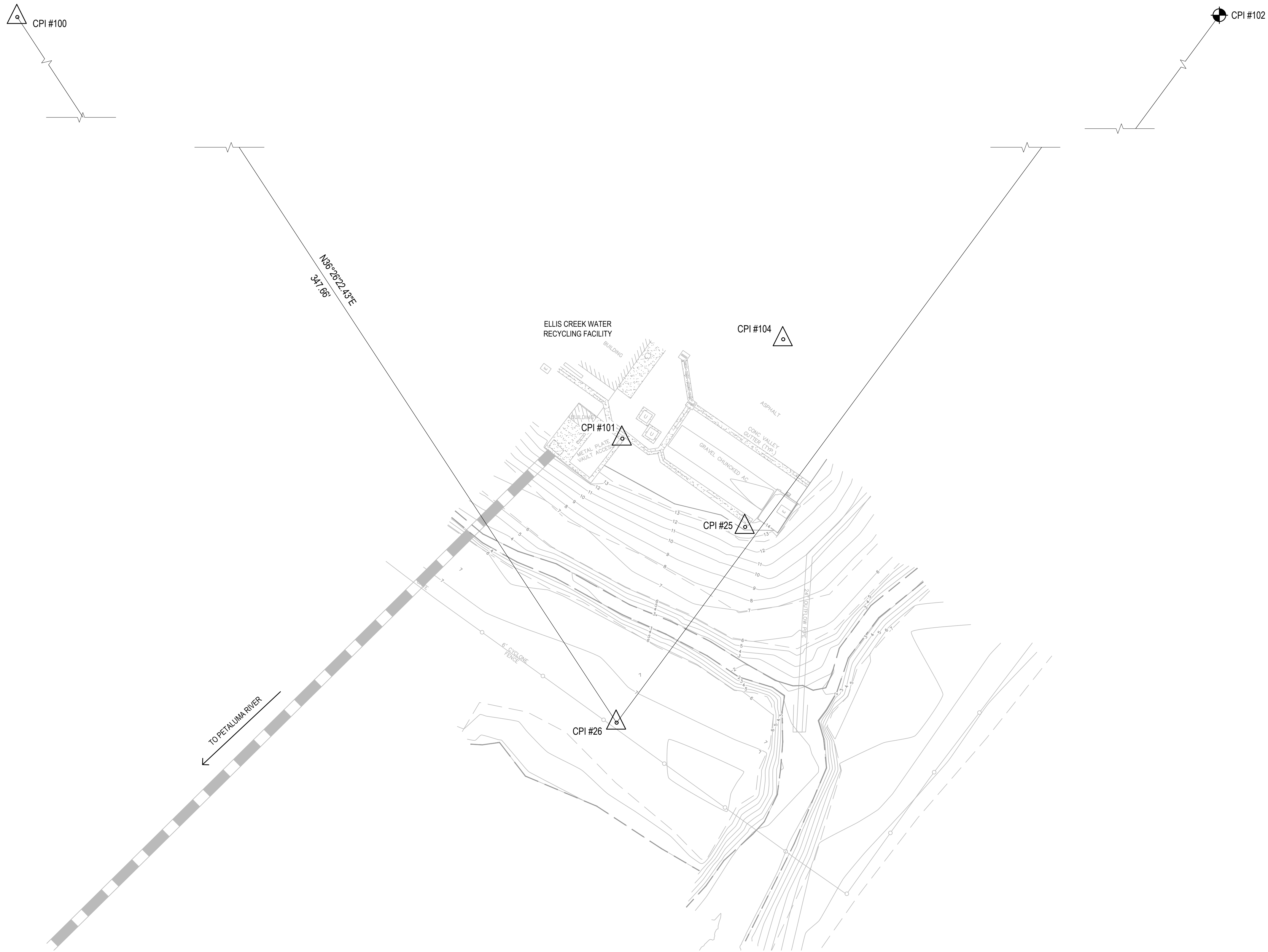
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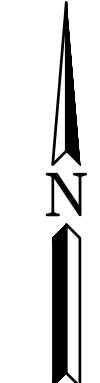
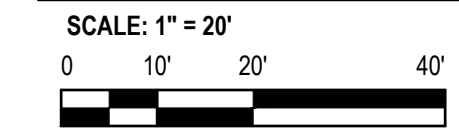
**ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 HORIZONTAL CONTROL PLAN**

SHEET
G-004

4 OF 15

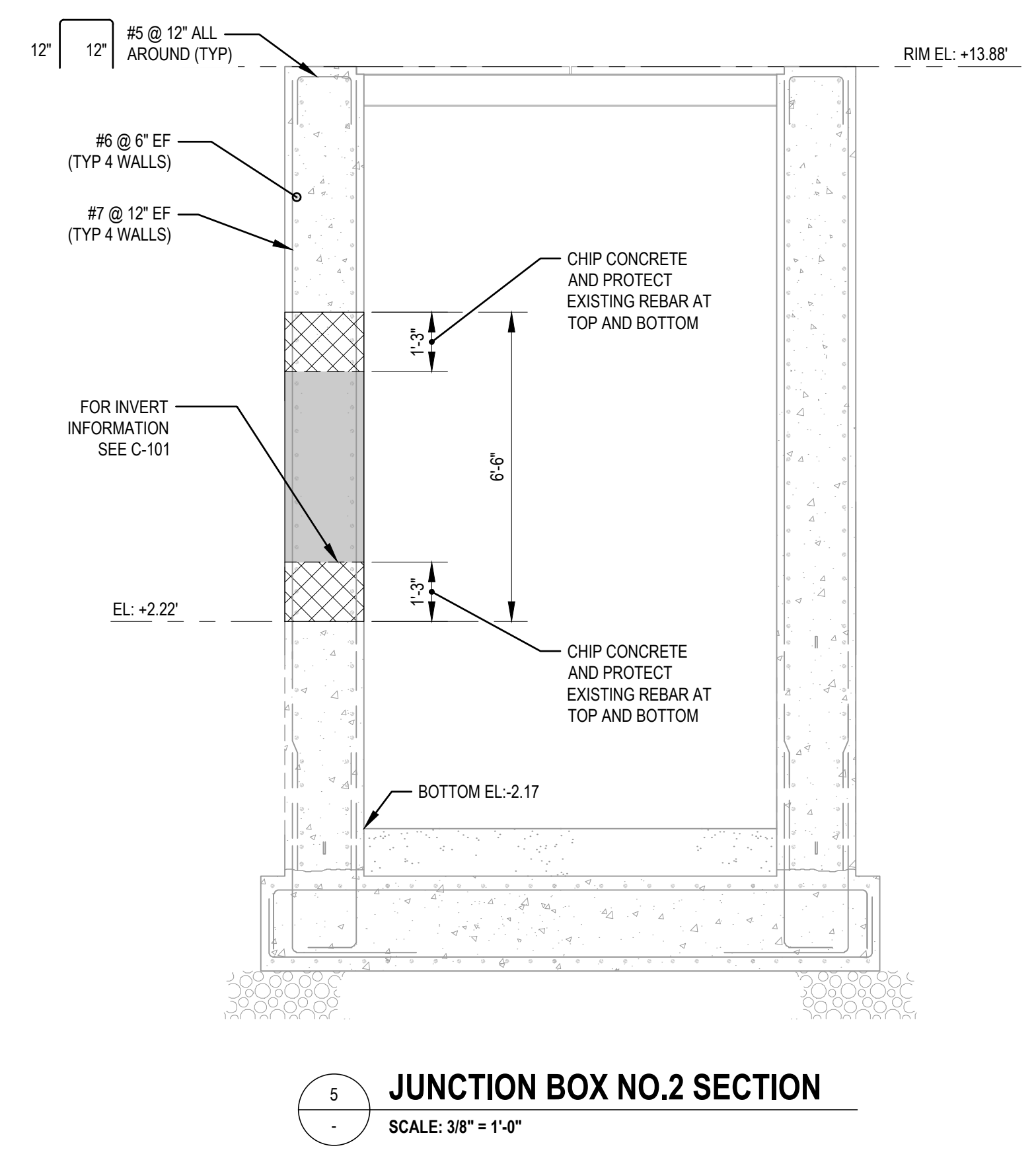
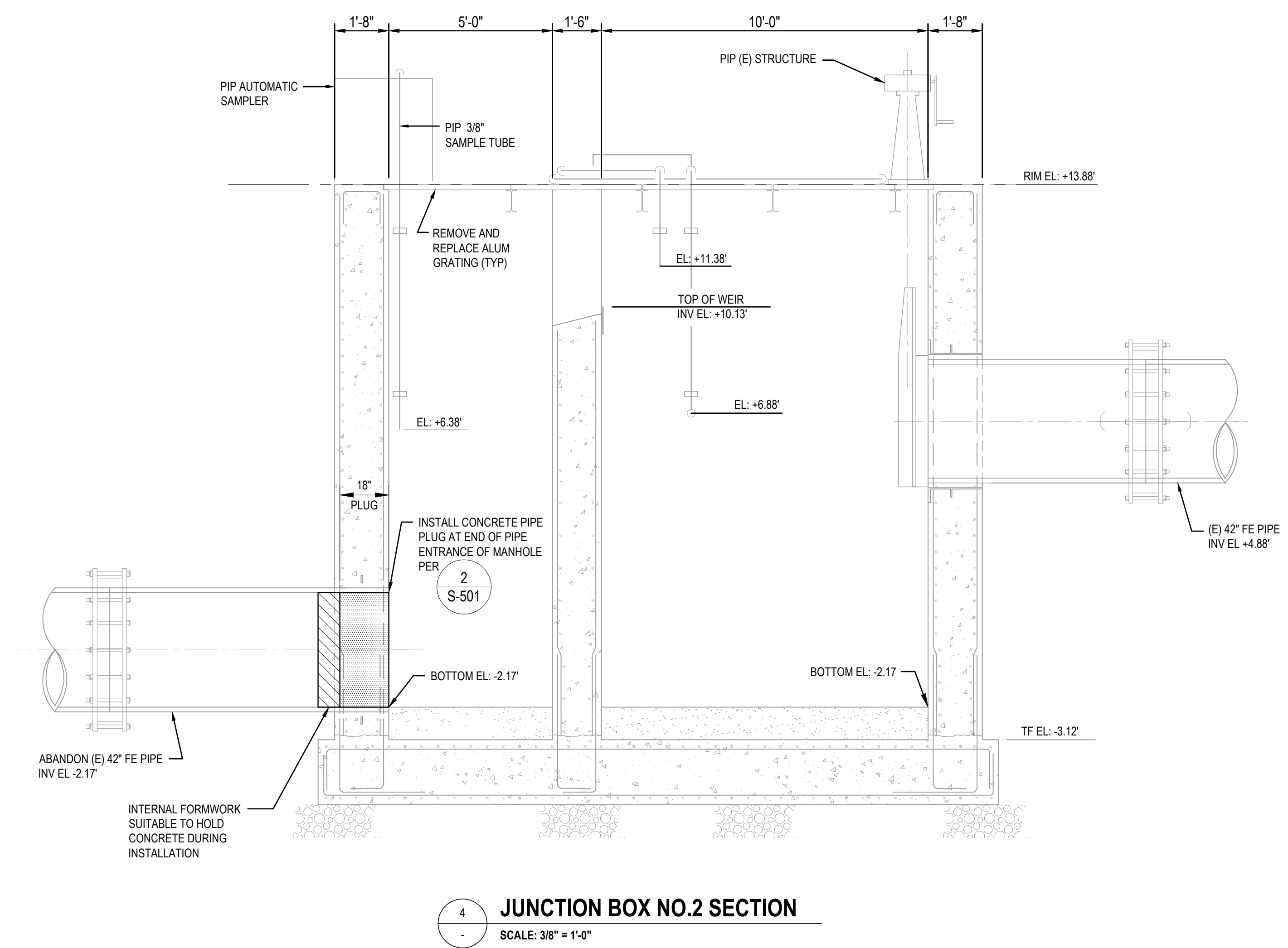
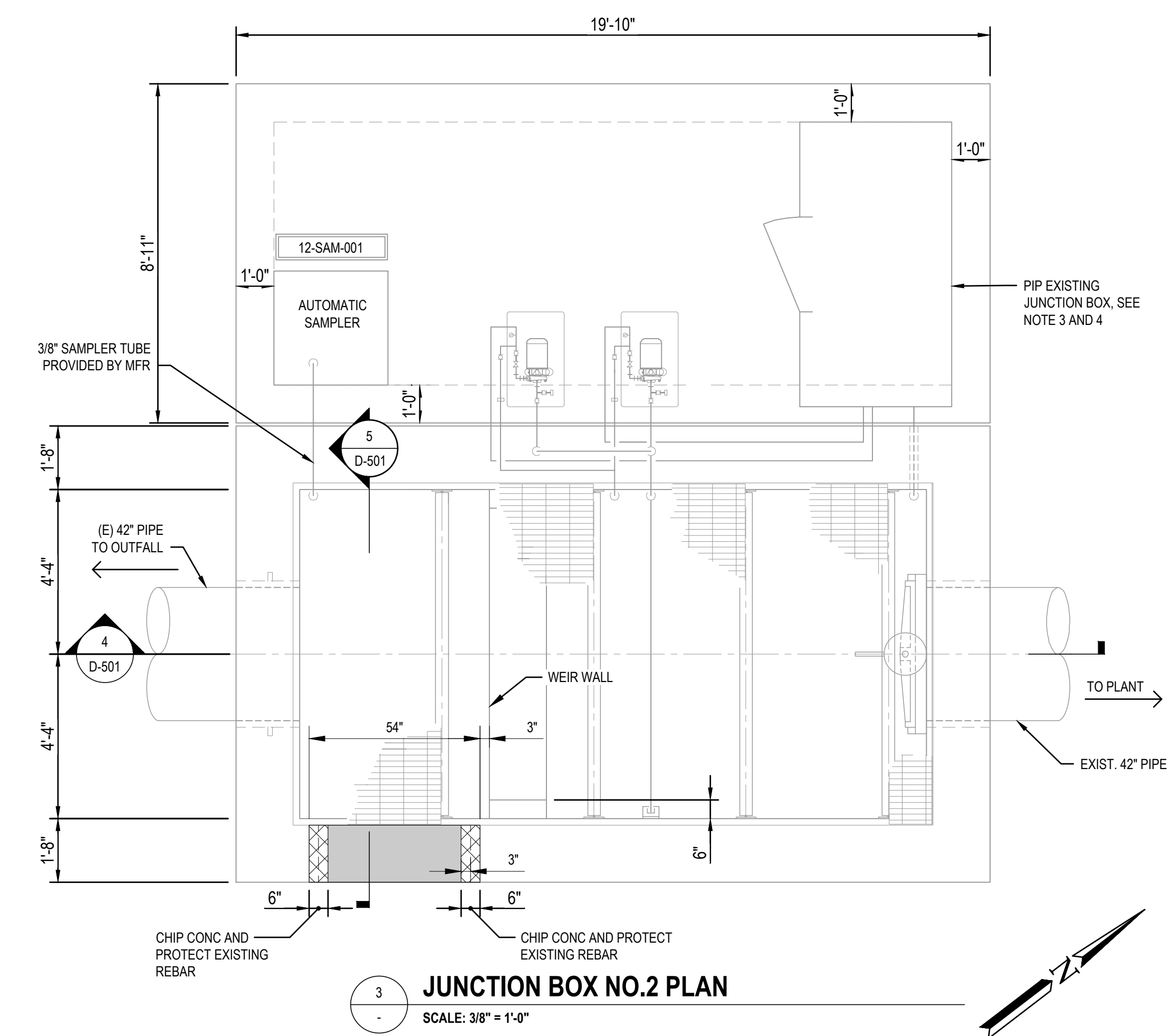
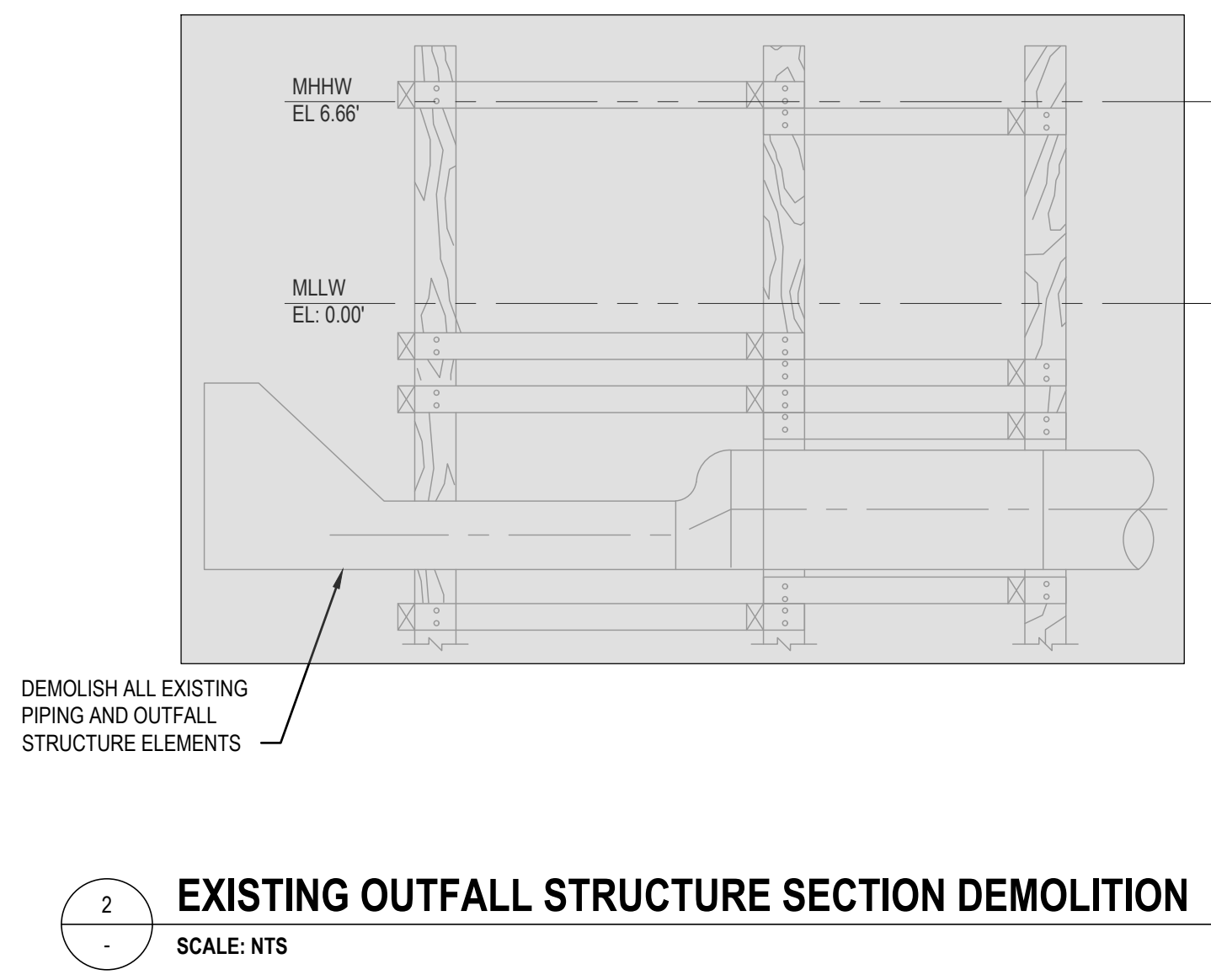
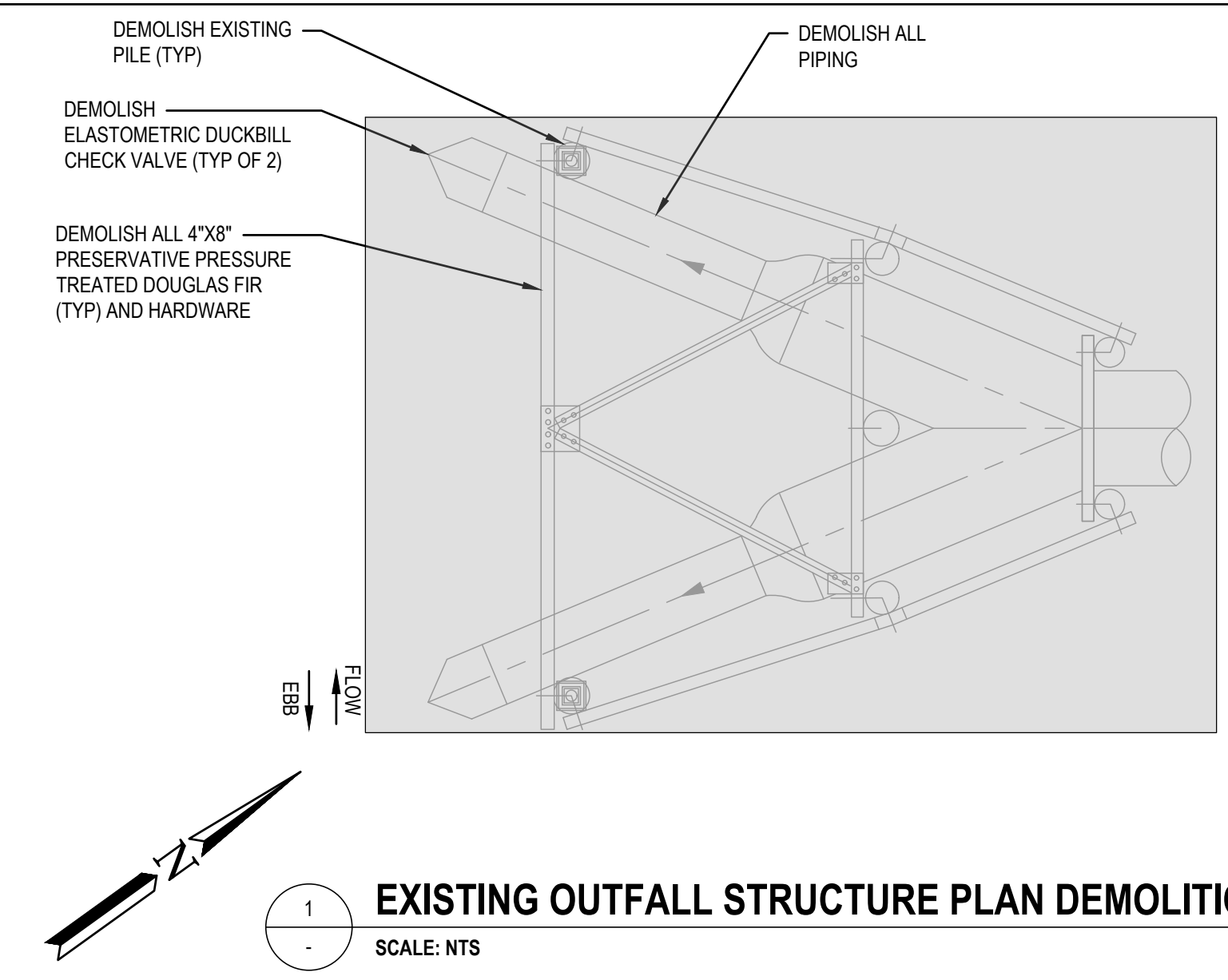


HORIZONTAL CONTROL PLAN



FILE NAME: \\ghn\engineering\GIS\Sanita_Rosa\Projects\8111227516\Digital_Design\ACAD 2018\8111227516-G-004.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022 - 4:51pm USER: emarinazi

ISSUED FOR BID



- SHEET NOTES**
- EXISTING JUNCTION BOX DETAIL FROM 2008 SEWER OUTFALL REPLACEMENT PROJECT.
 - CONTRACTOR TO FIELD VERIFY ALL DIMENSION, SIZES AND ELEVATIONS PRIOR TO COMMENCING WORK AND NOTIFY THE ENGINEER.
 - WORK ON JUNCTION BOX IS LIMITED TO WHAT IS SHOWN.
 - ANY ADDITIONAL DAMAGE TO BOX IS AT CONTRACTORS EXPENSE.

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MMM - Structural
 DRAWN BY: CM
 CHECKED BY: VT & SC

PROJECT NO.
 C66501838

REGISTERED PROFESSIONAL ENGINEER
 MICHIGAN J. DURAN
 No. 087319
 CIVIL
 STATE OF CALIFORNIA

CITY OF PETALUMA
 PUBLIC WORKS & UTILITIES
 202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
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PETALUMA 1855

ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 DEMOLITION DETAILS

SHEET
D-501
 6 OF 15

FILE NAME: \\g:\engineering\US\Sana_Rosa\Projects\811\227516\Digital_Design\CAD\2018\Sheet11\227516-D-501.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022, 8:55pm USER: cmmfz



1 JUNCTION BOX NO. 2
D-502 SCALE: NTS



2 JUNCTION BOX NO. 2
D-502 SCALE: NTS



3 JUNCTION BOX NO. 2
D-502 SCALE: NTS



4 EXISTING EMERGENCY OUTFLOW PIPE
D-502 SCALE: NTS



5 EXISTING EMERGENCY OUTFLOW PIPE AND SLOUGH JUNCTION
D-502 SCALE: NTS



6 END OF EXISTING EMERGENCY OUTFLOW PIPE
D-502 SCALE: NTS



7 EXISTING OUTFALL STRUCTURE
D-502 SCALE: NTS



8 EMERGENCY 42" OUTFALL EXTENTS OF DEMOLITION
D-502 SCALE: NTS



9 EMERGENCY 42" OUTFALL
D-502 SCALE: NTS



10 EMERGENCY 42" OUTFALL PIPE UNDER ROADWAY
D-502 SCALE: NTS



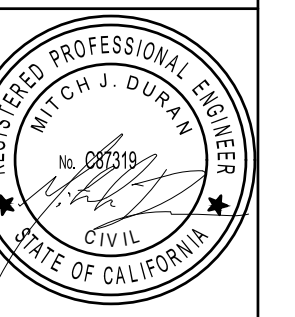
11 AREA OF EXISTING PAVEMENT TO BE REPLACED
D-502 SCALE: NTS



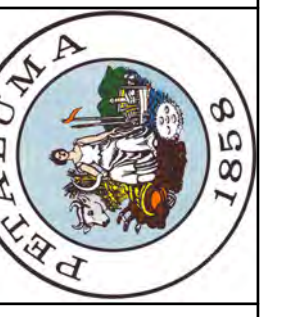
12 EXISTING STRUCTURES AND UTILITIES
D-502 SCALE: NTS

DATE: JUNE 24, 2022
DESIGNED BY: MD - Civil, MMM - Structural
DRAWN BY: CM
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PROJECT NO.
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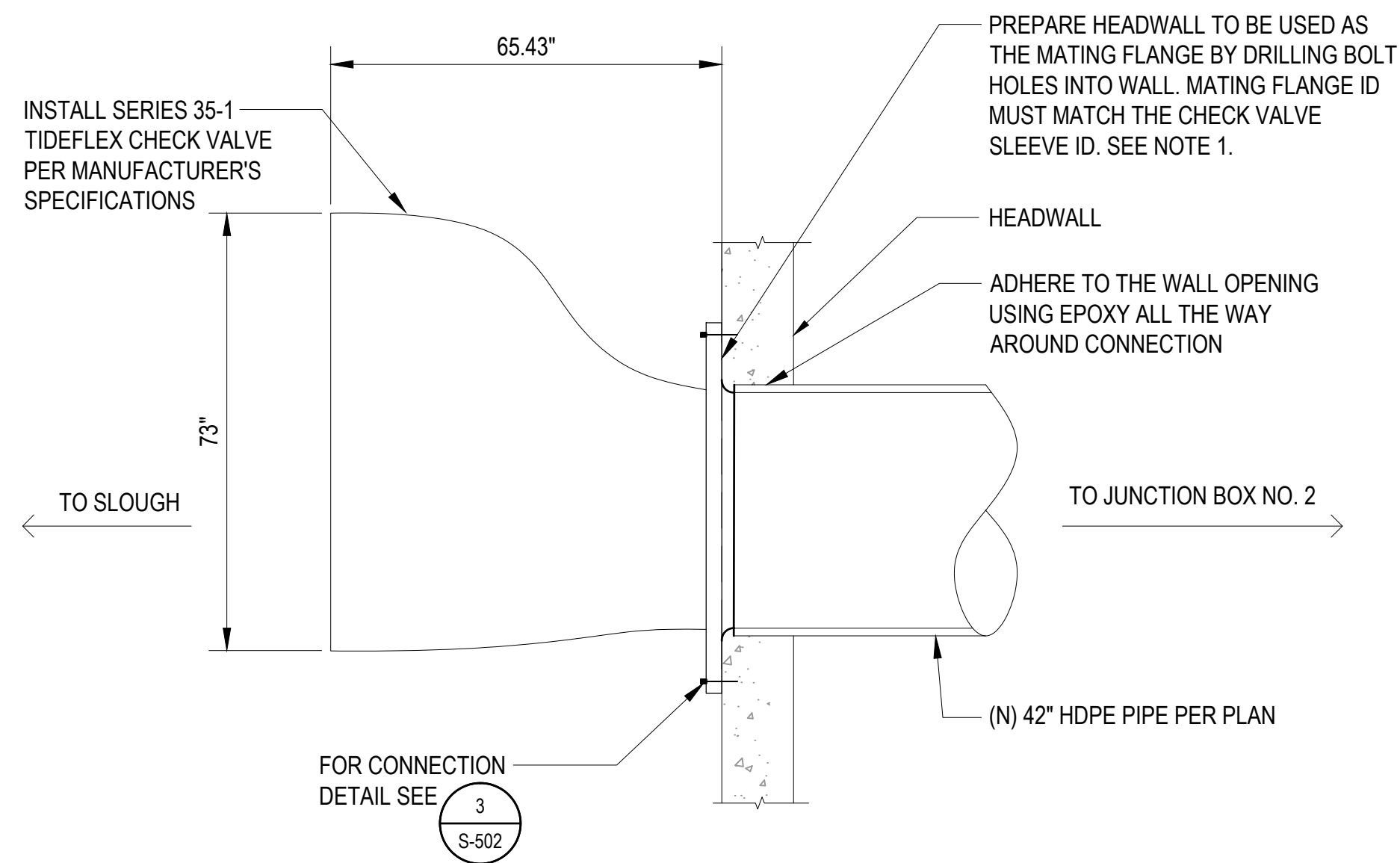


ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT
EXISTING PHOTOS

SHEET
D-502

7 OF 15

FILE NAME: \\highered\hds\Sara_Rosa\Projects\81112275\6\Digital_Design\CAD 2018\Sheet\1227516-D-502.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022, 4:56pm USER: cmaninazi



NOTES:

1. FLANGE BOLT PATTERN FOR THE CHECK VALVE SHALL USE ANSI B16.1 CLASS 125/ANSI B16.5, CLASS 150 STANDARDS.
2. SERIES 35-1 TIDEFLEX CHECK VALVE SHALL FUNCTION PER THE DESIGN CONDITIONS SHOWN ON THE TABLE BELOW.

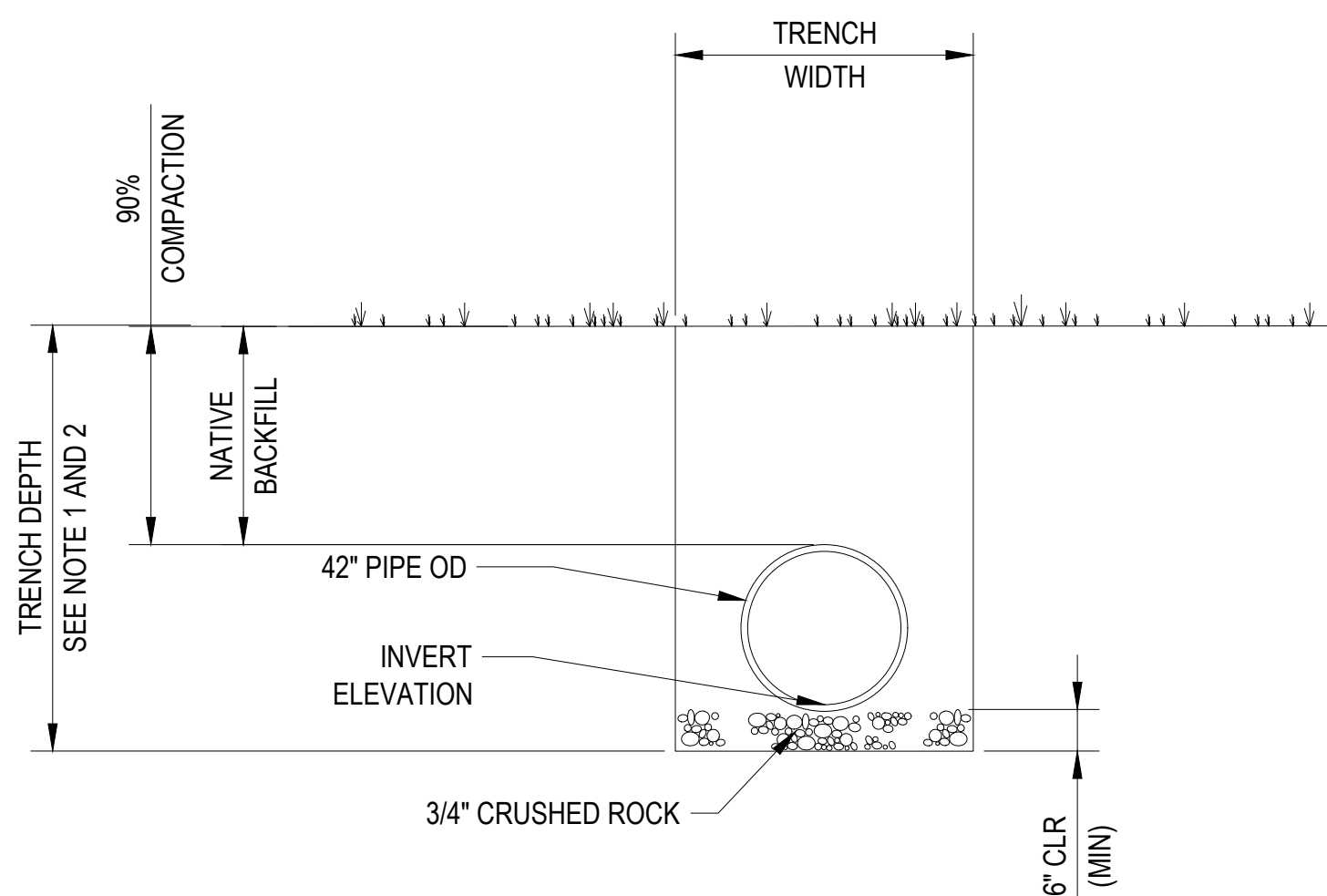
CHECK VALVE DESIGN CONDITIONS

CONDITION	VALUE	UNIT
DISCHARGE FLOWRATE, Q	16	MGD
WATER SURFACE ELEVATION, WSE	14.7	FT
BACK PRESSURE	4.31	PSI
LINE PRESSURE	4.77	PSI

DESIGN CONDITION FOR CHECK VALVE IS THE 100-YR FLOOD ELEVATION OF 9.5 FEET WITH AN ADDITIONAL 5.2 FEET OF SEA-LEVEL RISE WHICH RESULTS IN A TOTAL WATER SURFACE ELEVATION OF 14.7 FEET. A 16 MGD DISCHARGE FLOWRATE CREATES A BACK PRESSURE OF 4.31 PSI AT THE OUTLET AND A LINE PRESSURE OF 4.77 PSI IN THE PIPE.

1 42" CHECK VALVE DETAIL

SCALE: 6" = 1'-0"

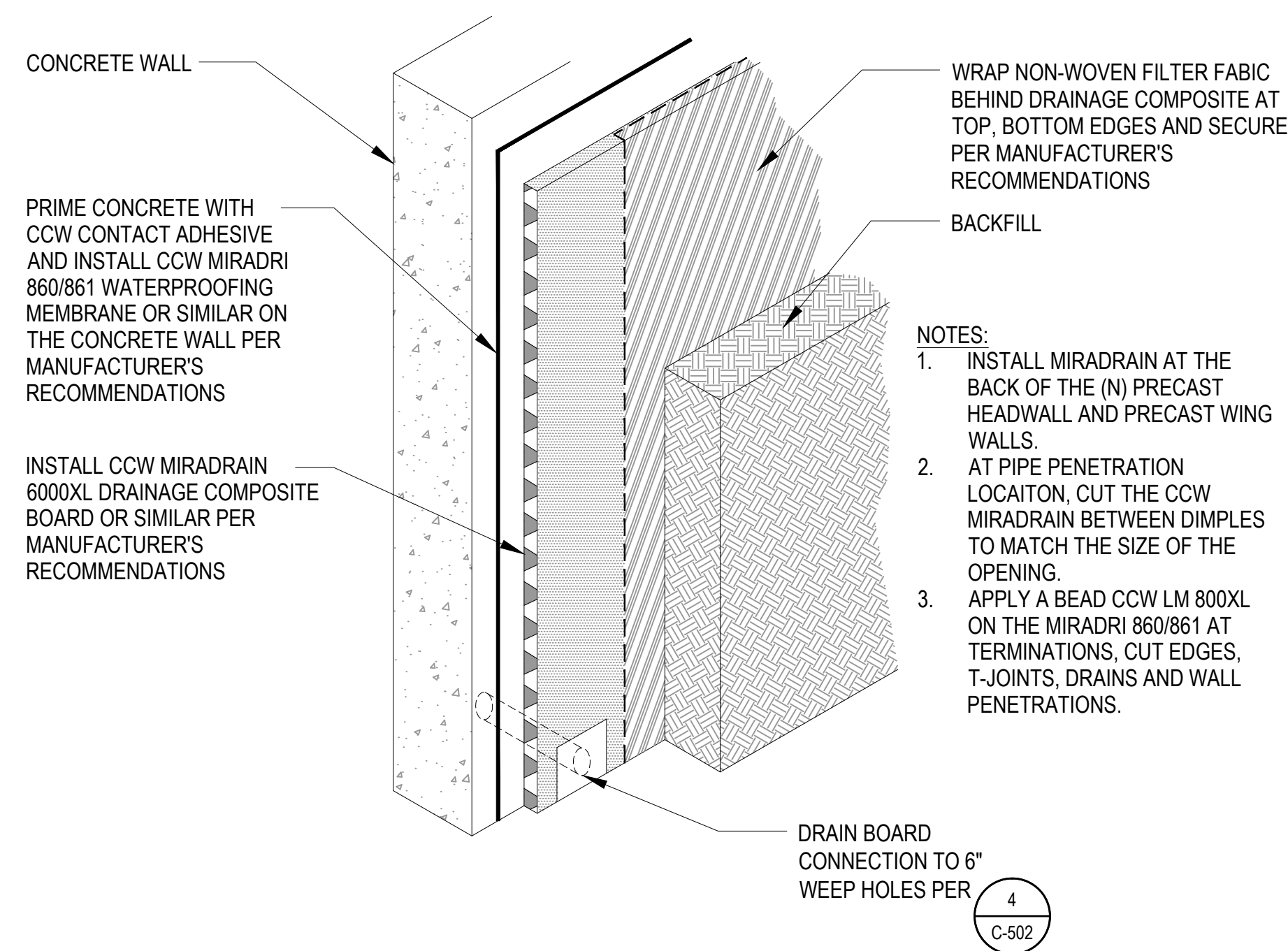


NOTES:

1. FOR VERTICAL EXCAVATIONS TALLER THAN 4', CONTRACTOR TO PROVIDE TEMPORARY SHORING.
2. NO SLOPED TRENCH WALLS ARE ALLOWED UNLESS APPROVED BY CITY REPRESENTATIVE OR ENGINEER.

2 UNPAVED SURFACE DETAIL

SCALE: 3" = 1'-0"

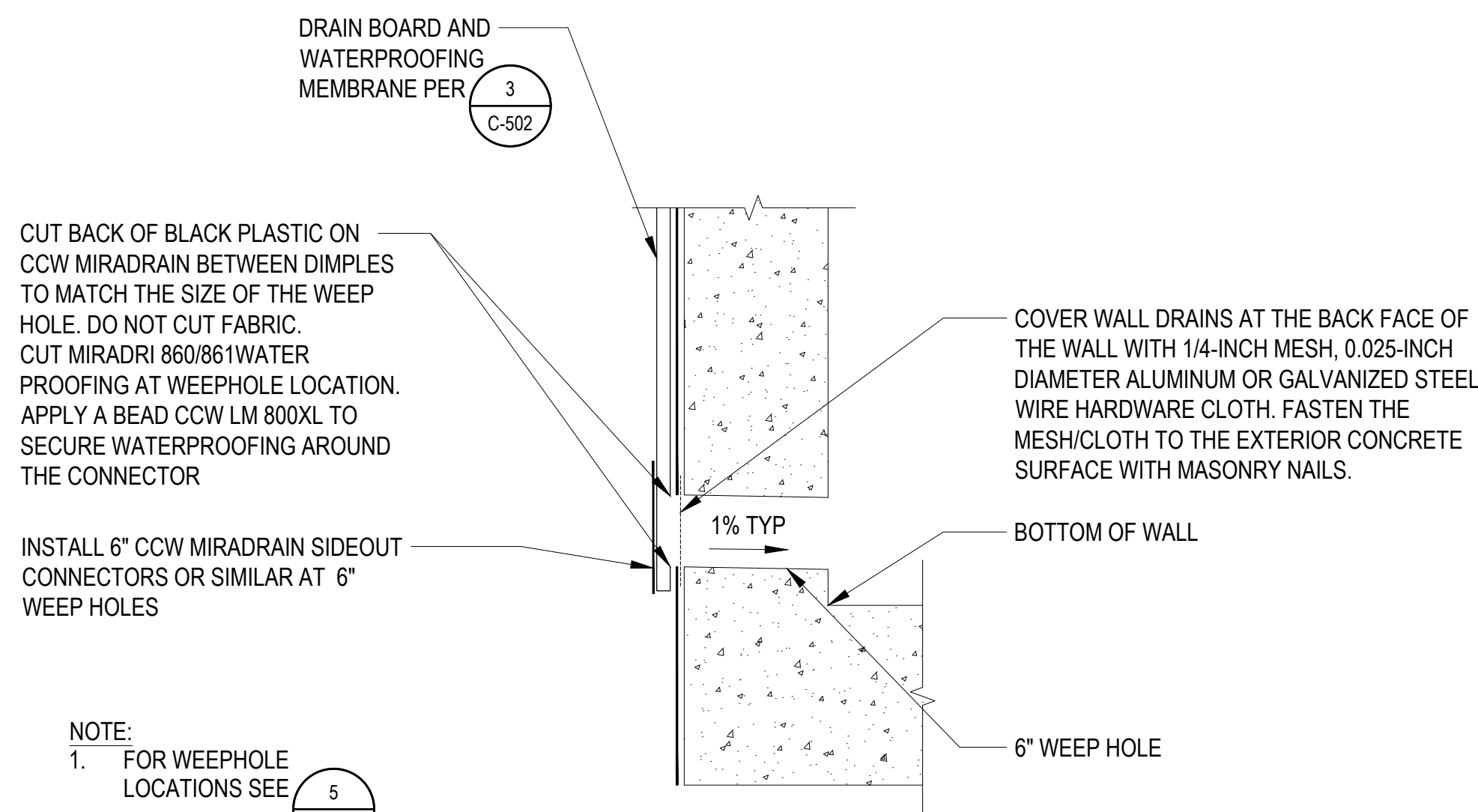


NOTES:

1. INSTALL MIRADRIN AT THE BACK OF THE (N) PRECAST HEADWALL AND PRECAST WING WALLS.
2. AT PIPE PENETRATION LOCATION, CUT THE CCW MIRADRIN BETWEEN DIMPLES TO MATCH THE SIZE OF THE OPENING.
3. APPLY A BEAD CCW LM 800XL ON THE MIRADRIN 860/861 AT TERMINATIONS, CUT EDGES, T-JOINTS, DRAINS AND WALL PENETRATIONS.

3 DRAIN BOARD DETAIL

SCALE: NTS

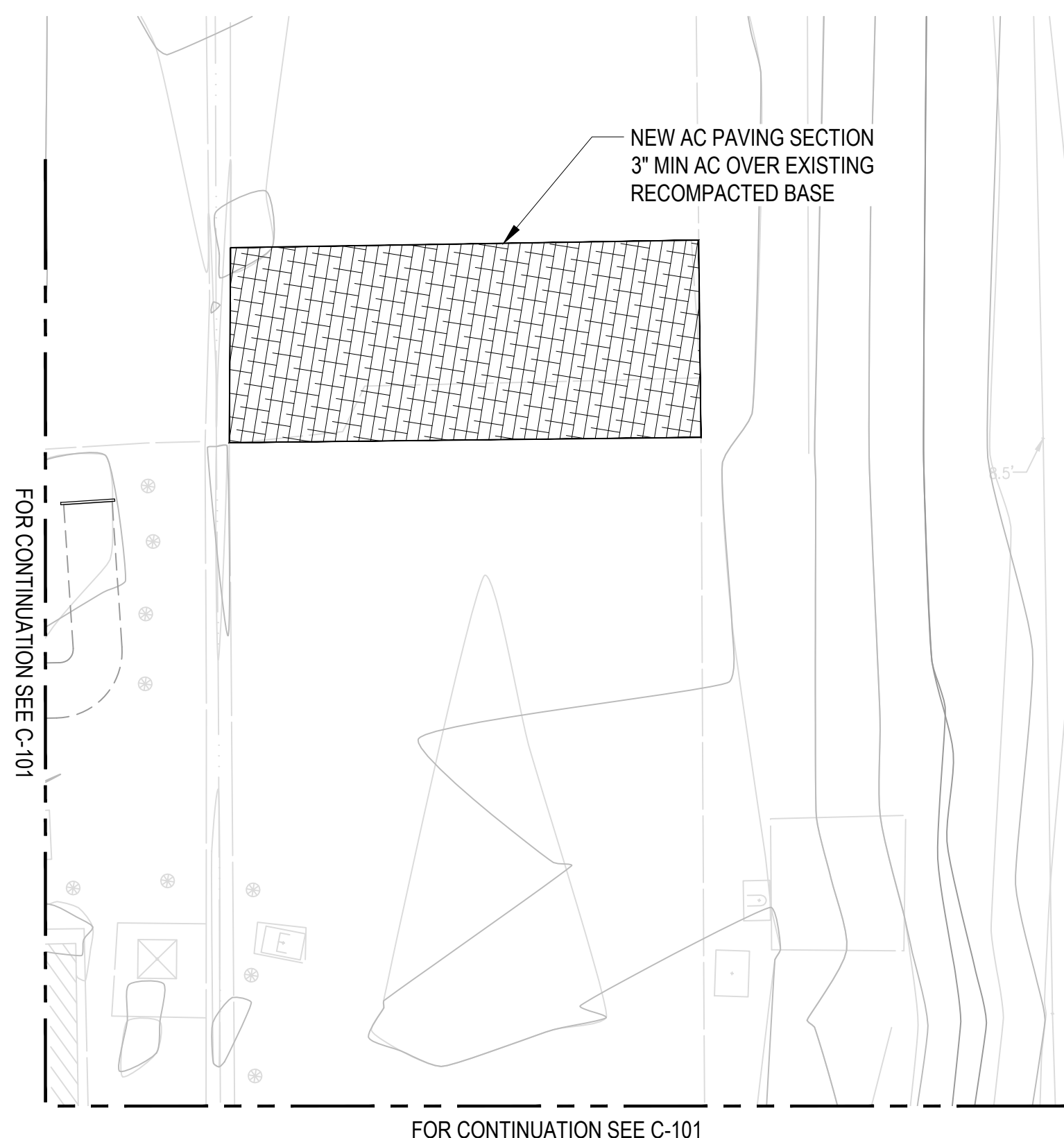


NOTE:

1. FOR WEEPHOLE LOCATIONS SEE 5 S-502

4 6" WEEPHOLE THROUGH HEADWALL/WINGWALL

SCALE: 1" = 1'-0"



5 PARTIAL OUTFALL IMPROVEMENT PLAN

SCALE: 1" = 10'

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MIM - Structural
 DRAWN BY: CM
 CHECKED BY: VT & SC

PROJECT NO.
 C66501838



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ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 CIVIL DETAILS 2 OF 2

SHEET
C-502

10 OF 15

GENERAL STRUCTURAL NOTES

A. CODES AND REFERENCES

ALL WORK SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF THE FOLLOWING CODES AND REFERENCES.

1. AMERICAN SOCIETY OF CIVIL ENGINEERS MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE 7, 2016.
2. AMERICAN CONCRETE INSTITUTE (ACI), BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY, ACI 318-14, 2014.
3. GEOTECHNICAL INVESTIGATION PETALUMA ELLIS CREEK OUTFALL, PETALUMA, CALIFORNIA, BY MILLER PACIFIC ENGINEER GROUP, JUNE 23, 2022.

B. GENERAL

1. PRODUCTS AND MATERIALS USED BY THE CONTRACTOR SHALL BE APPLIED, PLACED, ERECTED, OR INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALTERNATES FOR SPECIFIED ITEMS SHALL BE SUBMITTED TO THE CITY'S ENGINEER FOR REVIEW PRIOR TO INSTALLATION.
2. DO NOT SCALE INFORMATION FROM THE DRAWINGS.
3. SPECIAL INSPECTIONS ARE REQUIRED AS NOTED ON SHEET S-002.
4. UNO, MATERIAL AND DESIGN SPECIFICATIONS CITED HEREIN SHALL BE THOSE CONFORMING TO THE VERSION OF THE APPLICABLE SPECIFICATION OR CODE MOST RECENTLY ADOPTED BY THE CITY. THESE STRUCTURAL NOTES ARE TO BE USED AS A SUPPLEMENT TO THE SPECIFICATIONS.
5. GENERAL CONTRACTOR SHALL VERIFY DIMENSIONS, ELEVATIONS AND CONDITIONS AND EXISTING MEMBERS.
6. CONSTRUCTION METHODS AND PROJECT SAFETY:
 - THE CONTRACT DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE AND DO NOT INDICATE METHODS, PROCEDURES OR SEQUENCE OF CONSTRUCTION.
 - THE CITY REPRESENTATIVE RESERVES THE RIGHT TO ENFORCE SAFETY MEASURES OR REGULATIONS AS NECESSARY. CONTRACTOR SHALL BE RESPONSIBLE TO DESIGN, CONSTRUCT, AND MAINTAIN ALL SAFETY MEASURES.
7. THESE DRAWINGS AND THE SUPPORTING SPECIFICATIONS AND STRUCTURAL CALCULATIONS DEVELOPED BY THE STRUCTURAL ENGINEER SHALL ONLY BE USED FOR THIS PROJECT AND AT THE LOCATION SPECIFIED HEREIN.
8. FIELD ENGINEERED DETAILS DEVELOPED BY THE CONTRACTOR THAT DIFFER FROM, OR ADD TO, THE STRUCTURAL DRAWINGS SHALL BE STAMPED BY A LICENSED ENGINEER REGISTERED IN THE STATE OF CALIFORNIA AND SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO IMPLEMENTATION/FABRICATION.
9. FEATURES OF CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME TYPE AND CHARACTER AS SHOWN FOR SIMILAR CONDITIONS, SUBJECT TO REVIEW BY THE ENGINEER.

C. FOUNDATIONS

1. FOUNDATION DESIGN SHALL CONFORM TO THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT UNLESS APPROVED OTHERWISE BY EOR.

D. CONCRETE

1. ALL CONCRETE WORK SHALL COMPLY WITH THE RECOMMENDATIONS OF ACI 301 AND ACI 318, UNO.
2. MINIMUM CONCRETE COMPRESSIVE STRENGTH AT 28 DAYS, UNO.

	COMPRESSIVE STRENGTH
CAST-IN-PLACE CONCRETE	5,000 psi
PRECAST CONCRETE	5,000 psi
MISC CONCRETE	2,500 psi

3. CEMENT SHALL CONFORM TO ASTM C150 TYPE II UNO.
4. PLACEMENT OF CONCRETE SHALL BE IN ACCORDANCE WITH ACI 301.
5. GROUT: PREMANUFACTURED MIX WITH MINIMUM COMPRESSIVE STRENGTH AT THE END OF 28 DAYS OF 5000 PSI WITH MINIMUM WATER CONSISTENT WITH PLACING REQUIREMENTS.
6. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS. CONTRACTOR TO REVIEW FORMING, REINFORCING DETAILS AND ANY EMBEDDED ITEMS AND DETERMINE PRIOR TO FABRICATING ANY REINFORCING AND PLACEMENT REQUIREMENTS AND CLEARANCES.
7. CONSTRUCTION JOINTS SHALL NOT BE PLACED AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

8. ALL CONSTRUCTION JOINTS SHALL BE ROUGHENED TO 1/4" AMPLITUDE, UNO.
9. ALL EXPOSED CORNERS OF CONCRETE SHALL HAVE 3/4" CHAMFER, UNO.
10. PLANE SURFACES SHALL BE FINISHED TO A TOLERANCE OF PLUS OR MINUS 1/8" FOR ANY 10' FOOT LENGTH.
11. WRITTEN SPACING AND LOCATION OF REINFORCING SHALL TAKE PRECEDENCE OVER DEPICTED SPACING AND LOCATION.
12. SEE CIVIL AND MECHANICAL DRAWINGS FOR EMBEDDED ITEMS.
13. 3" CONCRETE COVER IS REQUIRED FOR REBAR MECHANICAL COUPLERS PER TYPICAL REBAR MECHANICAL SPLICE DETAIL. REINFORCING SHALL HAVE 3" CLEAR CONCRETE COVER, UNO ON THE DRAWINGS.

E. REINFORCING STEEL

REINFORCING BARS SHALL CONFIRM TO THE FOLLOWING, UNO:

1. REINFORCING BARS SHALL BE DEFORMED AND CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60 OR ASTM A706, GRADE 60. DEFORMATIONS SHALL BE IN ACCORDANCE WITH ASTM A-305.
2. REINFORCING STEEL FABRICATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF CRSI MANUAL OF STANDARD PRACTICE.
3. ALL DETAILING, FABRICATIONS, AND ERECTION OF REINFORCING STEEL SHALL CONFORM TO THE ACI DETAILING MANUAL-2004, SP-66. ALL REINFORCING BAR BENDS SHALL BE MADE COLD.
4. BARS SHALL BE CLEAN OF RUST, GREASE, OR OTHER MATERIALS LIKELY TO IMPAIR BOND.
5. ALL REINFORCEMENT SHALL BE EQUALLY SPACED WITHIN EACH MEMBER UNO.
6. REINFORCING BARS SHALL BE SECURELY SUPPORTED ON WELL CURED CONCRETE BLOCKS OR APPROVED PLASTIC CHAIRS PRIOR TO PLACING CONCRETE.
7. ALL SLAB OR WALL REINFORCEMENT INTERRUPTED BY OPENINGS SHALL HAVE ADDITIONAL REINFORCEMENT EQUAL TO THAT INTERRUPTED BY THE OPENING ADDED ON ALL SIDES OF THE OPENING UNO ON DRAWINGS. INSTALL ADDITIONAL REINFORCING AT OPENINGS/HOLE PENETRATIONS THROUGH CONCRETE AS SHOWN ON DRAWING, OR AS DIRECTED BY THE ENGINEER.
8. SPLICING OF REINFORCING OVER 20 FT IN LENGTH SHALL BE PERMITTED UNO. SPLICES SHALL BE STAGGERED WITH NO MORE THAN 50% OF THE BARS BEING SPLICED AT ANY ONE LOCATION. MINIMUM LENGTH OF CLASS B LAP SPLICE SHALL BE AS SHOWN ON TABLE 2.
9. CORNER BARS SHALL BE PROVIDED AT ALL CORNERS. CORNER BARS SHALL MATCH THE SMALLER HORIZONTAL REINFORCEMENT MADE CONTINUOUS AT THE CORNER. SPLICE CORNER BAR WITH A MINIMUM SPLICE LENGTH OF CLASS B LAP SPLICE PROVIDED ON TABLE 2.
10. SPLICED BARS SHALL HAVE A MINIMUM LAP AS SPECIFIED IN LATEST EDITION OF THE ACI 315 DETAILING MANUAL AND ACI 318 CLASS B TENSION LAP UNO IN CONTRACT DOCUMENTS. WHERE SHOWN ON THE DRAWINGS, l_d = DEVELOPMENT LENGTH AS SUMMARIZED IN STANDARD DETAIL. HOOKS OF REINFORCING STEEL SHALL COMPLY WITH STANDARD DETAILS.

F. BOLTS AND EMBEDS

1. ISOLATE SS BOLTS AND EMBEDS FROM REINFORCEMENT AND OTHER DISSIMILAR METALS.
2. SS BOLTS WITH COMPATIBLE NUTS AND WASHER. TYPE 316/316L

TABLE 1 - HOOK DEVELOPMENT LENGTHS l_{dh}

DEVELOPMENT LENGTH (l_{dh}) (INCHES) FOR BARS WITH STANDARD HOOKS FOR NORMAL WEIGHT CONCRETE	
BAR SIZE	5,000 PSI CONC (f _c)
#3	7
#4	10
#5	12
#6	15
#7	17
#8	19
#9	22
#10	24
#11	27

MULTIPLY TABLE VALUES BY 1.2 FOR EPOXY COATED HOOKS

TABLE 2 - CLASS B TENSION LAP SPLICE LENGTHS l_s

CLASS B LAP SPLICE LENGTHS (INCHES) FOR NORMAL WEIGHT CONCRETE (l_s)		
BAR SIZE	5,000 PSI CONC (f _c)	
	TOP BARS	OTHER BARS
#3	24	19
#4	32	25
#5	40	31
#6	48	37
#7	70	54
#8	80	62
#9	91	70
#10	102	79
#11	113	87

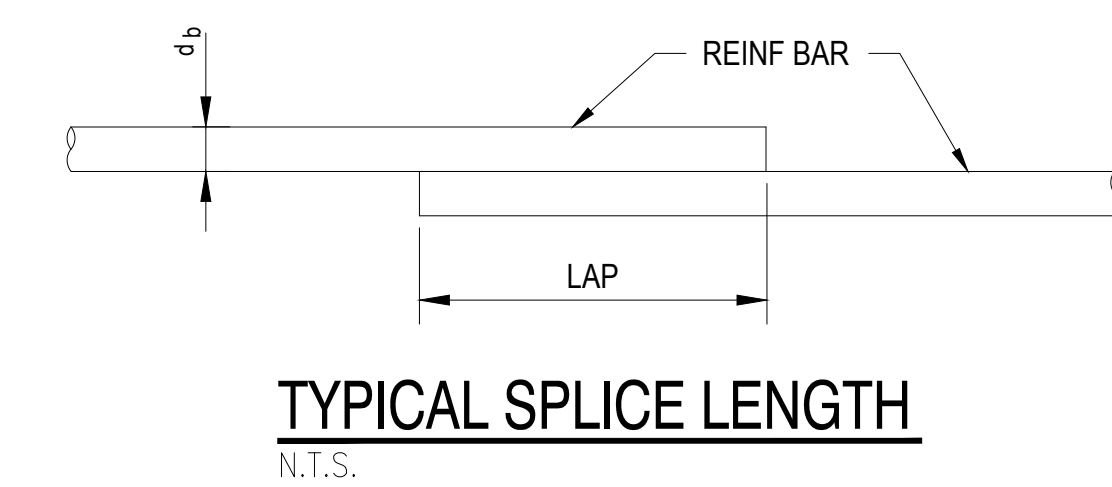
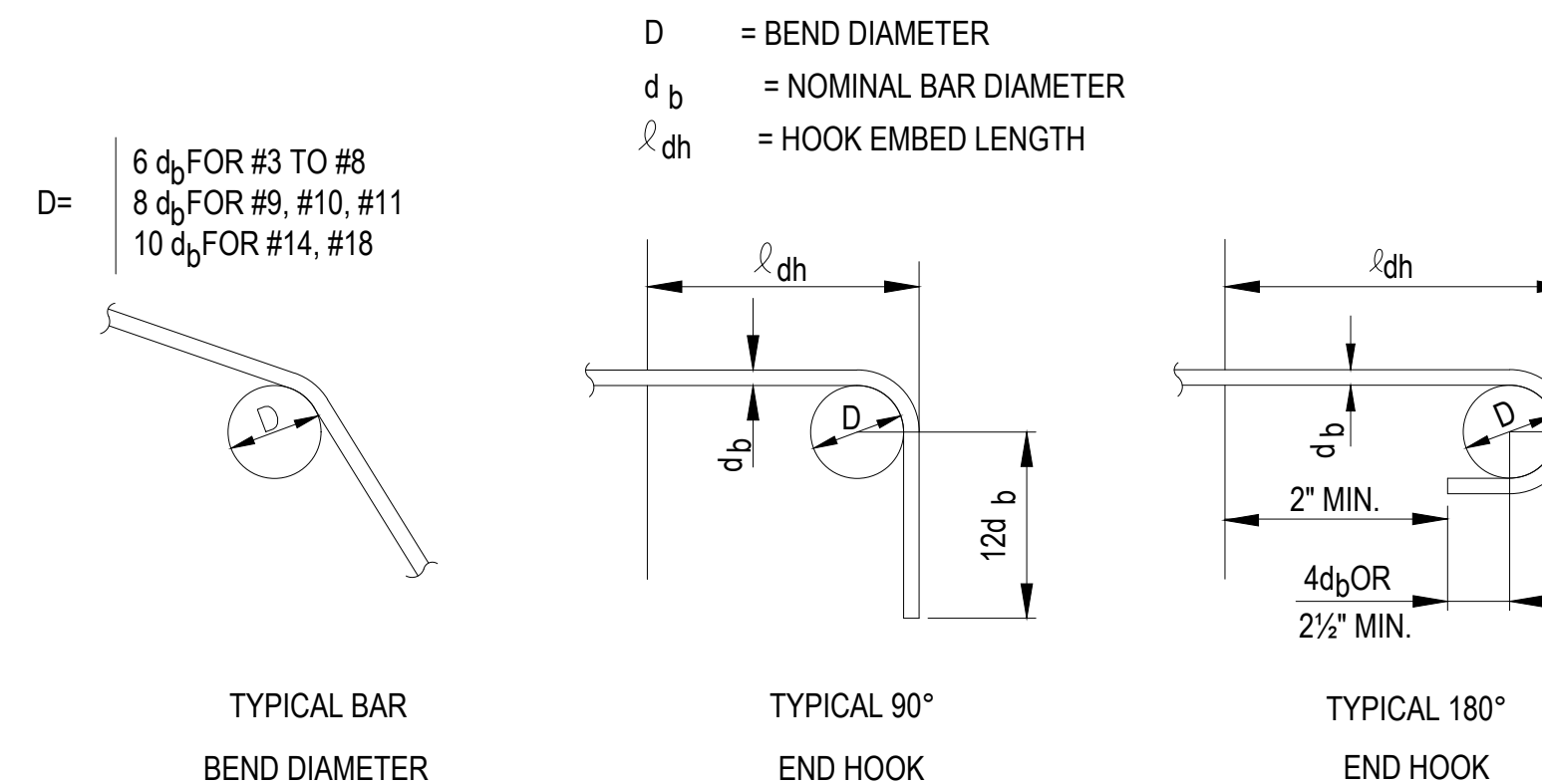
MULTIPLY TABLE VALUES BY 1.2 FOR EPOXY COATED BARS DEVELOPMENT LENGTH w/o HOOKS (l_d) = LAP SPLICE LENGTH (l_s) / 1.3

SPLICE NOTES:

1. ACI 318-14 AND ACI 315 APPLIES UNO.
2. CONCENTRIC MECHANICAL SPLICES IN COMPLIANCE WITH ACI 318-14 ARE ACCEPTABLE ALTERNATIVES TO LAP SPLICES.
3. WELDING SHALL NOT BE PERMITTED ON ANY REINFORCEMENT WITHOUT APPROVAL OF ENGINEER.

ISSUED FOR BID

TYPICAL BAR BENDS



FILE NAME: \ghner\gh\us\Sara_Rosa\Projects\8111227516\Digital_Design\CAD 2018\8111227516-S-001.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022 - 9:00pm USER: cminhazai

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MIM - Structural
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PROJECT NO.
 C66501838

REGISTERED PROFESSIONAL ENGINEER
 STATE OF CALIFORNIA
 CIVIL
 12515

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PETALUMA
 1855

ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
STRUCTURAL GENERAL NOTES

SHEET
S-001
 12 of 15

STATEMENT OF SPECIAL INSPECTIONS

ISSUED FOR BID

STATEMENT OF SPECIAL INSPECTIONS

THIS STATEMENT OF SPECIAL INSPECTIONS IS SUBMITTED AS A CONDITION FOR PERMIT ISSUANCE IN ACCORDANCE WITH THE SPECIAL INSPECTION AND STRUCTURAL TESTING REQUIREMENTS OF THE BUILDING CODE SECTIONS 1704 AND 1705.

THIS STATEMENT OF SPECIAL INSPECTIONS ENCOMPASS THE FOLLOWING DISCIPLINES:

- STRUCTURAL SPECIAL INSPECTIONS PER 1704 AND 1705
- STRUCTURAL SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE
- STRUCTURAL SPECIAL INSPECTIONS FOR WIND RESISTANCE

THE SCHEDULE OF SPECIAL INSPECTIONS SUMMARIZES THE SPECIAL INSPECTIONS AND TEST REQUIRED. SPECIAL INSPECTORS WILL REFER TO THE APPROVED PLANS AND SPECIFICATIONS FOR DETAILED SPECIAL INSPECTION REQUIREMENTS. ANY ADDITIONAL TESTS AND INSPECTIONS REQUIRED BY THE APPROVED PLANS AND SPECIFICATIONS WILL ALSO BE PERFORMED.

THE SPECIAL INSPECTIONS IDENTIFIED ARE IN ADDITION TO THOSE REQUIRED BY OTHER SECTIONS OF THE BUILDING CODE. SPECIAL INSPECTION IS NOT A SUBSTITUTE FOR INSPECTION BY THE BUILDING OFFICIAL HAVING JURISDICTION OR CONTRACTING OFFICER

THE SPECIAL INSPECTION COORDINATOR SHALL KEEP RECORDS OF ALL INSPECTIONS AND SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. DISCOVERED DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF SUCH DISCREPANCIES ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. THE SPECIAL INSPECTION PROGRAM DOES NOT RELIEVE THE CONTRACTOR OF HIS OR HER RESPONSIBILITIES.

INTERIM REPORTS SHALL BE SUBMITTED TO THE BUILDING OFFICIAL OR CONTRACTING OFFICER AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 1704.2.4.

A FINAL REPORT OF SPECIAL INSPECTIONS DOCUMENTING COMPLETION OF ALL REQUIRED SPECIAL INSPECTIONS, TESTING AND CORRECTION OF ANY DISCREPANCIES NOTED IN THE INSPECTIONS SHALL BE SUBMITTED PRIOR TO ISSUANCE OF A CERTIFICATE OF USE AND OCCUPANCY PER SECTION 1704.2.4. THE FINAL REPORT WILL DOCUMENT THE REQUIRED SPECIAL INSPECTIONS AND CORRECTION OF DISCREPANCIES NOTED IN INSPECTIONS.

JOB SITE SAFETY AND MEANS AND METHODS OF CONSTRUCTION ARE SOLELY THE RESPONSIBILITY OF THE CONTRACTOR.

THE CONTRACTOR IS REQUIRED TO COORDINATE ALL INSPECTIONS. THE CONTRACTOR SHALL NOTIFY THE CITY AND THE SPECIAL INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO ANY SPECIAL INSPECTIONS THAT ARE REQUIRED. THE CONTRACTOR SHALL NOTIFY THE CITY, THE ENGINEER, AND THE SPECIAL INSPECTOR A MINIMUM OF 24 HOURS PRIOR TO ANY CONCRETE TO BE POURED.

THE INSPECTORS AND TESTING AGENCIES SHALL BE ENGAGED BY THE CITY OR CITY REPRESENTATIVE, AND NOT BY THE CONTRACTOR OR SUBCONTRACTOR WHOSE WORK IS TO BE INSPECTED OR TESTED PER SECTION 1704.1. ANY CONFLICT OF INTEREST MUST BE DISCLOSED TO THE BUILDING OFFICIAL/CONTRACTING OFFICER, PRIOR TO COMMENCING WORK. IF APPROPRIATE AGENTS ARE NOTED AS "TO BE DETERMINED (TBD), THE CITY IS RESPONSIBLE TO COORDINATE THE ASSEMBLY OF A SPECIAL INSPECTION TEAM. ALL SPECIAL INSPECTORS AND TESTING LABORATORIES SHALL BE SUBMITTED TO GH/D/AGS AND THE BUILDING OFFICIAL/CONTRACTING OFFICE FOR REVIEW.

SPECIALY INSPECTED WORK THAT IS INSTALLED OR COVERED WITHOUT THE APPROVAL OF THE BUILDING OFFICIAL/CONTRACTING OFFICER IS SUBJECT TO REMOVAL OR EXPOSURE.

CONTINUOUS INSPECTION IS ALWAYS REQUIRED DURING THE PERFORMANCE OF THE WORK UNLESS OTHERWISE SPECIFIED. WHEN WORK IN MORE THAN ONE CATEGORY OF WORK REQUIRING SPECIAL INSPECTION IS TO BE PERFORMED SIMULTANEOUSLY, OR THE GEOGRAPHIC LOCATION OF THE WORK IS SUCH THAT IT CANNOT BE CONTINUOUSLY OBSERVED, IT IS THE AGENT'S RESPONSIBILITY TO EMPLOY A SUFFICIENT NUMBER OF INSPECTORS TO ASSURE THAT ALL THE WORK IS INSPECTED IN ACCORDANCE WITH THE PROVISIONS OF THE BUILDING CODE.

QUALIFICATIONS OF INSPECTORS AND TESTING TECHNICIANS

THE QUALIFICATIONS OF ALL PERSONNEL PERFORMING SPECIAL INSPECTION AND TESTING ACTIVITIES ARE SUBJECT TO THE APPROVAL OF THE BUILDING OFFICIAL. THE CREDENTIALS OF ALL INSPECTORS AND TESTING TECHNICIANS SHALL BE PROVIDED IF REQUESTED.

KEY FOR MINIMUM QUALIFICATIONS OF INSPECTIONS AGENTS:

WHEN THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE DEEMS IT APPROPRIATE THAT THE INDIVIDUAL PERFORMING A STIPULATED TEST OR INSPECTION HAVE A SPECIFIC CERTIFICATION OR LICENSE AS INDICATED BELOW, SUCH DESIGNATION SHALL APPEAR BELOW THE AGENCY NUMBER ON THE SCHEDULE.

PE/SE STRUCTURAL ENGINEER - A LICENSED SE OR PE SPECIALIZING IN THE DESIGN OF BUILDING STRUCTURES

PE/GE GEOTECHNICAL ENGINEER - A LICENSED GE OR PE SPECIALIZING IN SOIL MECHANICS AND FOUNDATIONS

EIT ENGINEER-IN-TRAINING - A GRADUATE ENGINEER WHO HAS PASSED THE FUNDAMENTALS OF ENGINEERING EXAMINATION

AMERICAN CONCRETE INSTITUTE (ACI) CERTIFICATION

ACI-CFTT CONCRETE FIELD TESTING TECHNICIAN - GRADE 1

ACI-CCI CONCRETE CONSTRUCTION INSPECTOR

ACI-LTT LABORATORY TESTING TECHNICIAN - GRADE 1&2

ACI-STT STRENGTH TESTING TECHNICIAN

AMERICAN WELDING SOCIETY (AWS) CERTIFICATION

AWS-CWI CERTIFIED WELDING INSPECTOR

AWS/AISC-SSICERTIFIED STRUCTURAL STEEL INSPECTOR

INTERNATIONAL CODE COUNCIL (ICC) CERTIFICATION

ICC-SMSI STRUCTURAL MASONRY SPECIAL INSPECTOR

ICC-SWSI STRUCTURAL STEEL AND WELDING SPECIAL INSPECTOR

ICC-SFSI SPRAY-APPLIED FIREPROOFING SPECIAL INSPECTOR

ICC-PCSI PRESTRESSED CONCRETE SPECIAL INSPECTOR

ICC-RCSI REINFORCED CONCRETE SPECIAL INSPECTOR

TABLE 1705.3 - CONCRETE

ITEM 1:	INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS AND PLACEMENT. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 2:	INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1704.3, ITEM 5B. ONLY A706 GRADE 60 STEEL SHALL BE WELDED <input checked="" type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): AWS-CWI
ITEM 3:	INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE <input type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 4:	VERIFYING USE OF REQUIRED DESIGN MIX. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 5:	AT TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE. MONITOR EMBEDDED SENSOR IS AT MASS CONCRETE <input type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CFTT, ACI-STT
ITEM 6:	INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES. <input type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 7:	INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 10:	VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POSTENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CFTT, ACI-STT
ITEM 11:	INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI

TABLE 1705.6 - INSPECTION OF SOILS

ITEM 1:	VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIRED BEARING CAPACITY. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/GE
ITEM 2:	VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/GE
ITEM 3:	PERFORM CLASSIFICATION AND TESTING OF CONTROLLED FILL MATERIALS. PERFORM SIEVE TESTS (ASTM D422 & D1140); ATTERBERG LIMIT TEST (ASTM D4318) AND MODIFIED PROCTOR TESTS (ASTM D1557) OF EACH SOURCE OF FILL MATERIAL. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/GE
ITEM 4:	VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF CONTROLLED FILL. TEST DENSITY OF EACH LIFT OF FILL BY NUCLEAR METHODS (ASTM D6938) OR SAND CONE (ASTM D1556). VERIFY EXTENT AND SLOPE OF FILL PLACEMENT. VERIFY COMPACTION OF FILL AND BACKFILL MATERIAL TO 90 PERCENT OF ASTM D 1557. TEST EACH LIFT AT RANDOMLY SELECTED LOCATIONS EVERY 1000 SQUARE FEET OF FILL OR 50 LINEAR FOOT OF WALL OR CONTINUOUS FOOTING, WHICHEVER IS GREATER. PERFORM A MINIMUM OF ONE TEST PER ISOLATED FOOTING. PERFORM 3 TEST MINIMUM PER LIFT. <input type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/GE
ITEM 5:	PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/GE

PRECAST CONCRETE

ITEM 1:	PLANT CERTIFICATION/QUALITY CONTROL PROCEDURES SCOPE: REVIEW PLANT OPERATIONS AND QUALITY CONTROL PROCEDURES <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 2:	MIX DESIGN SCOPE: INSPECT CONCRETE BATCHING OPERATIONS AND VERIFY COMPLIANCE WITH APPROVED MIX DESIGN <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 3:	MATERIAL CERTIFICATION SCOPE: VERIFY MATERIALS MEET CONTRACT DEMANDS. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.):
ITEM 4:	REINFORCEMENT INSTALLATION SCOPE: INSPECT SIZE, SPACING, POSITION AND GRADE OF REINFORCING STEEL. VERIFY THAT REINFORCING BARS ARE FREE OF FORM OIL OR OTHER DELETERIOUS MATERIALS. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 5:	CONNECTIONS/EMBEDDED ITEMS SCOPE: INSPECT FOR CONFORMANCE WITH CONTRACT DOCUMENTS. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.):
ITEM 6:	FORMWORK GEOMETRY SCOPE: INSPECT FORMWORK GEOMETRY FOR CONFORMANCE WITH CONTRACT DOCUMENTS. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.):
ITEM 7:	CONCRETE PLACEMENT SCOPE: INSPECT PLACEMENT OF CONCRETE. VERIFY THAT CONCRETE CONVEYANCE AND DEPOSITING AVOIDS SEGREGATION OR CONTAMINATION. VERIFY THAT CONCRETE IS PROPERLY CONSOLIDATED. <input type="checkbox"/> PERIODIC <input checked="" type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 8:	SAMPLING AND TESTING OF CONCRETE SCOPE: TEST CONCRETE COMPRESSIVE STRENGTH (ASTM C31 & C39, SLUMP (ASTM C143), AIR CONTENT (ASTM C231 or C173) AND TEMPERATURE (ASTM C1064) <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CFTT, ACI-STT
ITEM 9:	CURING AND PROTECTION SCOPE: INSPECT CURING, COLD WEATHER PROTECTION AND HOT WEATHER PROTECTION PROCEDURES. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): ACI-CCI, ICC-RCSI
ITEM 10:	ERECTED PRECAST ELEMENTS SCOPE: INSPECT ERECTION OF PRECAST CONCRETE INCLUDING MEMBER CONFIGURATIONS, CONNECTIONS, WELDING AND GROUTING. <input checked="" type="checkbox"/> PERIODIC <input type="checkbox"/> CONTINUOUS	AGENCY # (QUALIF.): PE/SE

SCHEDULE OF INSPECTION AND TESTING AGENCIES


THIS STATEMENT OF SPECIAL INSPECTIONS / QUALITY ASSURANCE PLAN INCLUDES THE FOLLOWING BUILDING SYSTEMS:

- SOILS AND FOUNDATIONS
- CAST-IN-PLACE CONCRETE
- PRECAST CONCRETE
- MASONRY LEVEL 1
- MASONRY LEVEL 2
- WOOD CONSTRUCTION
- MECHANICAL & ELECTRICAL SYSTEMS
- ARCHITECTURAL SYSTEMS
- STRUCTURAL STEEL
- COLD-FORMED STEEL FRAMING

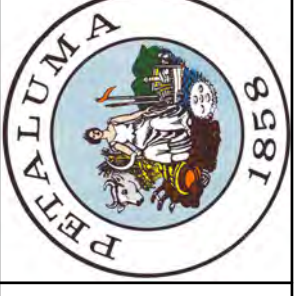
SPECIAL INSPECTION AGENCIES	FIRM AND CONTACT INFO.
1. SPECIAL INSPECTION COORDINATOR	TBD
2. INSPECTOR	TBD
3. INSPECTOR	TBD
4. TESTING AGENCY	TBD
5. TESTING AGENCY	TBD
6. OTHER	TBD

DATE: JUNE 24, 2022
DESIGNED BY: MD - Civil, MMM - Structural
DRAWN BY: CM
CHECKED BY: VT & SC

PROJECT NO.
C66501838



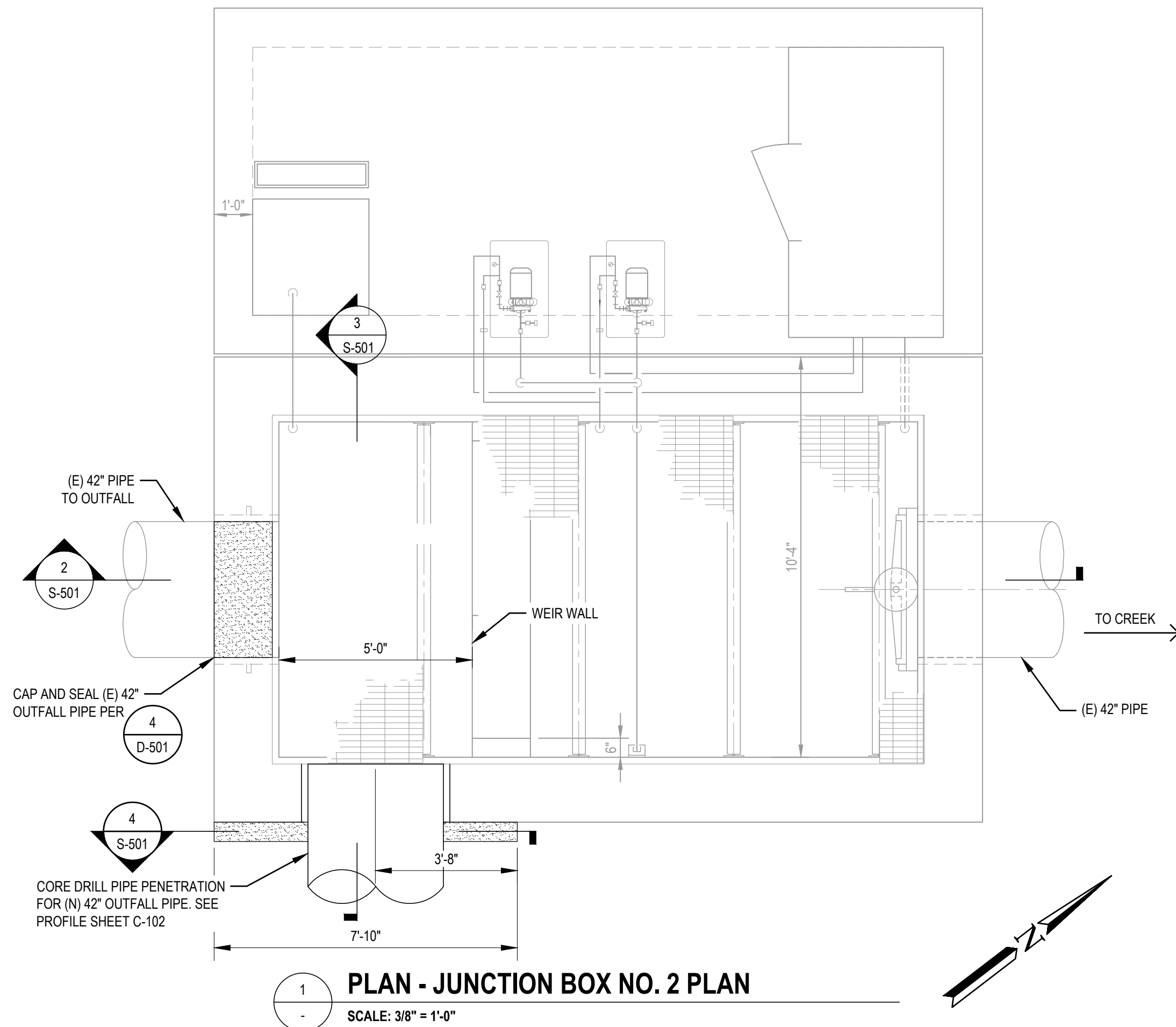
CITY OF PETALUMA
PUBLIC WORKS & UTILITIES
202 N. McDowell Blvd., PETALUMA, CALIFORNIA, 94954
PH. 707-778-4546 FAX. 707-778-4508



**ELLIS CREEK WATER RECYCLING FACILITY
OUTFALL RELOCATION PROJECT
STRUCTURAL SCHEDULE OF SPECIAL INSPECTIONS**

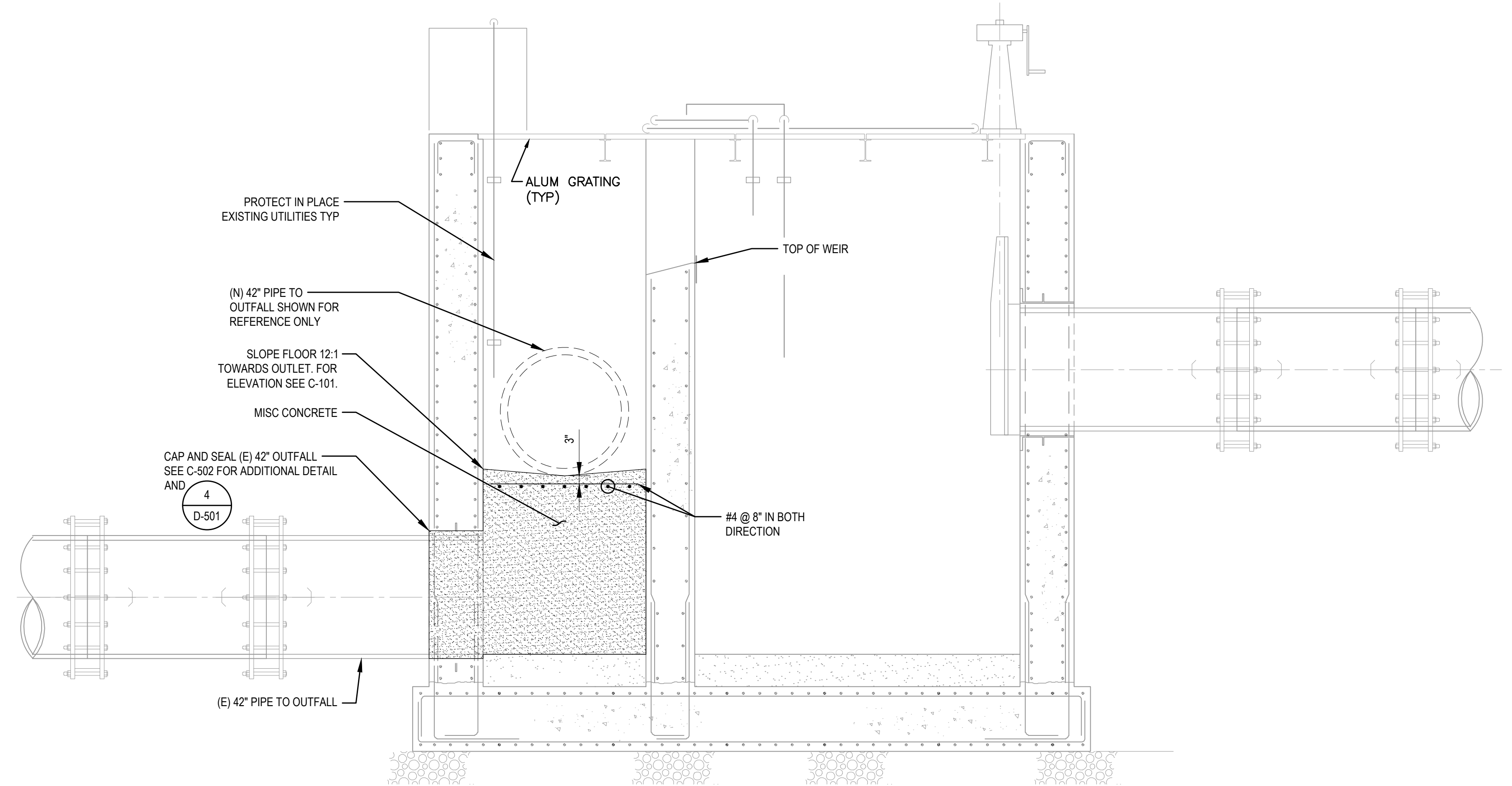
SHEET
S-002
13 of 15

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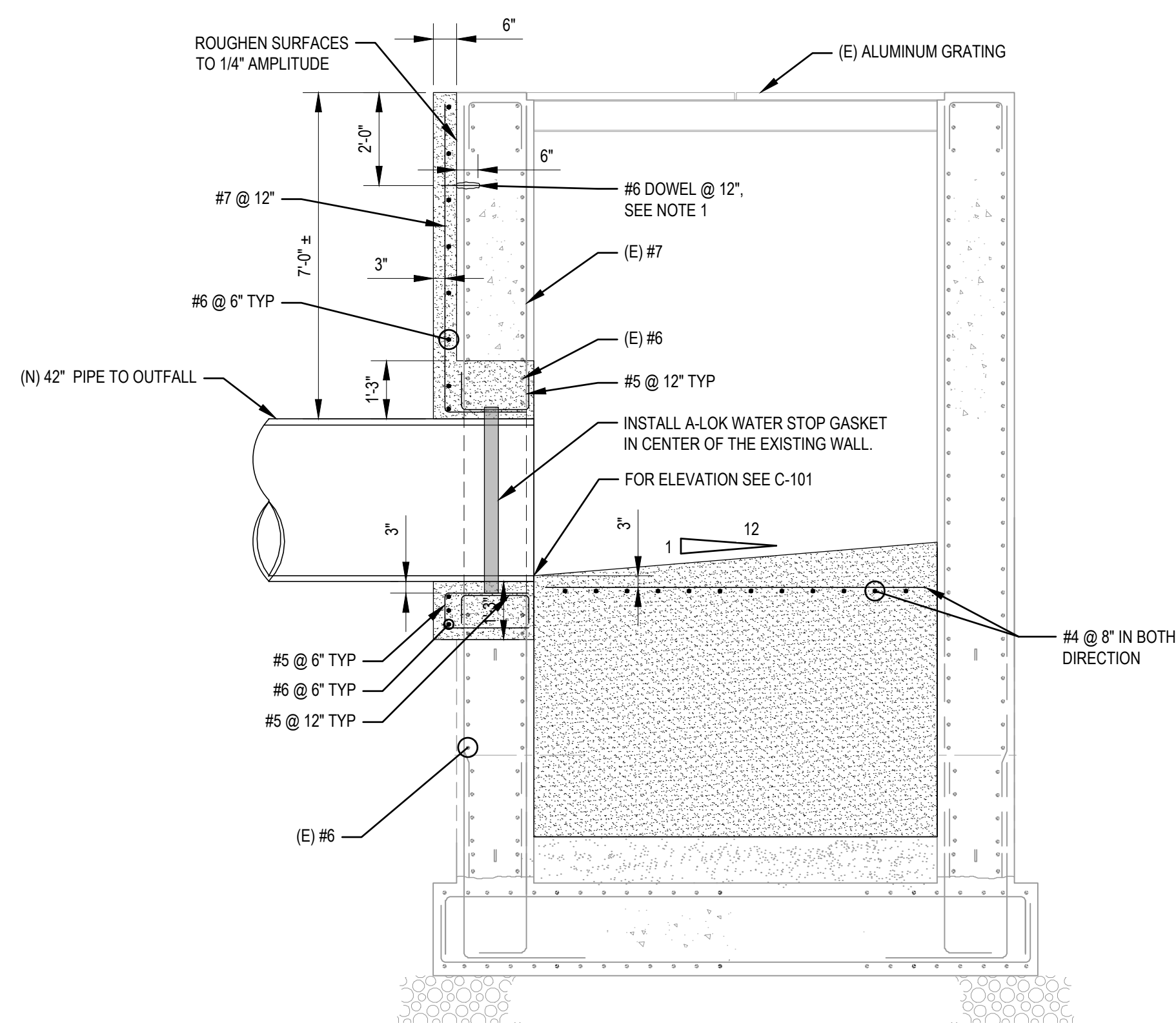
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SCALE: 3/8" = 1'-0"



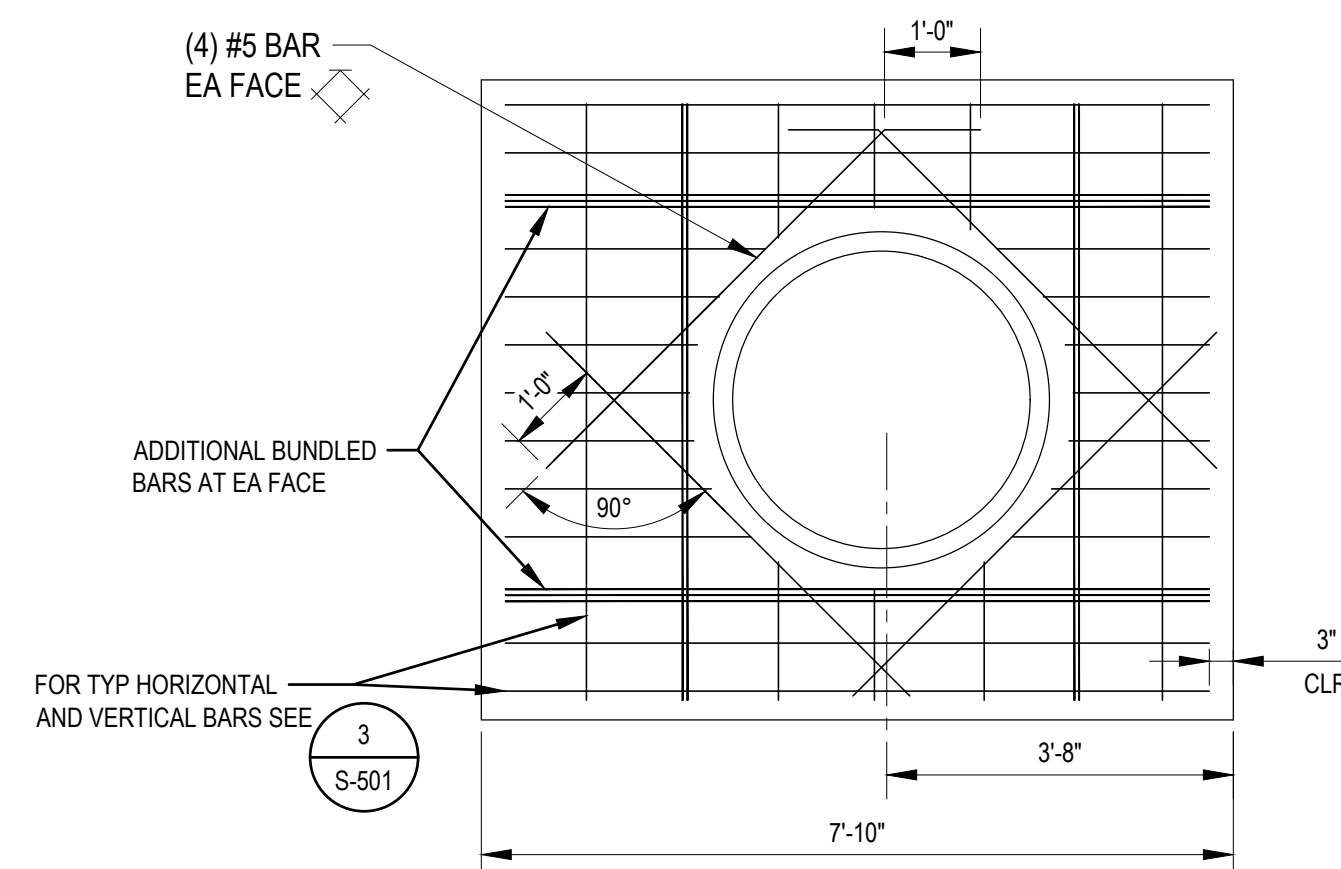
2 SECTION - JUNCTION BOX NO. 2

SCALE: 3/8" = 1'-0"



3 SECTION OF JUNCTION BOX NO. 2 AT NEW PIPE

SCALE: 3/8" = 1'-0"



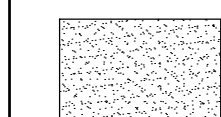
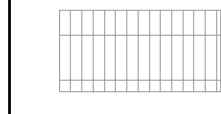

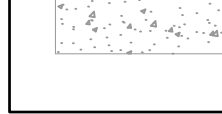
4 SECTION - JUNCTION BOX NO. 2

SCALE: 1/2" = 1'-0"

SHEET NOTES

- CHIP COVER TO LOCATE (E) REBAR. INSTALL DRILL AND BOND DOWELS AT A MINIMUM OF 2" CLEAR FROM (E) HORIZONTAL REBAR. USE HILTI RE 500V OR EQUIVALENT.
- SEE SHEET D-501 FOR ELEVATIONS AND AS BUILT DIMENSIONS.

LEGEND

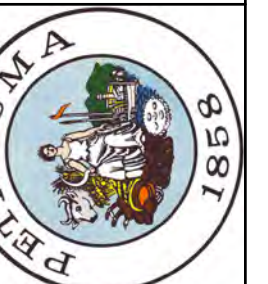
-  NEW CONCRETE
-  (E) ALUMINUM GRATING
-  (E) 12" COMPACTED ABC
-  (E) CONCRETE

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MMM - Structural
 DRAWN BY: CM
 CHECKED BY: VT & SC

PROJECT NO.
 C66501838



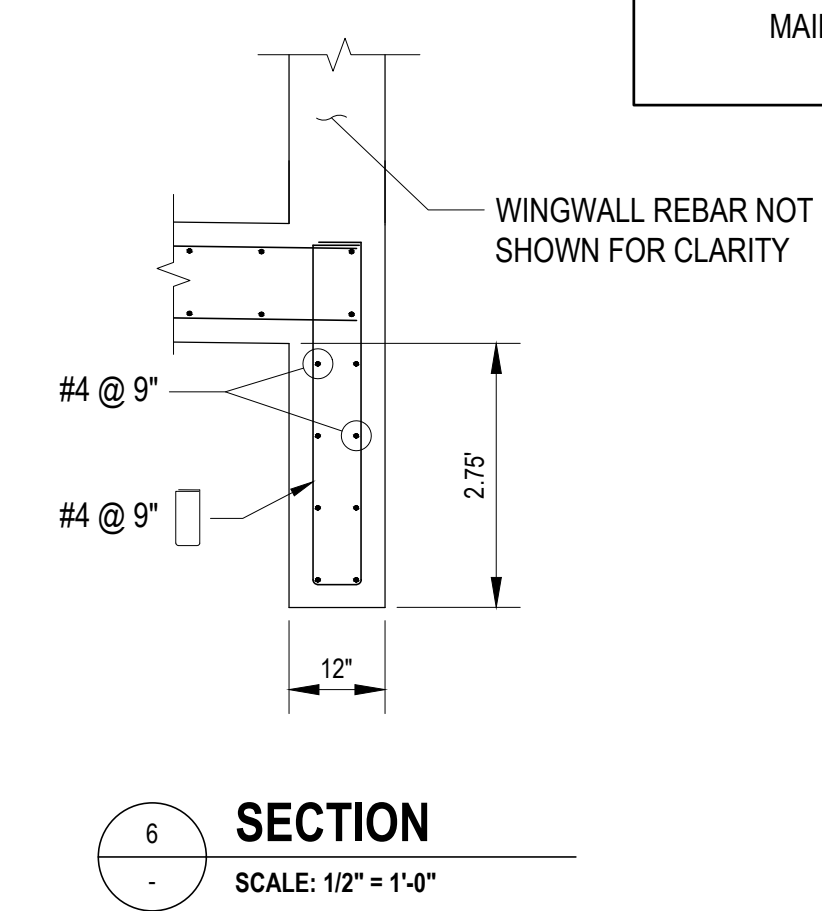
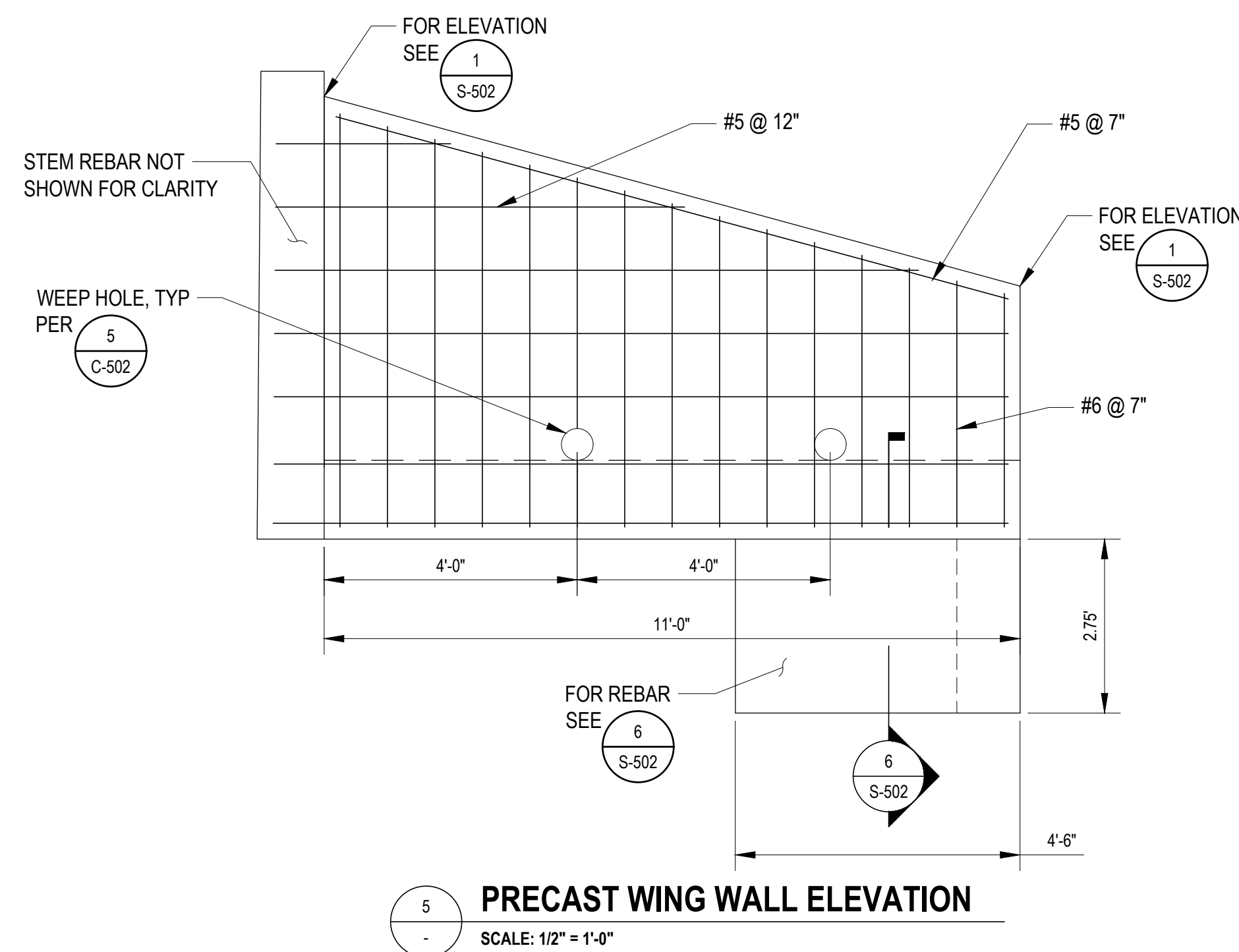
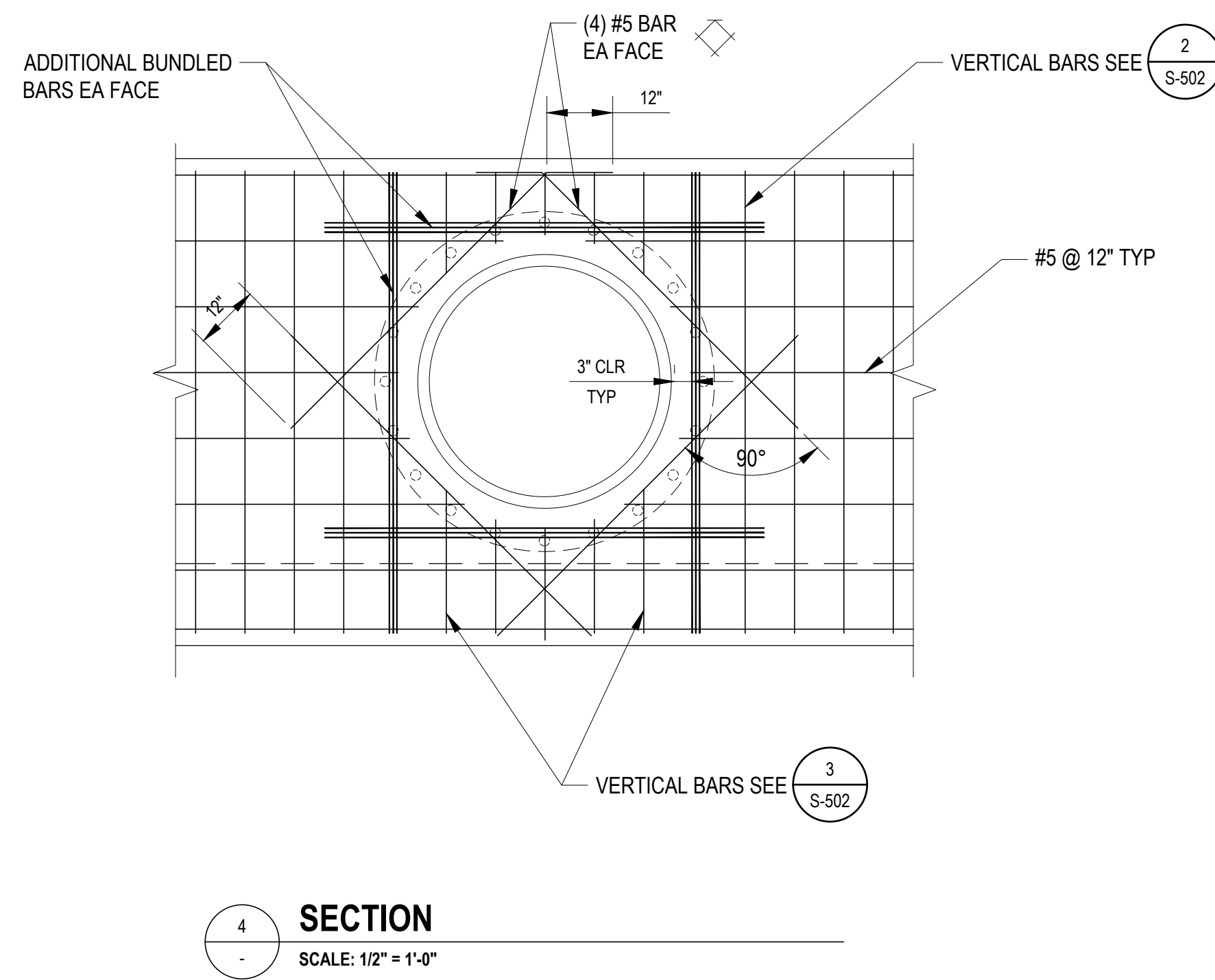
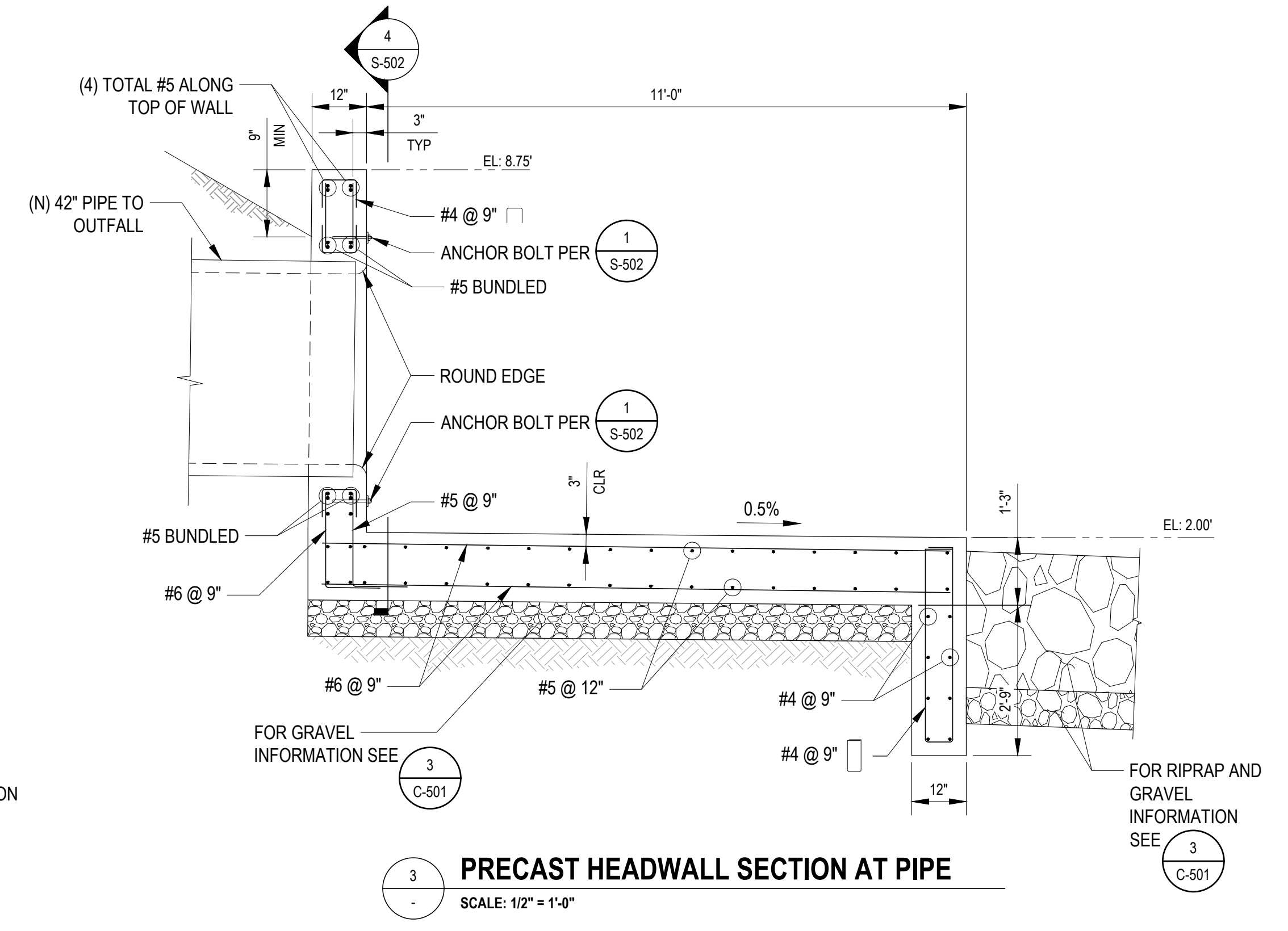
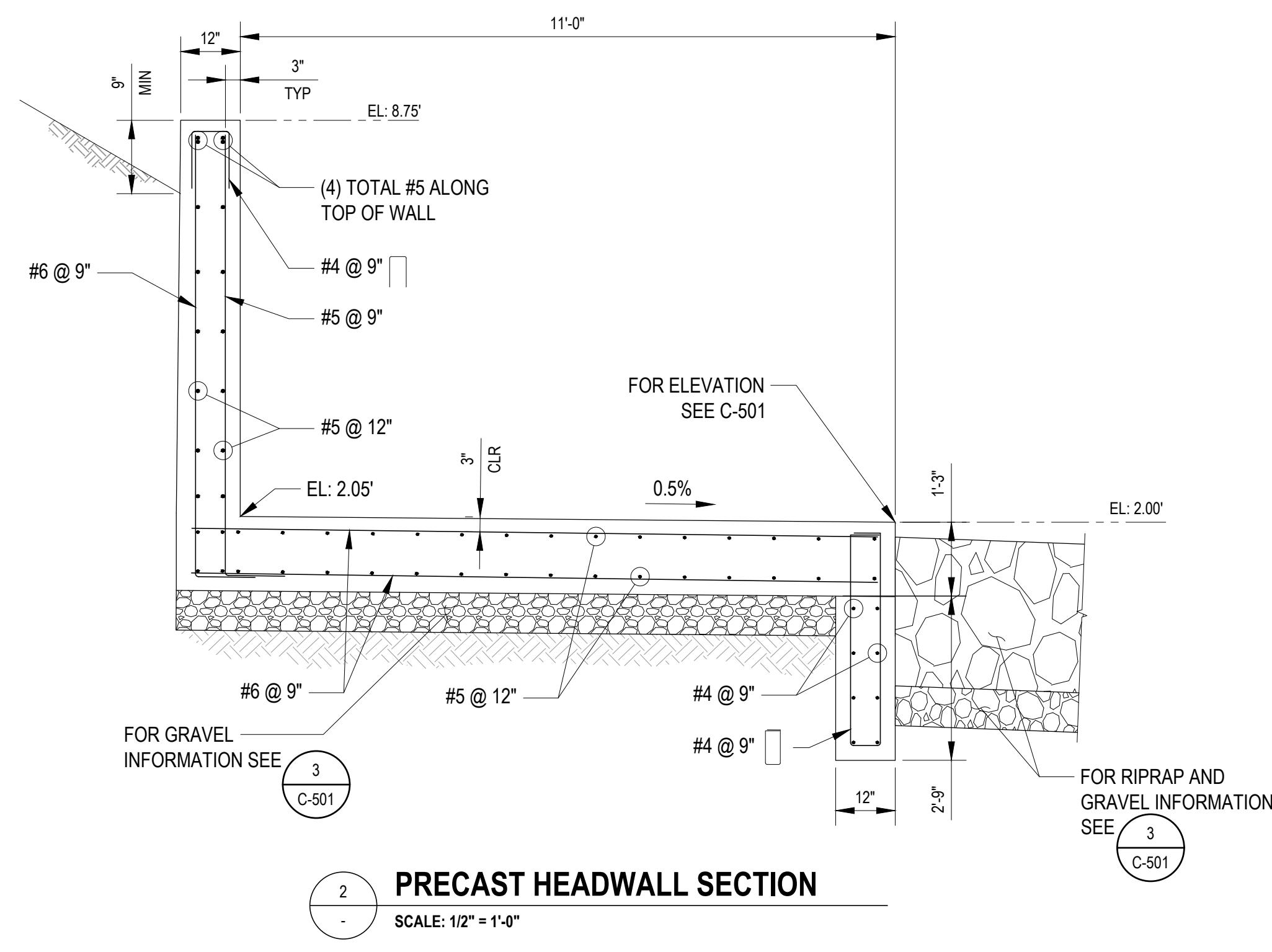
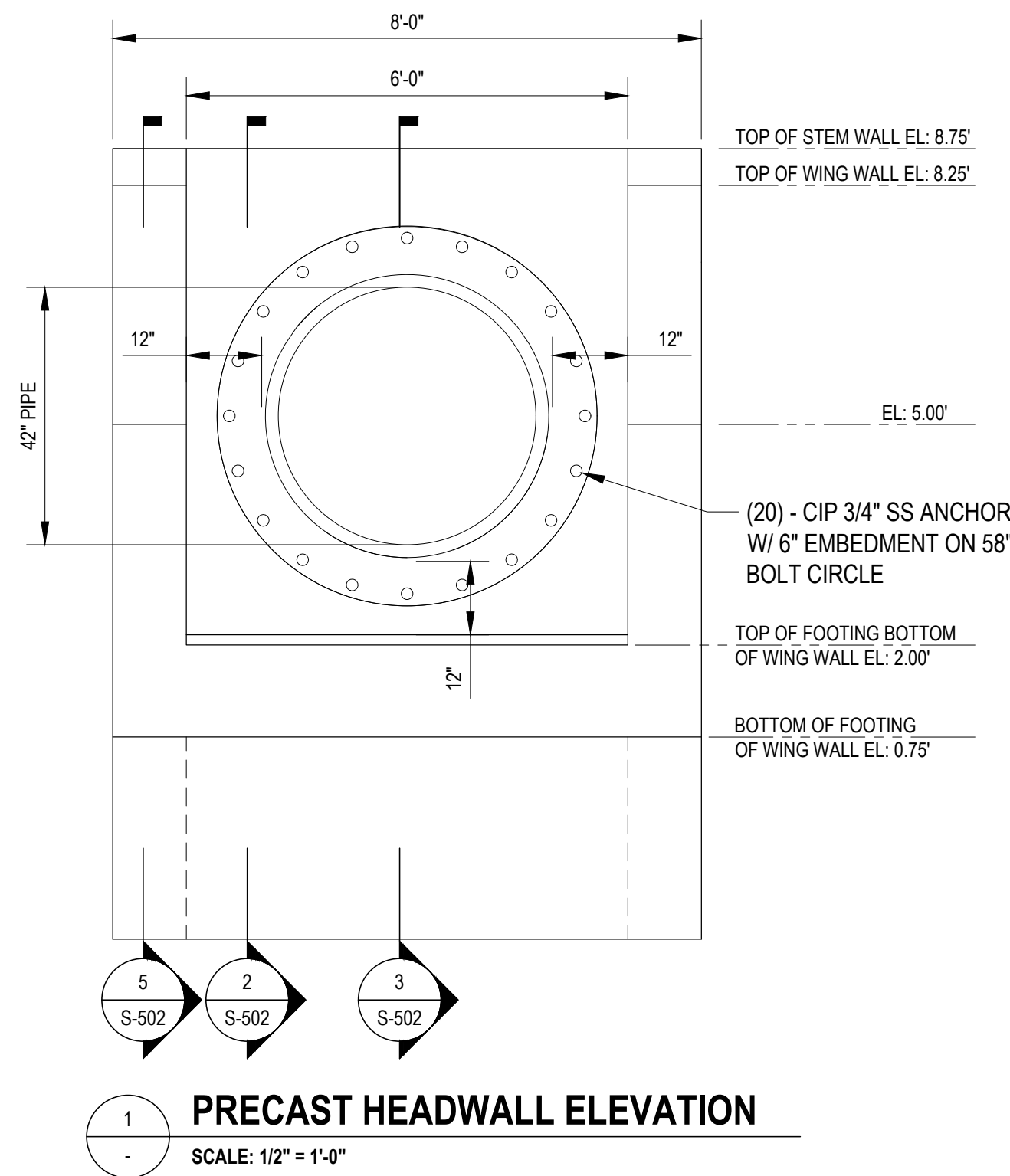
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ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 STRUCTURAL DETAILS 1 OF 2

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S-501

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SHEET NOTES

- CONTRACTOR HAS THE OPTION TO BUILD CIP HEADWALL ON SITE. SUITABLE CONDITIONS FOR PROPER INSTALLATION OF HEADWALL MUST BE MAINTAINED

DATE: JUNE 24, 2022
 DESIGNED BY: MD - Civil, MMM - Structural
 DRAWN BY: CM
 CHECKED BY: VT & SC

PROJECT NO.
 C66501838

REGISTERED PROFESSIONAL ENGINEER
 STATE OF CALIFORNIA
 CIVIL
 [Signature]

CITY OF PETALUMA
 PUBLIC WORKS & UTILITIES
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PETALUMA
 1855

**ELLIS CREEK WATER RECYCLING FACILITY
 OUTFALL RELOCATION PROJECT
 STRUCTURAL DETAILS 2 OF 2**

SHEET
S-502
 15 OF 15

FILE NAME: \\gharipg\p\US\Sana_Rosa\Projects\81112275\8\Digital_Design\CAD 2018\8\sheet11227516-S-502.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, June 27, 2022 - 9:02pm USER: cmaniazzi

SECTION VII
REFERENCES

Avoidance/Minimization Measures Committed to in Permit Applications

All construction-related activities performed will comply with the terms and conditions contained in the permits and approvals issued by the regulatory agencies. A City of Petaluma (City) project manager will coordinate with the contractor to ensure Project activities comply with the contract specifications, permits, and local, State, and Federal laws.

The following avoidance, minimization, and Mitigation Measures will be implemented to protect water quality, avoid indirect and direct impacts to jurisdictional waters, protect special-status species. Although not a covered project, the criteria and work windows outlined in *Proposed Additional Procedures and Criteria for Permitting Projects under a Programmatic Determination of Not Likely to Adversely Affect Select Listed Species in California* for the 2018 NLAA Program are utilized for certain activities such as the removal of the navigation structure, including creosote piles, and working within the Petaluma River.

Measures to Avoid and Minimize Impacts to Water Quality

Pile Removal (Existing Petaluma River Outfall)

When removing piles, the crane operator shall be experienced in pile removal. Piles will be removed slowly to minimize turbidity as well as sediment disturbance. The pulled pile shall be placed in a containment basin to capture any adhering sediment. This should be done immediately after the pile is initially removed from the water. The following pile removal methods may be utilized, depending on condition of the piles:

Vibratory Extraction (preferred option)

1. Extraction is the preferred method of pile removal. Vibratory extraction shall be employed first unless the pile is too decayed or short for the vibratory hammer to grip.
2. The vibratory hammer (a large mechanical device (5-16 tons)) is suspended from a crane by a cable and is activated to loosen the piling by vibrating as the piling is pulled up. The hammer is shut off when the end of the piling reaches the mudline. Vibratory extraction takes approximately 15 to 30 minutes per piling depending on piling length and sediment condition.
3. Operator will "Wake up" pile to break up bond with sediment. Vibrating breaks the skin friction bond between pile and soil and avoids pulling out a large block of soil – possibly breaking off the pile in the process. Pile shall then be removed slowly to allow sediment to slough off at, or near, the mudline.

Direct Pull (secondary option)

1. Piles would be wrapped with a choker cable or chain that is attached at the top to a crane. The crane pulls the piling directly upward, removing the piling from the sediment.
2. This method is optional if the contractor determines it to be appropriate for the substrate type, pile length, and structural integrity of the piling. Vibratory extractor must be attempted first unless there is risk of greater disturbance of sediments.

Cutting

1. Cutting is required if the pile breaks at or near the existing substrate and cannot be removed by other methods.
2. If a pile is broken or breaks during extraction, all of the methods listed below should be used to cut the pile.
 - i. Piles located in intertidal and shallow subtidal areas that are less than -10 feet deep MLLW shall be cut at least 2 feet below the mudline.
 - ii. In subtidal areas that are greater than -10 feet deep MLLW, piles shall be cut at least 1 foot below the mudline.
 - iii. Piles shall be cut off at lowest practical tide condition and at slack water. This is intended to reduce turbidity due to reduced flow and short water column through which pile must be withdrawn.
 - iv. No hydraulic jetting devices shall be used to move sediment away from piles.
 - v. Excavation of sediment in subtidal areas to expose broken piles shall be accomplished by divers using hand tools.
 - vi. Contractor shall provide the location of all the broken and cut piles using a GPS or similar device.

Properly Dispose of Creosote Piles and Handle Construction Residue

- Removed piles shall be lifted from the water without attempting to clean or remove any adhering sediment and placed in a barge or onshore such that all sediment and runoff is captured in a basin and not allowed to enter the water.
- If a piling breaks off above the mudline during removal, the loose piece of pile shall first be placed on a barge prior to removing the remaining pile.
- Piles shall be cut into short lengths to prevent re-use.
- Cut up piling, sediments, absorbent pads/boom, construction residue and plastic sheeting from containment basin shall be packed into a container and disposed at an approved upland facility.

Prevent Erosion and Sedimentation

The City shall prevent soil erosion and sedimentation during construction by developing and implementing an Erosion and Sediment Control Plan for the Project. The Plan will address how the Contractor will manage erosion and sediment control measures, general site and materials management, and inspection and maintenance. The Plan shall specifically address how all jurisdictional waters will be protected including the slough, marsh, and the Petaluma River. The following minimum measures shall be included in the Plan and incorporated into Project construction to reduce soil erosion and protect water quality.

- Erosion and sediment control measures will be in effect and maintained by the Contractor for the duration of construction.
- Fiber rolls or similar products will be utilized to reduce sediment runoff from disturbed soils.
- Storm drain inlets receiving storm water runoff will be equipped with inlet protection.

Prevent Increased Turbidity and Capture Debris

Demolition of Existing Outfall Structure

- If the tides allow, a sediment curtain shall be installed and utilized around the navigation and outfall structure in the Petaluma River during demolition. The curtain shall be inspected daily and maintained to function for its intended purpose.
- A floating debris barrier (or the sediment curtain installed in the Petaluma River) shall be placed as needed around and beneath the work areas to capture any debris that could accidentally be released from the work area. The debris boom shall be deployed and maintained to prevent any floating debris from escaping the work area. At the end of each workday, any floating debris within the barrier shall be removed.

Prevent Contaminants from Entering Marsh and Slough Area

- No construction material, including asphalt, concrete, wood, chemicals, or fuels shall be discharged directly or drained indirectly to the marsh and slough from the construction or staging areas.
- Construction equipment shall be cleaned and inspected prior to use. Mechanized construction equipment that will be used on the banks and adjacent to the slough will be cleaned and inspected daily prior to use. Servicing and refueling of vehicles and equipment shall be conducted a minimum of 50 feet from the Mean High Water of the marsh and/or slough at designated staging areas to avoid contamination through accidental drips and spills. If refueling or servicing of equipment within 50 feet of the edge of the marsh or slough is necessary, secondary containment and absorbent pads shall be used and spill response kits will be available to rapidly respond to accidental spills.
- Equipment shall be inspected daily by the operator for leaks or spills. If leaks or spills are encountered, they shall be cleaned up, and the cleaning materials shall be collected and shall be properly disposed. The source of the leak shall be identified prior to operating the equipment, and the project foreman shall document the resolution of the leak. Spills shall be cleaned up immediately using spill response equipment.
- Hazardous materials shall not be stored within 200 feet of the slough or Petaluma River.

Measures to Avoid and Minimize Impacts to Wildlife

Protect Black Rail

Construction in and adjacent to the marsh shall occur between September 1 and January 31, which is outside of the rail breeding season. This includes demolition of the emergency outfall and installation of the relocated outfall.

Protect Special-Status Fish Species

All in-water demolition within the Petaluma River shall occur within the work window of September 1 to October 15 to avoid potential impacts to special-status fish.

Protect Salt Marsh Harvest Mouse

- All construction personnel and onsite staff shall participate in an endangered species training program to be given by a qualified biologist. The training shall provide information about salt marsh harvest mouse, measures being implemented to avoid impacts to these

species, and procedures to follow should a salt marsh harvest mouse be encountered during work. Training shall cover the sensitive resources located in the area, how to avoid sensitive resources, environmental rules and regulations, and the importance of protecting environmental resources.

- Staging areas shall be located in a developed area of the project site at least 33 feet away from the edge of the marsh. If it is not practical to locate the staging area at least 33 feet from the marsh, the staging area shall be surrounded by a temporary exclusion fence. The fence type and installation shall follow the same specifications for the work area, as outlined in the next bullet.
- A qualified biologist familiar with salt marsh harvest mouse shall survey suitable habitat and flush mice from within the project footprint into adjacent marsh areas. Immediately after flushing, wetland vegetation within the footprint of construction should be removed using hand tools under the supervision of a qualified biologist. Disturbance to wetland vegetation should be limited to the minimum amount necessary to permit the activity to occur.
- Immediately after removal of the vegetation, temporary salt marsh harvest mouse exclusion fence shall be installed around the construction footprint and buried to a depth of 4 inches. The fence shall be constructed of heavy plastic sheeting curved outward at the top from the construction area to prevent mice from climbing or passing through. Fence height shall be at least 12 inches higher than adjacent vegetation. A qualified biologist shall inspect the fence daily, or as needed, to ensure there are no gaps or damage. Stakes shall be located on the inside of the exclusion fence (to deter mice from climbing stakes).
- Construction activities shall only occur during daylight between 30 minutes after sunrise and 30 minutes before sunset
- Any excavations left overnight shall be covered and inspected for wildlife the following morning or will have escape ramps placed inside.



**GEOTECHNICAL INVESTIGATION
PETALUMA ELLIS CREEK OUTFALL
PETALUMA, CALIFORNIA**

June 23, 2022

Job No. 1206.195

Prepared For:
GHD
2235 Mercury Way, Suite 150
Santa Rosa, California 95407

Attn: Mr. Matt Kennedy

CERTIFICATION

This document is an instrument of service, prepared by or under the direction of the undersigned professionals, in accordance with the current ordinary standard of care. The service specifically excludes the investigation of polychlorinated byphenols, radon, asbestos, or any other hazardous materials. The document is for the sole use of the client and consultants on this project. No other use is authorized. If the project changes, or more than two years have passed since issuance of this report, the findings and recommendations must be updated.

MILLER PACIFIC ENGINEERING GROUP
(a California corporation)

REVIEWED BY

A handwritten signature in black ink that reads 'Monica Thornton'.

Monica Thornton
Project Engineer



Scott Stephens
Geotechnical Engineer No. 2398
(Expires 6/30/23)

GEOTECHNICAL INVESTIGATION
PETALUMA ELLIS CREEK OUTFALL
PETALUMA, CALIFORNIA

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GEOTECHNICAL INVESTIGATION
PETALUMA ELLIS CREEK OUTFALL
PETALUMA, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of our Geotechnical Investigation for the City of Petaluma's Ellis Creek Outfall Pipe Project in Petaluma, California. The project site is located at the southeast corner of the existing treatment pond at the Ellis Creek Water Recycling Facility at 4400 Lakeville Highway, as shown on the Site Location Map, Figure 1.

Our work was performed in accordance with our Agreement for Professional Services authorized February 8, 2022. The purpose of our Geotechnical Investigation was to explore subsurface conditions and to develop geotechnical criteria for design and construction of the pump station improvements and pipe replacement. The scope of our services includes:

- Exploration of subsurface conditions with two borings located within the general vicinity of the pipe alignment.
- Geotechnical laboratory testing to estimate pertinent engineering properties of the soils encountered during our exploration.
- Evaluation of relevant geologic hazards including seismic shaking, settlement, and other hazards.
- Preparing geotechnical recommendations and design criteria related to temporary support of excavations, earthwork, new pavement sections, seismic design, and other geotechnical-related items.
- Preparation of this report which summarizes our subsurface exploration and laboratory testing programs, evaluation of relevant geologic hazards, and geotechnical recommendations and design criteria.

2.0 PROJECT DESCRIPTION

The project includes removing the existing emergency outfall pipe that is currently above ground and constructing a new 42-inch-diameter outfall pipe underground that will discharge into Ellis Creek. The outfall pipe will connect to the existing junction box at the facility. The proposed improvements are shown on the Preliminary Site Plan, Figure 2.

3.0 SITE CONDITIONS

3.1 Regional Geology

The project site lies within the Coast Ranges geomorphic province of California. Regional topography within the Coast Ranges province is characterized by northwest-southeast trending mountain ridges and intervening valleys that parallel the major geologic structures, including the San Andreas Fault System. The province is also generally characterized by abundant landsliding and erosion, owing in part to its typically high levels of precipitation and seismic activity.

The oldest rocks in the region are the sedimentary, igneous, and metamorphic rocks of the Jurassic-Cretaceous age (190- to 65-million years old) Franciscan Complex. Within Sonoma County, a variety of sedimentary and volcanic rocks of Tertiary (1.8- to 65-million years old) and

Quaternary (less than 1.8-million years old) age locally overlie the basement rocks of the Franciscan Complex. Tectonic deformation and erosion during late Tertiary and Quaternary time (the last several million years) formed the prominent coastal ridges and intervening valleys typical of the Coast Ranges province. The youngest geologic units in the region are Quaternary-age (last 1.8 million years) sedimentary deposits, including alluvial deposits which partially fill most of the valleys and colluvial deposits which typically blanket the lower portions of surrounding slopes.

The project site is located within lower-lying terrain just north of Ellis Creek and the Petaluma River. Regional geologic mapping (Wagner, 2002) indicates that the majority of the site is underlain by Bay Mud. A Regional Geologic Map and descriptions of the mapped geologic units are shown on Figure 3.

3.2 Surface Conditions

The existing outfall structure is located southeast of the intersection of Lakeville Highway and Browns Lane. There is an existing maintenance building located just north of the proposed new outfall structure. An emergency outfall structure is located in the creek just south of the asphalt parking area. The existing outfall structure and building are located on a levee that slopes down to the south towards the creek at approximately 2:1 (horizontal:vertical). The site is relatively flat with surface elevations along the proposed alignment ranging from about 2 to 12 feet.

3.3 Field Exploration and Geotechnical Laboratory Testing

We explored subsurface conditions near the proposed pump station on March 4, 2022, with two borings at the approximate locations shown on Figure 2. The borings were excavated using portable hydraulic drilling equipment to a maximum explored depth of 25.0 feet below the ground surface. The borings were logged by our Field Geologist and samples were obtained for classification and laboratory testing. We prepared boring logs based on soil descriptions in the field, as well as visual examination and testing of the soil samples in our laboratory. The boring logs are presented in Appendix A.

Laboratory testing of select soil samples were performed in general accordance with the applicable ASTM standards and included determination of moisture content, dry density, unconfined compressive strength, sieve analysis, percent passing the #200 sieve, and plasticity index. The results of the moisture content, dry density, unconfined compressive strength, and percent passing the #200 sieve are presented on the boring logs. The results of the sieve analysis and plasticity index are presented on Figures A-7 and A-8, respectively. The laboratory testing program is discussed in further detail in Appendix A.

3.4 Reference Subsurface Exploration

Moore and Taber previously explored the subsurface conditions at the site in 1971 and 1981, with four soil borings. Harding Lawson also performed borings in 1995. Fugro West performed borings in May 2002. Harza performed one CPT in April 2001. The approximate locations of the reference borings are shown on the site plan in Appendix B. The boring logs are presented in Appendix B.

3.5 Subsurface Conditions and Groundwater

Based on our field exploration, subsurface conditions are generally consistent with geologic mapping. Boring 1 encountered approximately 11 feet of silty sand with gravel fill over Bay Mud to 25.0-feet below the ground surface. We had to move the location of Boring 1 multiple times due to encountering concrete in one location which could be an abandoned utility and caving gravels in another location which is consistent with utility trench backfill. Boring 2 encountered approximately 7 feet of clay with sand fill over Bay Mud to 21.5 feet below the ground surface.

The fill encountered in our borings was heterogeneous and contains variable amounts of clay, silt, sand, and gravel. While not directly observed, the fill may also contain cobbles, boulders, wood, organic material, and other debris which could not be retrieved within the samples or detected by the relatively small diameter boring. The Bay Mud consists of very soft to soft clayey silt of high plasticity and was encountered to the maximum explored depths of 25.0 and 21.5-feet below the ground surface in Borings 1 and 2.

In general, subsurface conditions are divided into two categories; the levee embankment fill and the underlying marsh deposits and deep alluvial soils; The levee embankment fill is primarily compacted sandy clay and clayey sand with gravel, but also contains localized abandoned underground pipes and utilities that appear to have loose gravel backfill around and above the utilities. The underlying marsh and alluvial soils are composed of the upper 15 feet of soft, compressible silty clay with organics (Bay Mud) overlying medium stiff to stiff clays and medium dense to dense sand alluvial soils in excess of 80 feet deep.

Groundwater was encountered in Boring 1 at 5.0 feet and in Boring 2 at 14.5 feet below the ground surface during our exploration. Because the boring was not left open for an extended period of time, a stabilized depth to groundwater may not have been observed. Groundwater elevations fluctuate seasonally, and groundwater levels will likely be near the surface during periods of intense rainfall and/or high tides.

4.0 GEOLOGIC HAZARDS

This section summarizes our review of commonly considered geologic hazards and discusses their potential impacts on the planned improvements. The primary geologic hazards which could affect the proposed development include strong seismic ground shaking, settlement due to consolidation of the soft Bay Mud, corrosive soils, and high groundwater conditions. Other geologic hazards are judged less than significant with regard to the proposed project. Each significant geologic hazard considered is discussed in further detail in the following paragraphs.

4.1 Seismic Shaking

The project site will likely experience seismic ground shaking similar to other areas in the seismically active Bay Area. The intensity of ground shaking will depend on the characteristics of the causative fault, distance from the fault, the earthquake magnitude and duration, and site-specific geologic conditions.

While a site-specific seismic hazard analysis is beyond the scope of our work for this project, it should be noted that the potential for strong seismic shaking at the project site is high. Due to their proximity and historic rates of activity, the Rodgers Creek and San Andreas Faults present the highest potential for severe ground shaking. The significant adverse impact associated with

strong seismic shaking is potential damage to the new pipelines and related improvements. Measures to mitigate the effects of ground shaking should, as a minimum, include using flexible connections and designing any new structures to resist seismic loads as discussed in Section 5.1.

4.2 Liquefaction and Related Effects

Liquefaction refers to the sudden, temporary loss of soil strength during strong ground shaking. This phenomenon can occur in saturated, loose, granular deposits subjected to seismic shaking. Recent advances in liquefaction studies indicate that liquefaction can occur in granular materials with relatively high fines content provided the fines exhibit a plasticity index less than 7. Liquefaction can result in flow failure, lateral spreading, ground movement, settlement, and other related effects. Buried pipelines embedded within liquefied soils may also experience uplift due to buoyancy.

Geologic mapping and the results of our subsurface exploration indicate the project site is underlain by deposits of Bay Mud which are not susceptible to liquefaction. Although some sand and gravel were encountered within the overlying fill, these soils generally contain relatively high fines content and are located near or above the anticipated groundwater level. Deeper alluvial sands are dense and/or contain a high clay content and do not appear susceptible to liquefaction. Therefore, we judge the likelihood of damage to the outfall due to liquefaction is low.

4.3 Settlement

Significant settlement can occur when new loads are applied to soft, compressible soils such as the Bay Mud that exists beneath the project site. The rate and magnitude of potential settlements are dependent on the new loads that are applied, the thickness of compressible material and the inherent compressibility properties of the Bay Mud. We anticipate loads associated with the new pipeline and headwall structure will generally be roughly balanced by the soil that is removed during excavation and construction. This may not be the case for pipeline excavations that extend more than a several feet into the underlying Bay Mud or for the outfall structure is a significant portion is constructed above existing grades and the weight of the structure exceeds the weight of excavated soils.

Construction of new below-grade structures may reduce surface loading and future long-term settlement near the structure, and therefore some minor differential settlements may occur between new structures and the surrounding pavement/grades. Minimum mitigation measures should include minimizing the extent of the excavation and required backfill to reduce the potential for new loads associated with compacted backfill. Lightweight backfill materials should be considered for excavations that extend more than three feet into the Bay Mud. Deeper foundation support such as helical piles that extent through the Bay Mud could be used to support the outfall structure if needed.

4.4 Corrosive Soils

Corrosive soil can damage buried metallic structures, cause concrete spalling, and deteriorate rebar reinforcement. We performed soil corrosion tests on representative samples of near-surface site soils to evaluate pH, electrical resistivity, chloride, and sulfate contents. These laboratory test results are presented on Figure A-9.

The results of our corrosivity testing indicate the upper soil layers in the creek channel have a pH of 6.55, a chloride and sulfate concentration of 7,950 and 2,625 parts per million (ppm), respectively. Per Caltrans Corrosion Guidelines (2015) a soil is considered corrosive if the pH level is less than 5.5, the chloride concentration is greater than 500 ppm, and/or the sulfate concentration is 2,000 ppm or greater. We therefore judge there is a moderate to high risk of damage to new buried facilities and corrosion should be considered during design of the site improvements.

Minimum mitigation measures should include designing concrete structures in accordance with applicable durability requirements outlined in ACI 318. Metallic components should incorporate protective coatings or other measures aimed at improving corrosion resistance. A qualified corrosion engineer should be retained to provide additional mitigation measures as required.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our subsurface exploration, we judge that the proposed outfall improvements are feasible from a geotechnical standpoint. Primary geotechnical considerations for the project include excavation through variable geologic conditions which include soft Bay Mud; providing appropriate temporary support for excavations; providing for proper bedding and trench backfill; and minimizing the extent of excavation and associated backfills for new below-grade structures that are underlain by Bay Mud. Additional discussion and recommendations addressing these, and other considerations are presented in the following sections.

5.1 Seismic Design

Minimum mitigation of ground shaking includes seismic design of new structures in conformance with the provisions of the most recent edition (2019) of the California Building Code. The magnitude and character of these ground motions will depend on the particular earthquake and the site response characteristics. Based on the interpreted subsurface conditions and proximity of the Rodgers Creek and San Andreas Faults, we recommend the CBC coefficients and site values shown in Table 1 be used to calculate the design base shear of the new improvements as applicable.

Per ASCE 7-16 Section.11.4.8, a Site-Specific Ground Motion Hazard Analysis shall be performed in accordance with ASCE 7-16 Section 21.2 on sites classified as a "Site Class E" if the S_1 value is greater than or equal to 0.2 g. The S_1 value for the site conditions and location is 0.66 g; therefore, we performed a Site-Specific Ground Motion Hazard Analysis as presented in Appendix C and the results are presented below on Table 1.

Table 1 – 2019 California Building Code Seismic Design Criteria

Parameter	Design Value
Site Class	E
Site Latitude	38.2147°N
Site Longitude	-122.5748°W
Spectral Response (short), S_S	1.73 g
Spectral Response (1-sec), S_1	0.66 g
Spectral Response (Short), S_{MS}	1.68 g
Spectral Response (1 sec), S_{M1}	3.36 g
Design Spectral Response (short), S_{DS}	1.12 g
Design Spectral Response (1 sec), S_{D1}	2.24 g
MCE_G PGA adjusted for Site Class, PGA_m	0.801 g

Reference: SEAC/OSHPD Seismic Design Maps accessed on March 28, 2022.

5.2 Earthwork

Earthwork for the outfall improvements should be performed in accordance with the following recommendations:

5.2.1 Excavations

Excavations for the outfall improvements will generally encounter fill material consisting of medium stiff sandy clays and medium dense clayey sand (with localized areas of loose sand and gravels around abandoned and existing utilities) over soft Bay Mud. The backfill soils encountered around and below the existing pipelines and outfall structure are relatively permeable materials which may need to be dewatered prior to construction.

In unsupported excavations, the sandy and gravelly fill soils will be susceptible to flowing below groundwater and running to fast raveling above groundwater. The Bay Mud will be susceptible to squeezing. Definitions of the various ground behaviors are presented in the Tunnelman’s Ground Classification for Soils, Figure 5. In accordance with Cal-OSHA soil type designations, the fill and Bay Mud are considered “Type C” soils.” Temporary support for excavations should be installed prior to or during excavation to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring and temporary support of excavations is discussed in further detail in Section 5.3.

Based on our subsurface exploration, we judge the majority of site excavation can be performed with typical equipment, such as medium-size excavators.

5.2.2 Trench Bottom Stabilization

Based on planned pipeline invert depths and the fill thicknesses observed during our subsurface exploration, we anticipate the bottom of excavations for the new outfall pipe will extend through the fill soils and into the underlying Bay Mud. In areas where excavations extend below the top of the Bay Mud or where trench bottoms are soft, loose, or otherwise unstable, we recommend the trench bottoms be overexcavated a minimum of 12 inches below the planned pipe invert and backfilled with drain rock. The drain rock should be completely wrapped with a geotextile filter fabric consisting of Mirafi FW300 or an approved equivalent.

5.2.3 Fill Materials

Unless otherwise recommended by the City of Petaluma or the pipe manufacturer, pipe bedding and embedment materials should consist of well-graded sand with 90 to 100 percent of particles passing the No. 4 sieve and no more than 5 percent finer than the No. 200 sieve. Provide the minimum bedding thickness beneath the pipe in accordance with the manufacturer’s recommendations (typically 3 to 6 inches).

Fill materials used for pipe backfill should consist of non-expansive materials that are free of organic matter, have a Liquid Limit of less than 40 (ASTM D 4318), a Plasticity Index of less than 20 (ASTM D 4318), and have a minimum R-value of 20 (California Test 301). The fill material should contain no more than 50 percent of particles passing a No. 200 sieve and should have a maximum particle size of 4 inches. Some of the onsite fill soils may be suitable for re-use as trench backfill. The Bay Mud is not suitable for use as backfill and should be removed from the site.

In areas in which the pipe invert elevation is greater than 3 feet below the top of Bay Mud, we recommend using lightweight fill for backfilling to minimize new loads and the potential for settlement. The lightweight fill should be placed up to the top of Bay Mud and should consist of naturally occurring volcanic rock with a maximum unit weight of 65 pounds per cubic foot, minimum Durability Index of 35 (California Test 229), minimum R-Value of 50 (California Test 301) and should meet the gradation requirements outlined below in Table 2. The lightweight fill should be completely wrapped with a geotextile filter fabric consisting of Mirafi FW300 or an approved equivalent.

Table 2 – Gradation Requirements for Lightweight Fill

Sieve Size	Percentage Passing
1-1/2 inch	100
1 inch	95 to 100
3/4 inch	90 to 100
3/8 inch	15 to 85
No. 4	0 to 9

Reference: Gradation to be determined in conformance with the requirements of California Test 202, except shaking in the sieves must be limited to 5 minutes.

5.2.4 Fill Placement and Compaction

Fill and backfill materials should be moisture conditioned to near the optimum moisture content prior to compaction. Properly moisture conditioned fill materials should subsequently be placed in loose, horizontal lifts of 8 inches-thick or less and uniformly compacted to at least 90 percent relative compaction. In pavement areas, the upper 12 inches of backfill should be compacted to at least 95 percent relative compaction. The maximum dry density and optimum moisture content of fill materials should be determined in accordance with ASTM D1557. Where lightweight fill is used, the fill should be placed in loose, horizontal lifts which are lightly compacted using vibratory equipment to avoid crushing of the individual aggregate pieces.

5.3 Foundation Design

Interconnected shallow foundations may be utilized to support the structures provided they are designed to withstand the predicted settlements, determined once the structural loads are known, or the site is “load balanced” with lightweight fill. As with any new construction, and especially with a Bay Mud site, small differences in settlements should be anticipated as underlying soils react to new loads. Recommended design criteria for new shallow footing foundations are provided in Table 3.

Table 3 – Shallow Continuous Footing Design Criteria

Parameter	Design Value
Minimum Width ¹	12 inches
Minimum Embedment ²	12 inches
Allowable Bearing Pressure ³	500 psf
Base Friction Coefficient	0.25
Lateral Passive Resistance ⁴	200 pcf

Notes:

- (1) Size foundations to maintain uniform bearing pressures, i.e., size footing widths to design loads instead of uniform foundation widths.
- (2) Maintain minimum 7-foot horizontal confinement between base of footing and nearest slope face.
- (3) Dead plus live loads. May increase by 1/3 for total design loads, including wind and seismic.
- (4) Equivalent fluid pressure in rock.

Alternatively, deep foundations may be used to support structures, if desired. Suitable deep foundation options at the site could include helical piles, drilled piers, driven piles, auger-cast piers, or torque-down piles. Traditional drilled piers are not recommended as they would likely casing due to the high groundwater conditions and “squeezing”, dewatering, and disposal of Bay Mud soils. With adequately embedded foundations into the firm alluvial soils, structure settlements should be small, less than 1-inch. Some differential settlement between the structure and exterior grade should be expected due to on-going settlement and settlement associated with grading required to achieve the exterior finished grades. In areas where future settlement is expected, deep foundations will experience “down drag” effects as the underlying soils settle inducing negative skin friction on the pile.

Driven Piles

Driven piles are precast steel or concrete piles driven with a large pile hammer until a suitable driving resistance and bearing capacity is achieved. A couple disadvantages with driven piles are that the deeper alluvial soils are interbedded sand and clays with different strengths. The depth to achieve full pile capacity (70 tons) could vary across the site. Precast piles can be costly to extend or cut-off if needed. Driven piles will also cause significant noise and vibrations, and therefore are not the best suited option for the site conditions.

Auger Cast Piles

Auger Cast Piles (ACP) are installed by rotating a continuously flight hollow shaft auger in to displace the soil to a specified depth. High strength cement grout is pumped under pressure through the hollow shaft as the auger is slowly withdrawn. Reinforcing is installed while the cement grout is still fluid, or in the case of full-length single reinforcing bars, through the hollow shaft of the auger prior to the withdrawal and grouting process. The resulting reinforced grout column hardens and forms an auger cast pile. Capacities on the order of about 70-tons can be achieved at depths of about 50-60 feet

Helical Piles (HP) or Torque Down Piles (TDP)

Helical or torque down piles are full displacement, grout or concrete-filled steel pipe piles with a lead section and multiple helixes or a tapered closed ended conical tip with a helix to aid in installation. HP or TDP are screwed into the ground and the steel shaft displaces the surrounding soil as it advances. HP and TDP achieve vertical capacity through both skin friction between the soil and the steel pipe and the end bearing of the end tip. Since HP and TDP are displacement piles, minor soil spoils are generated during construction. Additionally, the piles are drilled into the ground, not driven, therefore the construction process is relatively quiet and excess vibrations are not generated. Capacities on the order of about 70-tons can be achieved at depths of about 50-60 feet for TDP, and about 30 to 40 kips at 50 feet for HP.

We should coordinate with the Project Structural Engineer to develop specific deep foundations design criteria for the preferred deep foundation type. Load testing should be performed on indicator piles to confirm the anticipated subsurface conditions and verify the design capacity has been achieved.

5.4 Retaining Walls

New retaining walls should be designed using the foundation design criteria presented in Section 5.3 and the lateral earth pressures shown in Table 4. These values may be used for both the headwall and junction box design.

Table 4 – Lateral Earth Pressures for Retaining Wall Design

Parameter	Design Value
Lateral Active Pressure (Drained) ¹	60 pcf
Lateral Active Pressure (Undrained) ¹	90 pcf
Lateral Passive Pressure (Drained) ²	200 pcf
Allowable Bearing Pressure (Bay Mud Below 10')	500 psf
Allowable Bearing Pressure (Levee Fill 0-10') ³	3,000 psf
Base Friction Coefficient	0.25
Seismic Surcharge ^{4,5}	10 X H
Horizontal Acceleration Factor	0.31
Active Pressure Coefficient	0.33
Active Dynamic Pressure Coefficient	0.20
Passive Pressure Coefficient	2.7
Passive Dynamic Pressure Coefficient	4.0
Vehicle Surcharge ^{5,6}	100 psf

Notes:

- (1) Triangular pressure distribution. Equivalent fluid pressure for 2:1 (horizontal:vertical) sloping backfill conditions. Can be reduced to 40 pcf for drained level backfill and 80 pcf for undrained level backfill. Interpolate for intermediate slopes.
- (2) Triangular pressure distribution. Equivalent fluid pressure for soft to medium stiff clayey (Bay Mud) soils and level backfill.
- (3) Bearing pressure based on the existing junction box dimensions of 11-feet wide by 16.5-feet long by 19-feet deep.
- (4) H = Total height of wall (in feet). The factor of safety for short-term seismic conditions can be reduced to 1.1 or greater.
- (5) Uniform rectangular pressure distribution in psf.
- (6) Vehicle surcharge should be applied to design in the upper five feet of all walls supporting vehicle-loaded areas such as driveways and parking areas.

All walls higher than 3-feet require drainage to prevent the build-up of hydrostatic pressure. A typical retaining wall drain detail is shown on Figure 6. Retaining wall backfill should be compacted in accordance with the recommendations presented in Section 5.2 of this report.

5.5 Temporary Support of Excavations

Temporary support of excavations will be required to ensure the safety of workers and to reduce the potential for trench failure and damage to surrounding areas. Shoring types may include trench boxes or shields, driven sheet piles, vertical hydraulic shores, or other systems. While a variety of systems are available, shoring that applies positive pressure to the side walls of the excavation will be more effective in controlling ground movements and reducing the risk of damage to nearby utilities and structures.

The selected support system should be designed to resist lateral pressures from earth and construction surcharge loads. Watertight shoring systems (e.g., interlocking sheet piles) which do

not allow for drainage should also be designed to resist hydrostatic pressures. As a minimum, shoring systems should be designed based on the criteria provided in Table 5.

Table 5 – Shoring Design Criteria

Parameter	Design Value
Active Earth Pressure, Unrestrained ¹	45 pcf
Active Earth Pressure, Restrained ²	35 x H psf
Ultimate Passive Resistance, Bay Mud ¹	250 pcf
Minimum Surcharge Pressure ^{2,3}	125 psf

Notes:

- (1) Equivalent fluid pressure. Level backfill.
- (2) Rectangular distribution, H is wall height in feet
- (3) Apply to upper 10 feet of trench shoring. Surcharge load to be adjusted at the discretion of the Contractor's shoring designer.

Temporary dewatering will be required where excavations extend below the groundwater table. While various systems are available, dewatering would most likely consist of sumps or wells spaced as needed to keep the groundwater level below the excavation bottom. The selection, design, installation, monitoring, and removal of temporary shoring and dewatering should be the responsibility of the Contractor in accordance with their means and methods. The Contractor should be required to submit dewatering plans for review prior to implementation

6.0 SUPPLEMENTAL GEOTECHNICAL SERVICES

We must review the plans and specifications when they are nearing completion to confirm that the intent of our recommendations has been incorporated and to provide supplemental recommendations as needed. During construction, we must inspect geotechnical items relating to earthwork. We should observe trench excavations, proper moisture conditioning of soils, fill placement and compaction, and other geotechnical-related work items.

7.0 LIMITATIONS

We believe this report has been prepared in accordance with generally accepted geotechnical engineering practices in Sonoma County at the time the report was prepared. This report has been prepared for the exclusive use of GHD, the City of Petaluma and/or their assignees specifically for this project. No other warranty, expressed or implied, is made. Our evaluations and recommendations are based on the data obtained during our subsurface exploration program and our experience with soils in this geographic area.

Our approved scope of work did not include an environmental assessment of the site. Consequently, this report does not contain information regarding the presence or absence of toxic or hazardous wastes.

The evaluations and recommendations do not reflect variations in subsurface conditions that may exist between boring locations or in unexplored portions of the site. Should such variations become apparent during construction, the general recommendations contained within this report will not be considered valid unless MPEG is given the opportunity to review such variations and revise or modify our recommendations accordingly. No changes may be made to the general recommendations contained herein without the written consent of MPEG.

We recommend that this report, in its entirety, be made available to project team members, contractors, and subcontractors for informational purposes and discussion. We intend that the information presented within this report be interpreted only within the context of the report as a whole. No portion of this report should be separated from the rest of the information presented herein. No single portion of this report shall be considered valid unless it is presented with and as an integral part of the entire report.

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SITE COORDINATES

LAT. 38.2150°
 LON. -122.5746°

SITE LOCATION

N.T.S.



REFERENCE: Google Earth, 2022



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SITE LOCATION MAP

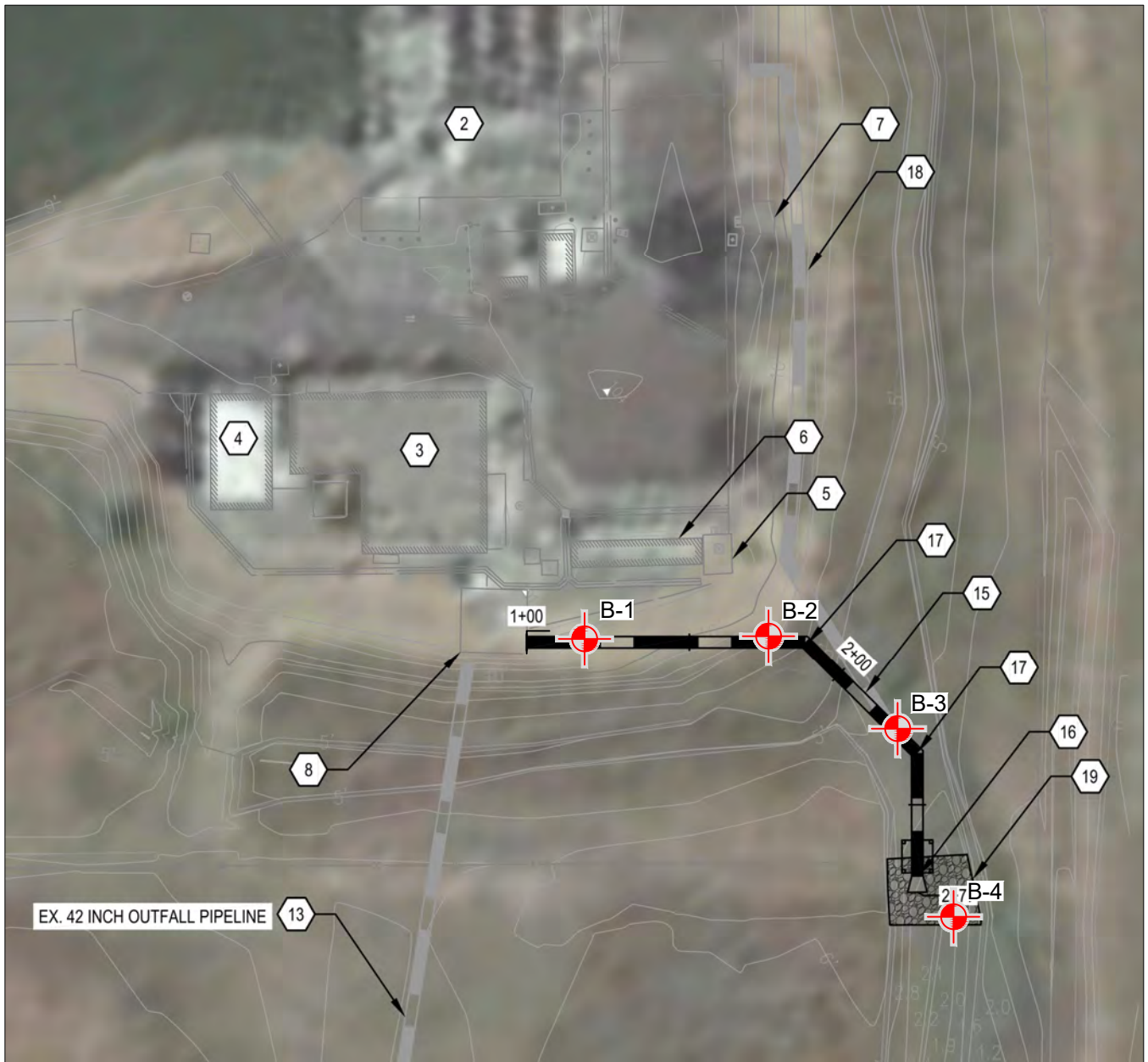
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 Petaluma, California

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1
 FIGURE

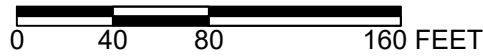
Project No. 1206.195


Date: 4/13/2022



SITE PLAN

SCALE



 Approximate boring location completed by MPEG, 2022

REFERENCE: GHD Inc., "City of Petaluma, Ellis Creek Outfall Project" Sheet C-102.

MPEG
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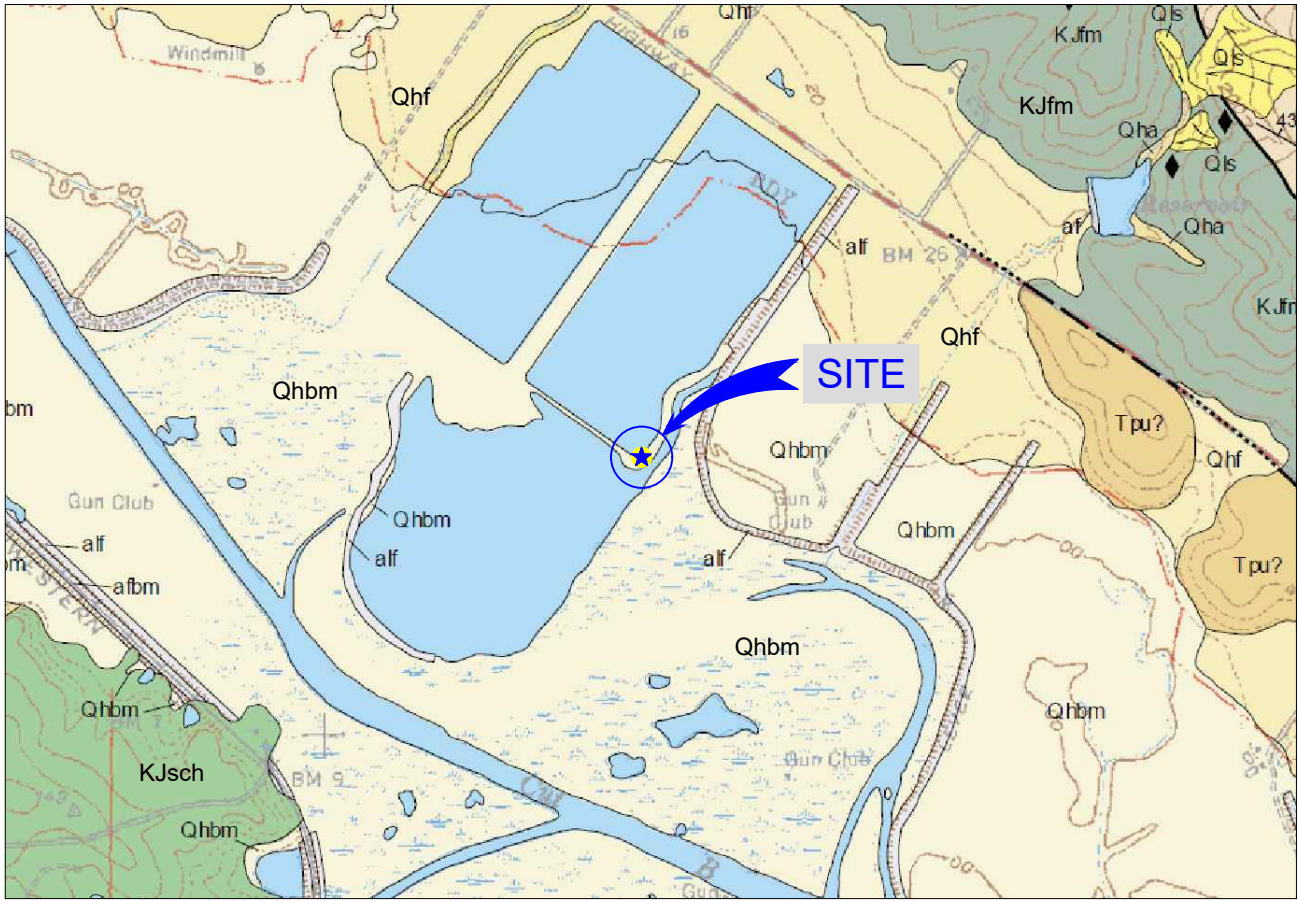
SITE PLAN

Ellis Creek Outfall
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2
 FIGURE




REGIONAL GEOLOGIC MAP

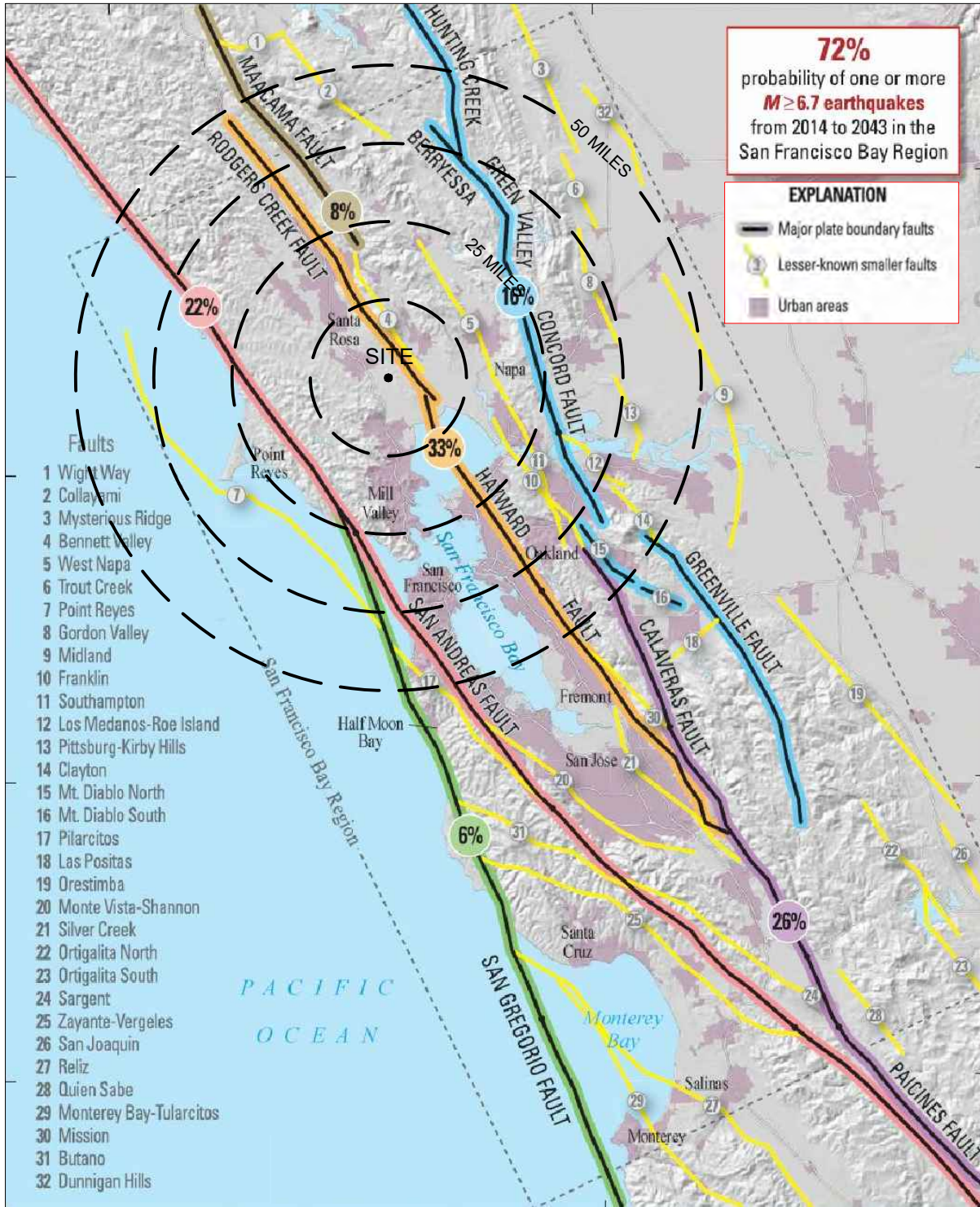


LEGEND

- alf **Artificial levee fill** [Quaternary]
- afbm **Artificial fill placed over bay mud** [Quaternary]
- Qhbm **Bay Mud** [Quaternary] - Silt, clay, peat, and fine sand deposited at or near sea level in San Pablo Bay.
- Qhf **Alluvial fan deposits** [Quaternary] - Sand, gravel, silt, and clay deposited by streams emanating from canyons onto alluvial valley floors. Sediment is poorly to moderately sorted and bedded.
- Qls **Landslides** [Quaternary] - Includes debris flow and block slump landslides. Arrows indicate direction of movement.
- Tpu **Upper Petaluma Formation** [Tertiary] - Massive, well sorted sandstone, siltstone, and conglomerate.
- KJfm **Franciscan complex melange** [Jurassic-Cretaceous] - Tectonic mixture of masses of resistant rock including sandstone, altered mafic volcanics, chert, gabbro, exotic metamorphic rocks imbedded in a sheared shaley matrix.
- KJsch **Franciscan complex** [Jurassic-Cretaceous] - Schist, phyllite, and semischist.

REFERENCE: Wagner, D.L., et al. (2002), 'Geologic Map of the Petaluma River 7.5' Quadrangle, Marin and Sonoma Counties, California: A Digital Database', California Geological Survey, Scale 1:24,000.

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	Ellis Creek Outfall 3890 Cypress Drive Petaluma, California	Drawn _____ EIC Checked _____	<div style="border: 2px solid black; padding: 10px; font-size: 2em; font-weight: bold;">3</div> FIGURE
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SITE COORDINATES
LAT. 38.2150°
LON. -122.5746°



DATA SOURCE:

1) U.S. Geological Survey, U.S. Department of the Interior, "Earthquake Outlook for the San Francisco Bay Region 2014-2043", Map of Known Active Faults in the San Francisco Bay Region, Fact Sheet 2016-3020, Revised August 2016 (ver. 1.1).



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ACTIVE FAULT MAP

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4
FIGURE

Tunnelman's Ground Classification for Soils¹

Classification		Behavior	Typical Soil Types
Firm		Heading can be advanced without initial support, and final lining can be constructed before ground starts to move.	Loess above water table; hard clay, marl, cemented sand and gravel when not highly overstressed.
Raveling	Slow raveling ----- Fast raveling	Chunks or flakes of material begin to drop out of the arch or walls sometime after the ground has been exposed, due to loosening or to overstress and "brittle" fracture (ground separates or breaks along distinct surfaces, opposed to squeezing ground). In fast raveling ground, the process starts within a few minutes, otherwise the ground is slow raveling.	Residual soils or sand with small amounts of binder may be fast raveling below the water table, slow raveling above. Stiff fissured clays may be slow or fast raveling depending upon degree of overstress.
Squeezing		Ground squeezes or extrudes plastically into tunnel, without visible fracturing or loss of continuity, and without perceptible increase in water content. Ductile, plastic yield and flow due to overstress.	Ground with low frictional strength. Rate of squeeze depends on degree of overstress. Occurs at shallow to medium depth in clay of very soft to medium consistency. Stiff to hard clay under high cover may move in combination of raveling at excavation surface and squeezing at depth behind surface.
Running	Cohesive-running ----- Running	Granular materials without cohesion are unstable at a slope greater than their angle of repose (+/- 30° – 35°). When exposed at steeper slopes they run like granulated sugar or dune sand until the slope flattens to the angle of repose.	Clean, dry granular materials. Apparent cohesion in moist sand, or weak cementation in any granular soil, may allow the material to stand for a brief period of raveling before it breaks down and runs. Such behavior is cohesive-running.
Flowing		A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances, completely filling the tunnel in some cases.	Below the water table in silt, sand, or gravel without enough clay content to give significant cohesion and plasticity. May also occur in highly sensitive clay when such material is disturbed.
Swelling		Ground absorbs water, increases in volume, and expands slowly into the tunnel.	Highly preconsolidated clay with plasticity index in excess of about 30, generally containing significant percentages of montmorillonite.

¹ Modified by Heuer (1974) from Terzaghi (1950)



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TUNNELMAN'S GROUND CLASSIFICATION FOR SOILS

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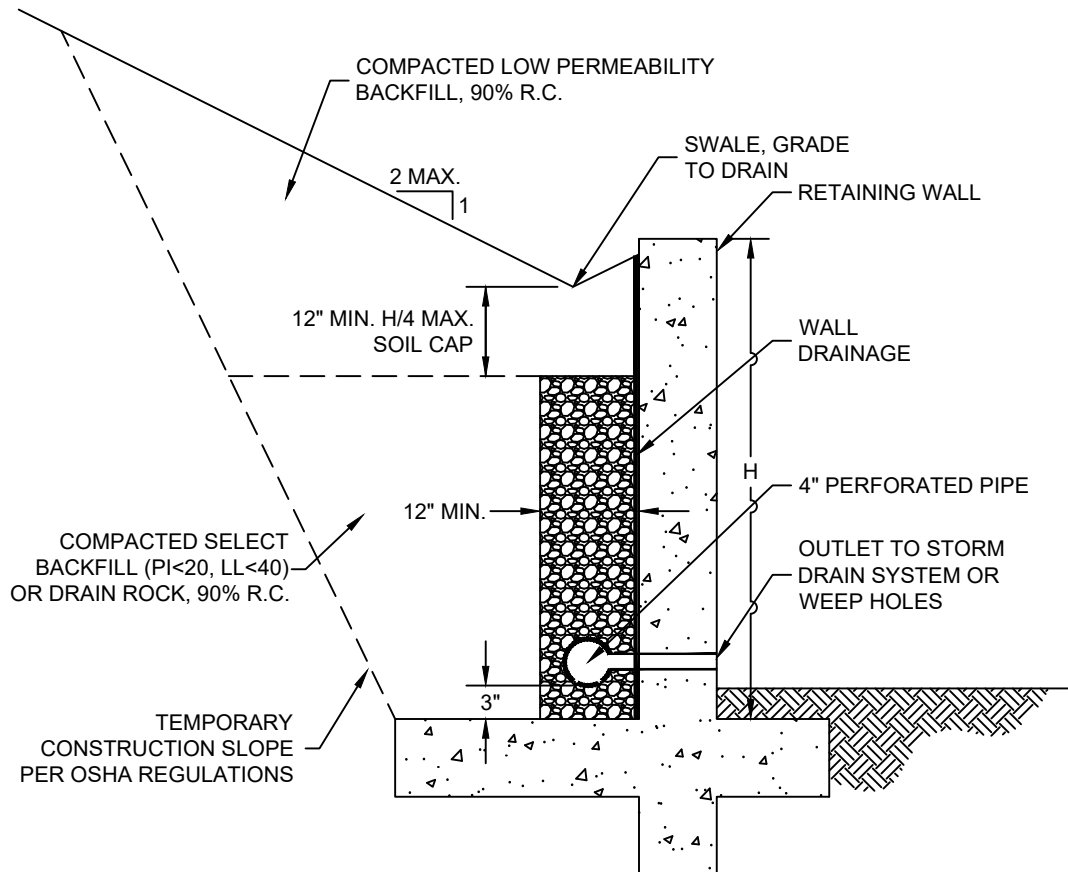
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5

FIGURE



NOTES:

1. Wall drainage should consist of clean, free draining 3/4 inch crushed rock (Class 1B Permeable Material) wrapped in filter fabric (Mirafi 140N or equivalent) or Class 2 Permeable Material. Alternatively, pre-fabricated drainage panels (Miradrain G100N or equivalent), installed per the manufacturers recommendations, may be used in lieu of drain rock and fabric.
2. All retaining walls adjacent to interior living spaces shall be water/vapor proofed as specified by the project architect or structural engineer.
3. Perforated pipe shall be SCH 40 or SDR 35 for depths less than 20 feet. Use SCH 80 or SDR 23.5 perforated pipe for depths greater than 20 feet. Place pipe perforations down and slope at 1% to a gravity outlet. Alternatively, drainage can be outlet through 3" diameter weep holes spaced approximately 20' apart.
4. Clean outs should be installed at the upslope end and at significant direction changes of the perforated pipe. Additionally, all angled connectors shall be long bend sweep connections.
5. During compaction, the contractor should use appropriate methods (such as temporary bracing and/or light compaction equipment) to avoid over-stressing the walls. Walls shall be completely backfilled prior to construction in front of or above the retaining wall.
6. Refer to the geotechnical report for lateral soil pressures.
7. All work and materials shall conform with Section 68, of the latest edition of the Caltrans Standard Specifications.



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TYPICAL RETAINING WALL BACKDRAIN

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Project No. 1206.195

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6
 FIGURE

**APPENDIX A
SUBSURFACE EXPLORATION AND GEOTECHNICAL LABORATORY TESTING****A. SUBSURFACE EXPLORATION**

We explored subsurface conditions with two exploratory borings drilled with portable hydraulic drilling equipment on March 4, 2022, at the approximate locations shown on the Site Plan, Figure 2. We performed two additional exploratory borings with manual bucket auger equipment on March 14, 2022. The exploration was conducted under the technical supervision of our Field Geologist who examined and logged the soil materials encountered and obtained samples. The subsurface conditions encountered in the test borings are summarized and presented on the Boring Logs, Figures A-2 through A-6.

“Undisturbed” samples were obtained using a 3-inch diameter, split-barrel Modified California Sampler with 2.5 by 6-inch tube liners or a Standard Penetration Test (SPT) Sampler. The samplers were driven by a 140-pound hammer at a 30-inch drop. The number of blows required to drive the samplers 18 inches was recorded and is reported on the boring logs as blows per foot for the last 12 inches of driving. The samples obtained were examined in the field, sealed to prevent moisture loss, and transported to our laboratory

B. GEOTECHNICAL LABORATORY TESTING

We conducted laboratory tests on selected intact samples to verify field identifications and to evaluate engineering properties. The following laboratory tests were conducted in accordance with the ASTM standard test method cited:

- Laboratory Determination of Water (Moisture Content) of Soil, Rock, and Soil-Aggregate Mixtures, ASTM D 2216;
- Density of Soil in Place by the Drive-Cylinder Method, ASTM D 2937;
- Unconfined Compressive Strength of Cohesive Soil, ASTM D 2166;
- Amount of Material in Soils Finer Than the No. 200 (75 µm) Sieve, ASTM D 1140;
- Liquid and Plastic Limits of Soil, ASTM D 4318;
- pH in soil, EPA 9040;
- Resistivity in Soil, SM 2510; and
- Anions in soil (sulfate and chloride), EPA 300.

The moisture content, dry density, unconfined compressive strength, and percent passing the #200 sieve results are shown on the exploratory Boring Logs and the results of our sieve analysis and plasticity index are presented on Figures A-7 and A-8. The results of our corrosion testing are presented on Figure A-9. The exploratory boring logs, description of soils encountered, and the laboratory test data reflect conditions only at the location of the borings at the time they were excavated or retrieved. Conditions may differ at other locations and may change with the passage of time due to a variety of causes including natural weathering, climate, and changes in surface and subsurface drainage.

MAJOR DIVISIONS		SYMBOL	DESCRIPTION
COARSE GRAINED SOILS over 50% sand and gravel	CLEAN GRAVEL	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines
	GRAVEL with fines	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	CLEAN SAND	SW	Well-graded sands or gravelly sands, little or no fines
		SP	Poorly-graded sands or gravelly sands, little or no fines
	SAND with fines	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS over 50% silt and clay	SILT AND CLAY liquid limit <50%	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silt-clays of low plasticity
	SILT AND CLAY liquid limit >50%	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity
HIGHLY ORGANIC SOILS	PT	Peat, muck, and other highly organic soils	
ROCK		Undifferentiated as to type or composition	

KEY TO BORING AND TEST PIT SYMBOLS

CLASSIFICATION TESTS

PI	PLASTICITY INDEX
LL	LIQUID LIMIT
SA	SIEVE ANALYSIS
HYD	HYDROMETER ANALYSIS
P200	PERCENT PASSING NO. 200 SIEVE
P4	PERCENT PASSING NO. 4 SIEVE

STRENGTH TESTS

UC	LABORATORY UNCONFINED COMPRESSION
TXCU	CONSOLIDATED UNDRAINED TRIAXIAL
TXUU	UNCONSOLIDATED UNDRAINED TRIAXIAL
	UC, CU, UU = 1/2 Deviator Stress
DS (2.0)	DRAINED DIRECT SHEAR (NORMAL PRESSURE, ksf)

SAMPLER TYPE

	MODIFIED CALIFORNIA		HAND SAMPLER
	STANDARD PENETRATION TEST		ROCK CORE
	THIN-WALLED / FIXED PISTON		DISTURBED OR BULK SAMPLE

SAMPLER DRIVING RESISTANCE

Modified California and Standard Penetration Test samplers are driven 18 inches with a 140-pound hammer falling 30 inches per blow. Blows for the initial 6-inch drive seat the sampler. Blows for the final 12-inch drive are recorded onto the logs. Sampler refusal is defined as 50 blows during a 6-inch drive. Examples of blow records are as follows:

25 sampler driven 12 inches with 25 blows after initial 6-inch drive

85/7" sampler driven 7 inches with 85 blows after initial 6-inch drive

50/3" sampler driven 3 inches with 50 blows during initial 6-inch drive or beginning of final 12-inch drive

NOTE: Test boring and test pit logs are an interpretation of conditions encountered at the excavation location during the time of exploration. Subsurface rock, soil or water conditions may vary in different locations within the project site and with the passage of time. Boundaries between differing soil or rock descriptions are approximate and may indicate a gradual transition.



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SOIL CLASSIFICATION CHART

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Project No. 1206.195

Date: 4/13/2022

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A-1
FIGURE

DEPTH				BORING 1		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
meters	feet	SAMPLE	SYMBOL (4)	EQUIPMENT: Portable Hydraulic Drill Rig with 4.0-inch Solid Flight Auger	DATE: 3/4/2022						
				ELEVATION: 11 - feet*	*REFERENCE: Google Earth, 2022						
0	0			Clayey SAND with Gravel (SC) Medium brown-gray, dry to moist, loose, fine to coarse grained sand, ~45-50% low to medium plasticity clay, ~20-25% angular gravels. [Fill]		12	103	21.7	UC 1200		
1						12	94	26.0	UC 800	SA P200 46.6%	
5											
2				Clayey GRAVEL with Sand (GC) Medium gray, wet, loose, medium dense, angular gravels up to 1" Ø, ~20-30% medium plasticity clay, ~10-20% fine to coarse grained sand. [Fill]		12	96 84	28.2 39.6	UC 1300		
3	10										
4		X		Clayey SILT (MH) Medium gray, wet, soft, high plasticity, organics and shells present, sulfuric odor. [Bay Mud]				84.3			
15				hole keeps caving to 10-feet, unable to sample							
5											
6	20			hole keeps caving to 10-feet, unable to sample							

- ▽ Water level encountered during drilling
- ▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $\text{kN/m}^3 = 0.1571 \times \text{DRY UNIT WEIGHT (pcf)}$
(3) METRIC EQUIVALENT STRENGTH (kPa) = $0.0479 \times \text{STRENGTH (psf)}$
(4) GRAPHIC SYMBOLS ARE ILLUSTRATIVE ONLY



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BORING LOG

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Project No. 1206.195 Date: 4/13/2022



Drawn _____

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A-2

FIGURE

DEPTH meters feet	SAMPLE	SYMBOL (4)	BORING 1 (CONTINUED)		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
20			Clayey SILT (MH) Medium gray, wet, soft, high plasticity, organics and shells present, sulfuric odor. [Bay Mud]							
7										
25	X		Clayey SAND (SC) Medium gray, wet, fine to medium grained sand, ~30-35% medium to high plasticity clay. [Alluvium]			25.5		P200 30.4%		
8			Boring terminated at 25.0 feet. Groundwater measured at 5.0 feet upon completion of exploration.							
9			First attempt concrete was encountered at 5.5 feet below the ground surface. We moved the boring southwest 4.0 feet and encountered caving gravels to 9.0 feet below the ground surface. We moved the boring 4.0 feet southwest of the second attempt and drilled through the gravel layer to obtain samples from the bay mud layer below.							
30										
10										
35										
11										
12										
40										

-  Water level encountered during drilling
-  Water level measured after drilling

- NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $\text{KN/m}^3 = 0.1571 \times \text{DRY UNIT WEIGHT (pcf)}$
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BORING LOG

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A-3
FIGURE

Project No. 1206.195

Date: 4/13/2022

DEPTH				BORING 2		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
meters	feet	SAMPLE	SYMBOL (4)	EQUIPMENT: Portable Hydraulic Drill Rig with 4.0-inch Solid Flight Auger	DATE: 3/4/2022						
				ELEVATION: 11 - feet*	*REFERENCE: Google Earth, 2022						
0	0			CLAY with Sand (CL-CH) Medium gray-brown, moist, soft to medium stiff, medium plasticity clay, ~10% very fine grained sand with increased sand content in upper 12". [Alluvium]		7	102	19.8	UC 1200	LL:50 PI:28	
1				grades dark gray-black							
5						7	66	54.9	UC 300		
2				Clayey SILT (MH) Medium gray, wet, very soft, high plasticity, low density, trace fine sand, sulfuric odor. [Bay Mud]							
3	10					2	45	98.4	UC 300		
4											
15				grades medium stiff, organics present, up to 10% fine to medium grained sand		9	97	26.5	UC 1100		
5											
6	20			CLAY with Sand (CH) Light gray-brown, moist, stiff, high plasticity clay, ~15-25% fine to medium grained sand, trace gravels. [Alluvium]							
				Boring terminated at 21.5 feet. Groundwater measured at 14.5 feet upon completion of exploration.		22	111	18.4	UC 2900		

 Water level encountered during drilling
 Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
 (2) METRIC EQUIVALENT DRY UNIT WEIGHT $\text{kN/m}^3 = 0.1571 \times \text{DRY UNIT WEIGHT (pcf)}$
 (3) METRIC EQUIVALENT STRENGTH (kPa) = $0.0479 \times \text{STRENGTH (psf)}$
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BORING LOG

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A-4
 FIGURE

Project No. 1206.195

Date: 4/13/2022

DEPTH meters feet	SAMPLE	SYMBOL (4)	BORING 3		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
			EQUIPMENT: 3.25-Inch Manual Bucket Auger	DATE: 3/14/2022						
0 - 0	X X		Sandy SILT (MH) Gray, saturated, very soft, high plasticity silt, ~20-25% fine grained sand, ~5-10% gravel. [Alluvium]		80	40.3			SA P200 67.5%	
1			Boring terminated at 1.0 foot. No groundwater encountered during exploration.							
5										
10										
15										
20										

 Water level encountered during drilling
 Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
 (2) METRIC EQUIVALENT DRY UNIT WEIGHT $\text{kN/m}^3 = 0.1571 \times \text{DRY UNIT WEIGHT (pcf)}$
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BORING LOG	
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A-5

FIGURE

DEPTH meters feet	SAMPLE	SYMBOL (4)	BORING 4		BLOWS / FOOT (1)	DRY UNIT WEIGHT pcf (2)	MOISTURE CONTENT (%)	SHEAR STRENGTH psf (3)	OTHER TEST DATA	OTHER TEST DATA
			EQUIPMENT: 3.25-Inch Manual Bucket Auger	DATE: 3/14/2022						
0 - 0	X		Clayey SILT (MH)							
	X		Gray, saturated, very soft, high plasticity silt, trace fine grained sand. [Bay Mud]			39	104.9		SA P200 97.0%	LL:110 PI:69
	X		Boring terminated at 2.0 feet. No groundwater encountered during exploration.							
1										
5										
2										
3										
10										
4										
15										
5										
6										
20										

- ▽ Water level encountered during drilling
- ▼ Water level measured after drilling

NOTES: (1) UNCORRECTED FIELD BLOW COUNTS
(2) METRIC EQUIVALENT DRY UNIT WEIGHT $\text{kN/m}^3 = 0.1571 \times \text{DRY UNIT WEIGHT (pcf)}$
(3) METRIC EQUIVALENT STRENGTH (kPa) = $0.0479 \times \text{STRENGTH (psf)}$
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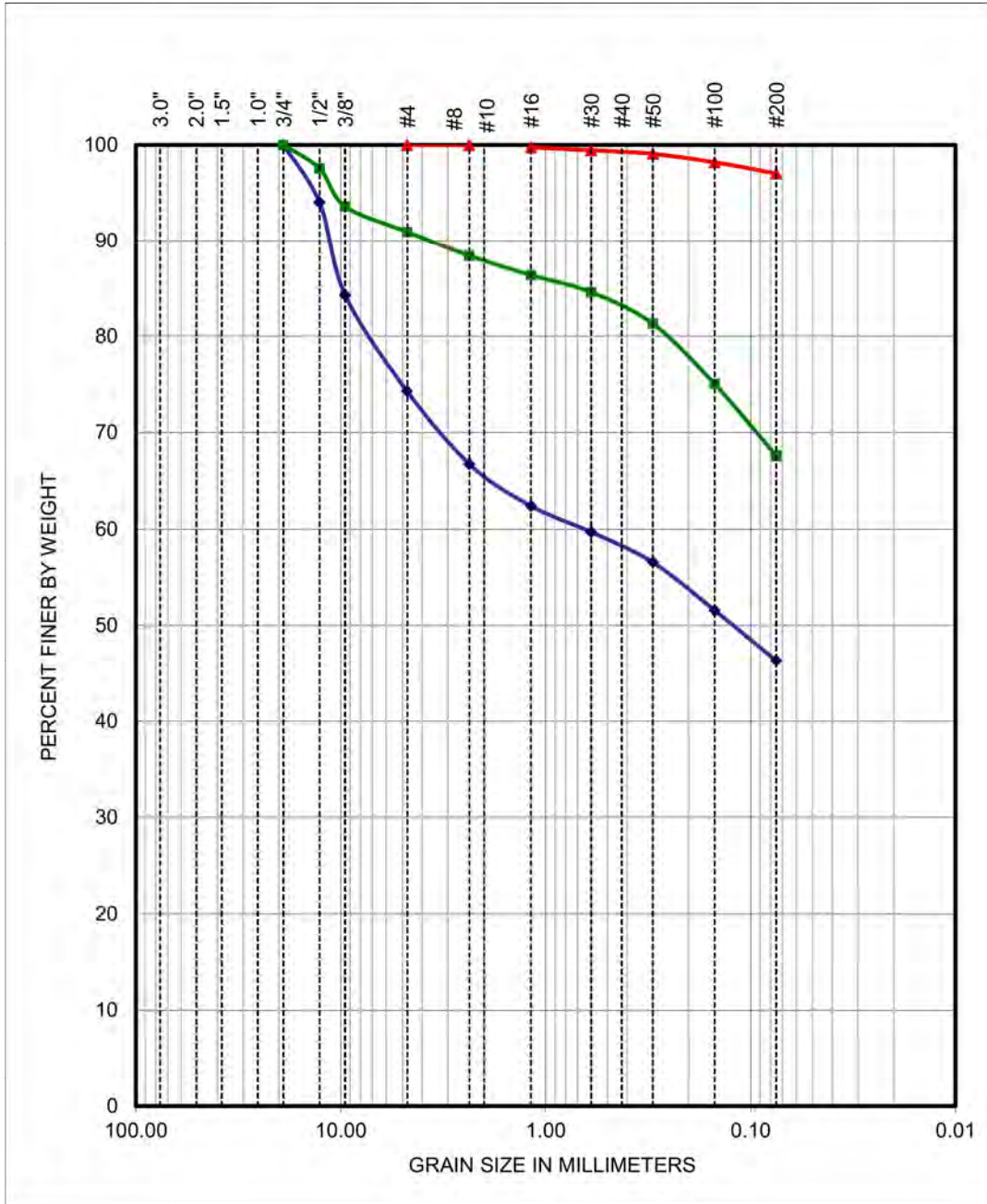
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A-6

FIGURE

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PARTICLE SIZE ANALYSIS - ASTM D 6913 & ASTM D 1140



SYMBOL	SAMPLE SOURCE	CLASSIFICATION
—◆—	B1 @ 4.5'	Clayey SAND with Gravel (SC)
—■—	B3 @ 0-12"	Sandy SILT (MH)
—▲—	B4 @ 0-2.0'	Clayey SILT (MH)



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SIEVE ANALYSIS TEST RESULTS

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Project No. 1206.195

Date: 4/13/2022

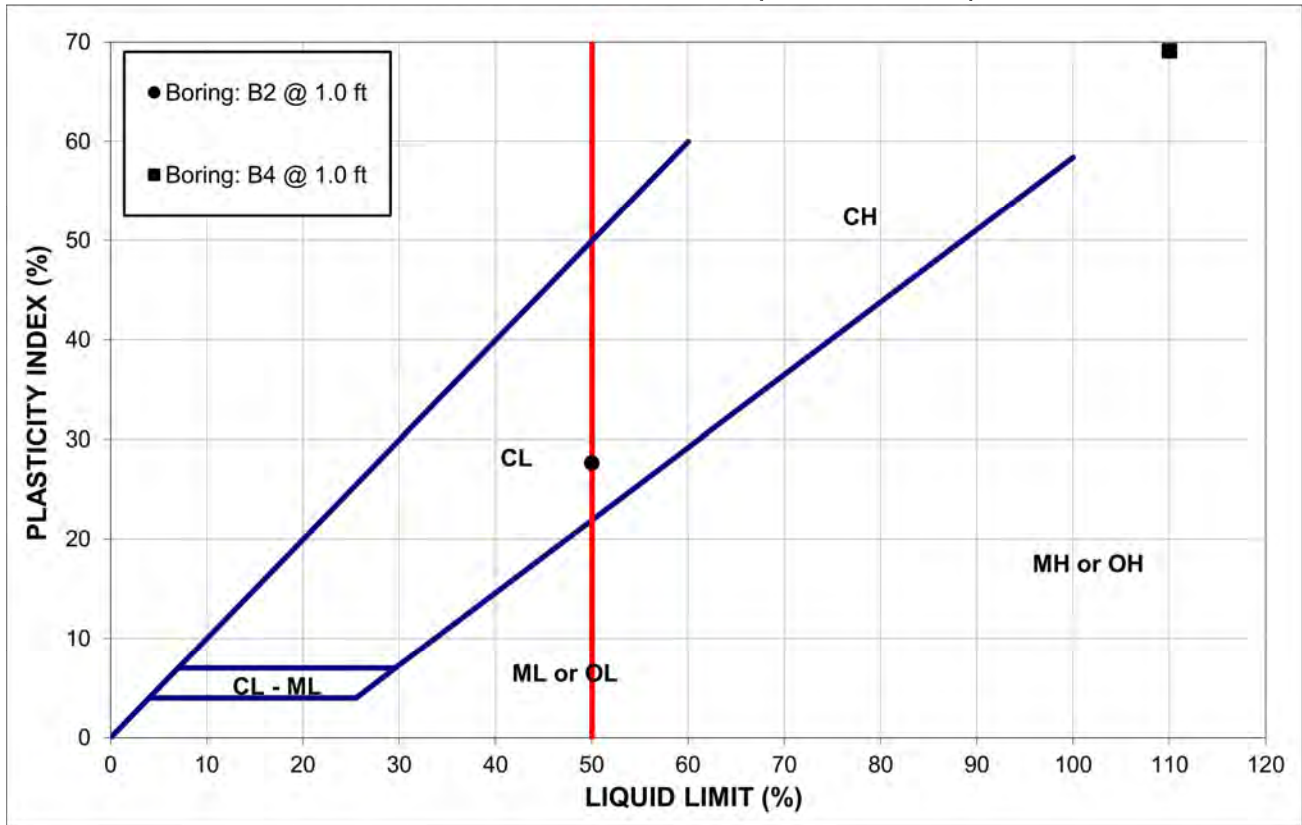
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A-7

FIGURE

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ATTERBERG LIMITS TEST (ASTM D 4318)



Sample	Classification	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
Boring: B2 @ 1.0 ft	CLAY with Sand (CL/CH) medium gray-brown	50	22	28
Boring: B4 @ 1.0 ft	Clayey SILT (MH) medium gray	110	41	69

PI = 0-3: Non-Plastic
 PI = 3-15: Slightly Plastic
 PI = 15-30: Medium Plasticity
 PI = >30: High Plasticity



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PLASTICITY INDEX TEST RESULTS

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Project No. 1206.195

Date: 4/13/2022

Drawn _____
 EIC
 Checked _____

A-8

FIGURE



ETS

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**Serving people and the environment
 so that both benefit.**

COMPANY: Miller Pacific Engineering Group, P.O. Box 2802, Novato, CA 94948-2808			ANALYST(S)	SUPERVISOR
ATTN: Monica Thornton, 1360 Redwood Way, Suite B, Petaluma, CA		DATE of	L. Quijano	S. Godinez
JOB NAME: Ellis Creek Outfall, Ellis Creek Water Recycling		COMPLETION	S. Santos	LAB DIRECTOR
JOB #: 1206.195	Facility, Petaluma, California	3/29/2022		G.S. Conrad PhD

CORROSION TEST							
LAB SAMPLE NUMBER	SAMPLE ID	DESCRIPTION of SOIL and/or SEDIMENT	SOIL pH -log[H+]	MINIMUM AVE. RESISTIVITY Ohm-cm	ELECTRICAL CONDUCTIVITY µmhos/cm	SULFATE SO4 ppm	CHLORIDE Cl ppm
08931-1	EC-10F/P	Native Soil (B3+B4 @ 0.0-2.0')	6.55	106.5	[9390]	2625	7,950

Method	Detection	Limits --->	---	1	0.1	1	1
LAB SAMPLE NUMBER	SAMPLE ID	DESCRIPTION of SOIL and/or SEDIMENT	SALINITY ECe dS/cm	SOLUBLE SULFIDES (S=) ppm	SOLUBLE CYANIDES (CN=) ppm	REDOX mV	PERCENT MOISTURE %
Method	Detection	Limits --->	---	0.1	0.1	1	0.1

 COMMENTS

Resistivity is >100 ohm-cm, i.e., very low (= very poor); soil reaction (i.e., pH) is very mildly acidic (@ <6.6); sulfate is high (@ >2,500 ppm), and chloride is very high (@ ~8,000 ppm). CalTrans (CT) times to perforation of galvanized steel and the full depth pitting time (following Uhlig) for otherwise unprotected steel in this soil are determined based on the pertinent parameters [see table at left below]. Considering the setting, the very low Rs, and the chloride level, sodium must be high as well. Sulfate would have a significant adverse impact on concrete, cement, mortar or grout; and chloride would have a very significant adverse impact on rebar or buried steel. Based on these parameters, a point range for this soil can be determined [see table below on right]. Lime or mild cement treatment could be of any benefit in this case, but only in the context of taking other actions. To improve metals longevity any more in this soil would require considerable steel and other actions as well. Cathodic protection along with the coating or wrapping may be one potential solution. Other general options can include increased or specialized engineering fill (probably most helpful), use of a polymer coating (very prudent), or use of plastic, or fiberglass assets. Based on these results, i.e., the very low/poor Rs, significantly elevated sulfate (@ >0.2%), the very high chloride (approaching 1%), and presumably a very low, perhaps even negative, redox (worth at least 5 more points), substantial remediation actions and upgrading of construction materials would be prudent to protect structures, e.g. ASTM Type V portland cement, increased steel gauge with coating or wrapping, etc.

SAMPLE ID	CT 18 ga	CT 12 ga	2 mm (Uhlig)	PARAMETER/ID	BFES1-AW/A		
BFES1-AW/A treated	<1 yr	<1 yr	~5 yrs	pH	Ø		
	<10 yrs	<22 yrs	~3 yrs	Rs	10		
				SO4	3		
				Cl	4		
				Redox	-		
				TOTAL POINTS	17+		

NOTES: Methods are from following sources: extractions by Cal Trans protocols as per Cal Test 417 (SO4), 422 (Cl), and 643 (pH & resistivity); &/or by ASTM Vol. 4.08 & ASTM Vol. 11.01 (=EPA Methods of Chemical Analysis, or Standard Methods); pH - ASTM G51; Spec Cond. - ASTM D1125; resistivity - ASTM G187; redox - Pt probe/ISE; sulfate - extraction Title 22, and detection ASTM D516 (=EPA 375.4); chloride - extraction Title 22, detection ASTM D512 (=EPA 325.3); soluble sulfides - extraction by Title 22, and detection EPA 376.2 (=SMEWW 4500-S D); cyanides - extraction by Title 22, and detection by ASTM D4374 (=EPA 335.2).



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 Novato, CA 94947
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 www.millerpac.com

CORROSION TEST RESULTS

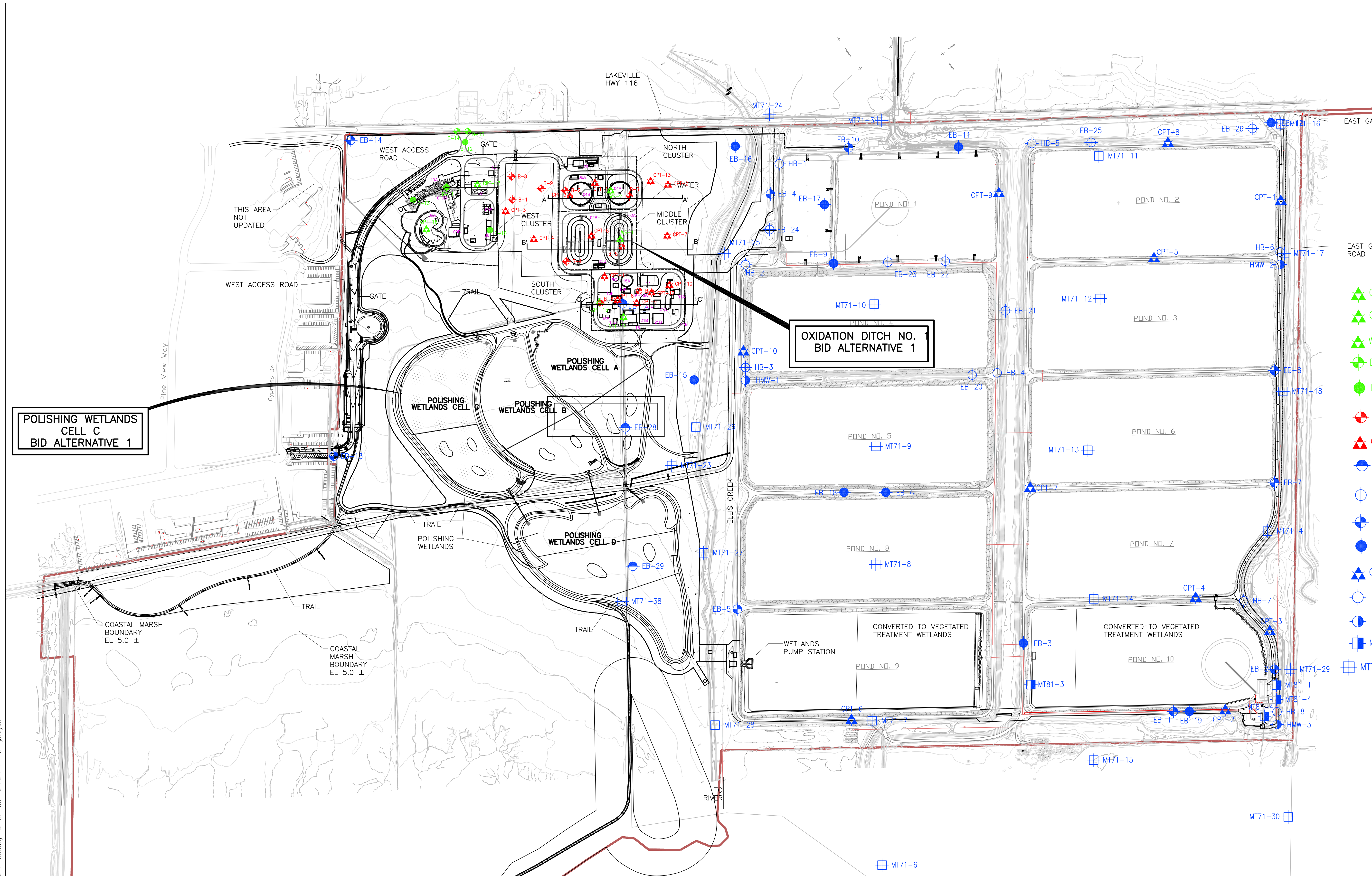
Ellis Creek Outfall
 3890 Cypress Drive
 Petaluma, California

Drawn _____
 EIC
 Checked _____

A-9
 FIGURE

Project No. 1206.195 Date: 4/13/2022

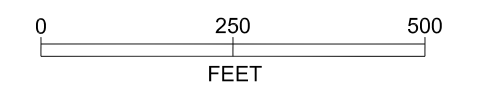
APPENDIX B
REFERENCE SUBSURFACE EXPLORATION



POLISHING WETLANDS CELL C
BID ALTERNATIVE 1

OXIDATION DITCH NO. 1
BID ALTERNATIVE 1

- LEGEND**
- ▲ CPT-17 PROPOSED LOCATION OF CONE PENETRATION TEST (CPT) BY FUGRO WEST (2004)
 - ▲ CPT-14 LOCATION OF CONE PENETRATION TEST (CPT) BY FUGRO WEST (2004)
 - ▲ WS-2 APPROXIMATE LOCATION OF WATER SAMPLING BY FUGRO WEST (2004)
 - B-15 APPROXIMATE LOCATION OF EXPLORATORY BORING BY FUGRO WEST (2003)
 - B-13 APPROXIMATE LOCATION OF EXPLORATORY BORING BY FUGRO WEST (2004)
 - B-9 SURVEYED LOCATION OF EXPLORATORY BORING/PIEZOMETER BY FUGRO (JULY 2003)
 - ▲ CPT-13 SURVEYED LOCATION OF CONE PENETRATION TEST (CPT) BY FUGRO (2003)
 - EB-29 APPROXIMATE LOCATION OF EXPLORATORY BORING (EB-27 & EB-29) AND PIEZOMETER (EB-28) BY FUGRO WEST (NOVEMBER, 2002)
 - EB-26 APPROXIMATE LOCATION OF EXPLORATORY BORING BY FUGRO WEST (MAY, 2002)
 - EB-14 SURVEYED LOCATION OF EXPLORATORY BORING BY HARZA, (APRIL & JUNE, 2001) CONVERTED INTO STAND PIPE PIEZOMETERS
 - EB-19 SURVEYED LOCATION OF EXPLORATORY BORING BY HARZA, (APRIL & JUNE, 2001)
 - ▲ CPT-11 APPROXIMATE LOCATION OF CONE PENETRATION TEST BY HARZA, (APRIL, 2001)
 - HB-26 APPROXIMATE LOCATION OF EXPLORATORY BORING BY HARDING LAWSON ASSOC., (1995)
 - HMW-8 APPROXIMATE LOCATION OF MONITORING WELLS BY HARDING LAWSON., (1995)
 - MT81-4 APPROXIMATE LOCATION OF EXPLORATORY BORING BY MOORE AND TABER (1981)
 - MT71-30 APPROXIMATE LOCATION OF EXPLORATORY BORING BY MOORE AND TABER (1971)



FUGRO WEST, INC.
1000 Broadway, Suite 200, Oakland, California, 94607
Tel.: (510) 268-0461, FAX: (510) 268-0137

SITE PLAN
Lakeville Highway Water Recycling Facility (WRF)-Parcel A
Petaluma, California

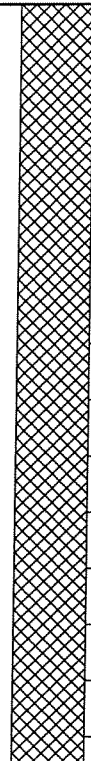


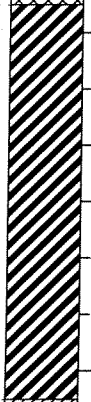

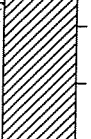

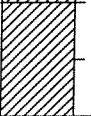
3045.001 April 2005 PLATE 2

G:\jdocs\3045\3045_022\Drawings\3045_022-03.dwg 5-02-05 02:32:17 PM jpreyes

BASE MAP SOURCE: This Site Plan provided by Corollo Engineers, titled "00c200.dwg", dated 4/21/05

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.3 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	23 feet	BORING DIAMETER	8-inch	DATE DRILLED	4/6/01

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							

EMBANKMENT FILL: CLAY (CL), green gray, with silt, moist	Stiff		5		21	23	100	2.4	
			10		19				
(silty, trace fine-grained sand)									
BAY MUD: CLAY (CH/MH), dark green gray, silty, trace organics, wet to saturated	Firm		15		9	81	52	0.9	
CLAY (CL/CH), blue green, silty, moist	Very Stiff		20		34	30	93	1.8	
CLAY (CL), blue gray, with sand lenses, trace gravel (fine, subangular to subrounded), moist	Stiff								

File Name: G:\ENGINEERING\PROJECTS\19639-GJ.GPJ Report Template: FUGRO 440 Output Date: 9/17/02






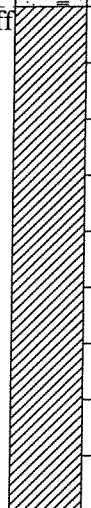
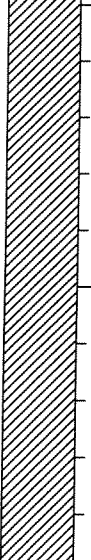



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Oakland, CA 94607

EXPLORATORY BORING LOG

**LAKEVILLE HIGHWAY WRF PROJECT
Petaluma, California**

PROJECT NO.	DATE	BORING NO.	EB-1
3045.006	June 2001		

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.3 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	23 feet	BORING DIAMETER	8-inch	DATE DRILLED	4/6/01

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
CLAY (CL), continued	Stiff				15				
SAND (SW), brown, fine- to coarse-grained, trace gravel (fine, subangular), trace clay, saturated	Very Dense		30		80/9"				
CLAY (CL), light yellow brown, silty, trace sand (fine-grained), moist	Very Stiff		35		28				
(yellow brown, with sand inclusions)			40		42	25	101		
			45						
					33				

File Name: G:\ENGINEERING\PROJECTS\19639-GI.GPJ Report Template: FUGRO 440 Output Date: 9/17/02



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EXPLORATORY BORING LOG		
LAKEVILLE HIGHWAY WRF PROJECT Petaluma, California		
PROJECT NO.	DATE	BORING NO. EB-1
3045.006	June 2001	

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.3 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	3 feet	BORING DIAMETER	8-inch	DATE DRILLED	4/5/01









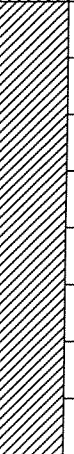

DESCRIPTION AND CLASSIFICATION		DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST							

PAVEMENT: 2 inches AC over 8 inches AB EMBANKMENT FILL: CLAY (CL), dark olive gray, with silt, trace sand (fine-grained), damp to moist (dark gray, moist)	Stiff		5	19		92	1.7	
			10	17				
BAY MUD: CLAY (CH/MH), dark olive gray, silty, trace organics, saturated	Soft		15	6	109 95	43 47		Tx = 0.45 (1.0) Tx = 0.40 (2.0)
			20	4	82 94	52 47		Tx = 0.45 (1.5) Tx = 0.45 (1.0)
SAND (SC), gray brown, fine- to coarse-grained, trace gravel (fine,	Dense		20	4	65	60	0.8	

File Name: G:\ENGINEERING\PROJECTS\19639-GJ.GPJ_Report_Template: FUGRO 440 Output Date: 9/17/02

 <p>FUGRO WEST, INC. 1000 Broadway, Suite 200 Oakland, CA 94607</p>	EXPLORATORY BORING LOG		
	LAKEVILLE HIGHWAY WRF PROJECT Petaluma, California		
	PROJECT NO.	DATE	BORING NO. EB-2
	3045.006	June 2001	

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.3 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	3 feet	BORING DIAMETER	8-inch	DATE DRILLED	4/5/01

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							
subangular), trace to some clay, saturated	Dense				60				
CLAY (CL) , dark blue green, silty, some sand (fine-grained), moist	Firm		30		6				
SAND (SW) , gray brown, fine- to coarse-grained, trace silt and clay, saturated	Medium Dense		35		33				
SAND (SC) , brown, fine-grained, with clay, wet	Medium Dense		40		27				
CLAY (CL) , yellow brown, silty, trace sand (fine-grained), moist	Very Stiff		45		31				

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EXPLORATORY BORING LOG

LAKEVILLE HIGHWAY WRF PROJECT
Petaluma, California

PROJECT NO.	DATE	BORING NO.	EB-2
3045.006	June 2001		

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.3 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	3 feet	BORING DIAMETER	8-inch	DATE DRILLED	4/5/01

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							

CLAY (CL), continued	Very Stiff		55		52				
			60						
	Hard								

Bottom of Boring = 65 Feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A.
3. A 140-lb wire trip hammer falling 30 inches was used to drive the samplers.
4. A piezometer was installed upon completion of drilling (See Figure A-2 for typical piezometer detail).
5. The initial groundwater level was encountered at 24 feet at the time of drilling. The stabilized groundwater level was monitored in the piezometer in the following months after drilling was completed.
6. Tx = undrained shear strength from UU triaxial test (ksf) and confinement pressure (ksf).

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EXPLORATORY BORING LOG

LAKEVILLE HIGHWAY WRF PROJECT
Petaluma, California

PROJECT NO.	DATE	BORING NO.	EB-2
3045.006	June 2001		

DRILL RIG	Mobile B-53, HSA	SURFACE ELEVATION	10.8 Feet	LOGGED BY	JND
DEPTH TO GROUND WATER	Not Encountered	BORING DIAMETER	8-inch	DATE DRILLED	6/18/01

DESCRIPTION AND CLASSIFICATION			DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT(%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)	OTHER TESTS
DESCRIPTION AND REMARKS	CONSIST	SOIL TYPE							

EMBANKMENT FILL: CLAY (CL), dark gray, silty, trace to some sand (fine-grained), damp to moist	Stiff		5						
	Very Stiff		Very Stiff	10	X	20			
BAYMUD: CLAY (CH/MH)	Very Stiff			X	30				

Bottom of Boring = 12 feet

Notes:

1. The stratification lines represent the approximate boundaries between soil types and the transition may be gradual.
2. For an explanation of penetration resistance values, see the first page of Appendix A.
3. A 140-lb wire trip hammer falling 30 inches was used to drive the samplers.
4. No groundwater level was encountered at the time of drilling.

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EXPLORATORY BORING LOG

LAKEVILLE HIGHWAY WRF PROJECT
Petaluma, California

PROJECT NO.	DATE	BORING NO.	EB-19
3045.006	June 2001		



Table A-1. Summary of Previous Boring Logs by Others

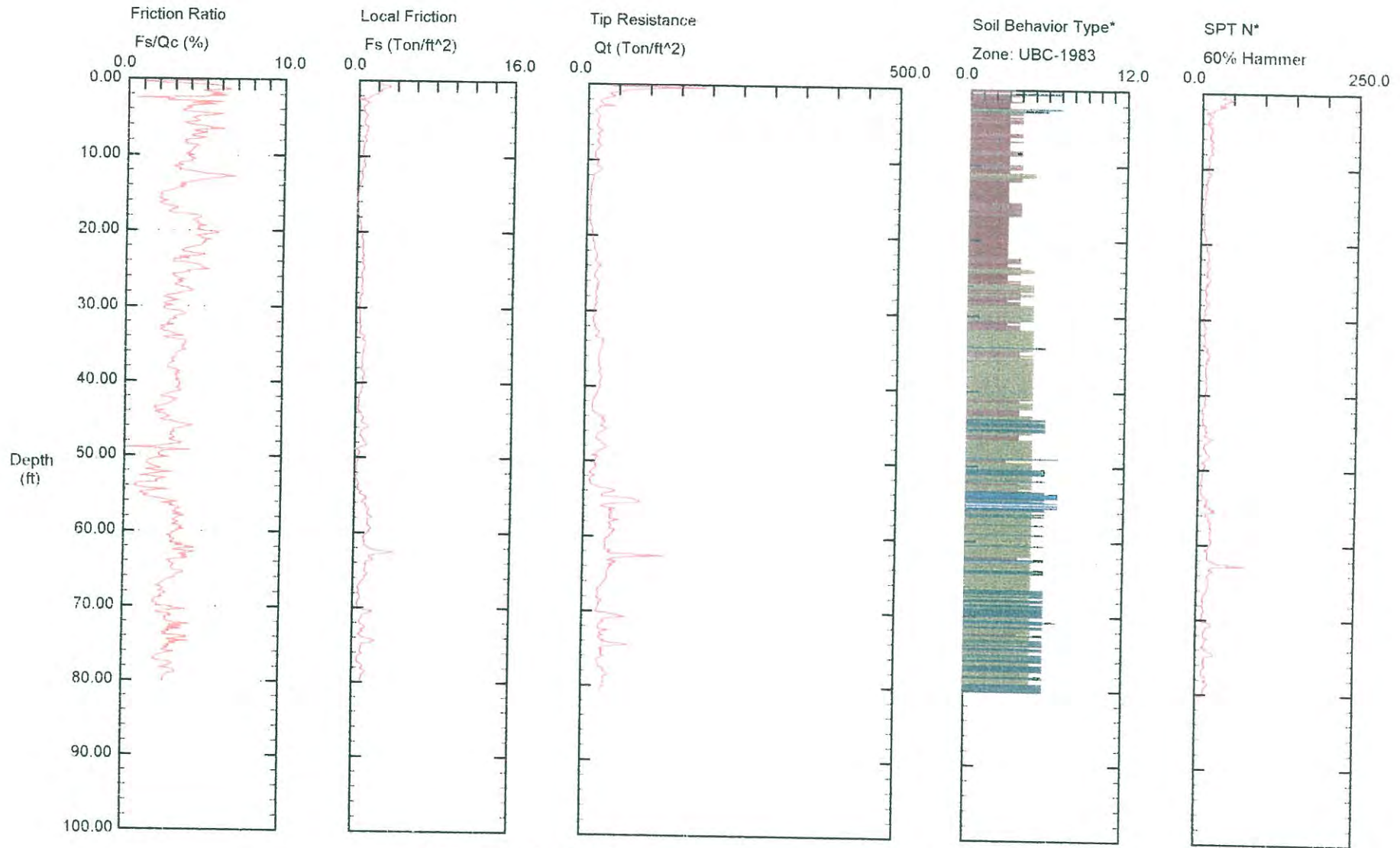
Boring	Ground Elevation (feet)	Depth (feet)	Material
MT71-3	+ 14	0-5 5-12	Soft, Silty CLAY Stiff Sandy CLAY
MT71-10	+10.2	0-4 4-9 9-13.5 13.5-23 23-27	Stiff, Silty CLAY Soft Silty CLAY Soft , Sandy CLAY Very loose Clayey to Silty SAND Dense gravelly SAND
MT71-24	+18.3	0-3 3-10 10-17	Stiff Silty CLAY Stiff Sandy CLAY Very stiff Sandy CLAY
MT71-25	+17	0-4 4-7 7-13 13-20	Stiff Silty CLAY Soft Clayey SILT Soft Silty CLAY Stiff Sandy CLAY
HB-1	+20	0-13 13-18 18-23 23-28.5 28.5-31.5	Stiff lean CLAY Medium Stiff fat CLAY Loose clayey SAND Very Stiff fat CLAY Stiff sandy fat CLAY
HB-2	+20	0-16 16-28 28-34.5 34.5-41.5	Stiff to Very Stiff lean CLAY Very Stiff sandy fat CLAY Medium Dense clayey SAND Very Stiff sandy fat CLAY
HB-3	+17	0-17 7-29 29-30	Medium Stiff to Stiff lean CLAY Very Stiff sandy lean CLAY Poorly-Graded SAND
HB-4	+17	0-23.5 23.5-25 25-26	Medium Stiff to Very Stiff lean CLAY Medium Dense poorly-graded SAND Very Stiff lean CLAY
HB-5	+19	0-13 13-26.5	Stiff sandy lean CLAY Stiff sandy fat CLAY
HB-6	+19	0-16 16-41.5	Stiff to Very Stiff sandy lean CLAY Medium Dense clayey SAND
HB-7	+14	0-14 14-24 24-29 29-31.5	Stiff to Very Stiff sandy CLAY Soft to Medium Stiff fat CLAY Medium Stiff to Stiff sandy lean CLAY Very Stiff sandy fat CLAY
HB-8	+11.5	0-9.5 9.5-18.5 18.5-20 20-23 23-25 25-27 27-49 49-50	Medium Stiff to Stiff lean CLAY Medium Stiff fat CLAY Very Stiff sandy CLAY Dense clayey SAND Medium Stiff lean CLAY Loose to Medium Dense clayey SAND Stiff to Very Stiff fat CLAY Clayey Gravel



VBI In-Situ Testing

Operator: TIM d'ARCY
 Sounding: 01Z076
 Cone Used: HO752TC U2
 Elevation: +11.1

CPT Date/Time: 04-17-01 11:40
 Location: CPT-2
 Job Number: 18147-CA



Maximum Depth = 80.38 feet

Depth Increment = 0.16 feet

- 1 sensitive fine grained
- 2 organic material
- 3 clay

- 4 silty clay to clay
- 5 clayey silt to silty clay
- 6 sandy silt to clayey silt

- 7 silty sand to sandy silt
- 8 sand to silty sand
- 9 sand

- 10 gravelly sand to sand
- 11 very stiff fine grained (*)
- 12 sand to clayey sand (*)

**APPENDIX C
RISK TARGETED MAXIMUM CONSIDERED****EARTHQUAKE (MCE_R) GROUND MOTION HAZARD ANALYSIS**

Due to the presence of soft clay soil layers beneath the building site, we judge the site should be classified as “Site Class E” per the 2019 California Building Code. The ASCE 7-16 mapped spectral acceleration parameters at a period of 0.2-second, S_S , and 1.0-second, S_1 , at the project site are 1.73 g and 0.66 g, respectively. Per ASCE 7-16 Table 11.4-1 a Site-Specific Ground Motion shall be developed per Section 11.4.8 for S_S values greater than 1.0 g for Site Class E sites and all cases for Site Class F sites. Additionally, a Site-Specific Ground Motion Hazard Analysis shall be performed per ASCE 7-16 Section 11.4.8 if the S_1 value is greater than 0.2 g for Site Class D, greater than 1.0 g for Site Class E, and all cases for Site Class F. Therefore, per ASCE 7-16 Section 11.4.8, we performed a Site-Specific Ground Motion Hazard Analysis per ASCE 7-16 Section 21.2, as described in the sections below.

Probabilistic (MCE_R) Ground Motions: Method 1

A probabilistic acceleration response spectrum, corresponding to a 2% chance of exceedance in 50-years (2,475 return period) was generated utilizing the United States Geologic Survey (USGS) online Unified Hazard Tool (<https://earthquake.usgs.gov/hazards/interactive/>, accessed 2022) for a Site Class e soil profile ($V_{S30} = 180$ m/s) and the Dynamic: Conterminous U.S. 2014 (v4.2.0) model. The accelerations given were modified by the risk coefficients C_{RS} and C_{R1} , 0.90 and 0.90, respectively. The accelerations were further converted to the probabilistic spectral response acceleration in the maximum horizontal response utilizing the procedures outlined by Shahi and Baker, 2013. These modifications to the probabilistic spectra correspond to a response with a risk targeted level of 1% probability of collapse within a 50-year period. The resulting probabilistic MCE_R values and spectra are presented on Figures C-1 and C-2, respectively.

Deterministic (MCE_R) Ground Motions

A deterministic acceleration response spectrum was generated utilizing the NGA attenuation models outlined by Abrahamson, Silva & Kamai (2014); Boore, Stewart, Seyhan & Atkinson (2014); Campbell & Borzognia (2014); and Chiou & Youngs (2014) NGA2 West models for a Site Class e ($V_{S30} = 180$ m/s). The geometric average of the 84th percentile spectral accelerations from the aforementioned attenuation relationships were modified for the probabilistic spectral response acceleration in the maximum horizontal direction, utilizing the procedures outlined by Shahi and Baker, 2013. The resulting deterministic MCE_R values and spectra are shown on Figures C-1 and C-2, respectively. The deterministic MCE_R spectra shall not be less than the Lower Limit Deterministic MCE_R Response Spectrum, as described in ASCE 7-16 Figure 21.2-1 which is tabulated and plotted on Figures C-1 and C-2, respectively.

Site Specific MCE_R

The site specific MCE_R spectral response acceleration at any period shall be taken as the lesser of the response accelerations from the probabilistic ground motions and the deterministic ground motions and is presented on Figure C-3. Additionally, per ASCE 7-16 Section 21.3, the design spectral response acceleration at any period is equal to $2/3^{\text{rds}}$ the MCE_R Response Spectrum, as shown on Figure C-3.

Per ASCE 7-16 Section 21.4, the MCE_R spectral response acceleration parameters shall be taken from the Site-Specific Spectrum defined as follows and are presented on Figure C-3:

- S_{DS} – The S_{DS} parameter shall be taken as 90% of the maximum spectral acceleration, S_a , obtained from the site-specific spectrum, at any period between 0.2 and 5.0-seconds. However, the values obtained shall not be less than 80% of the values determined in accordance with ASCE 7-16 Section 11.4.5.
- S_{D1} – The S_{D1} parameter shall be taken as the maximum value of the product, TS_a , for periods between 1.0 and 2.0-seconds for Site Class C and B sites; and periods between 1.0 and 5.0-seconds for Site Class D, E & F sites. However, the values obtained shall not be less than 80% of the values determined in accordance with ASCE 7-16 Section 11.4.5.
- S_{MS} – The S_{MS} parameter is equal to 1.5 times the S_{DS} value, but not less than 80% of the values determined in accordance with ASCE 7-16 Section 11.4.4.
- S_{M1} – The S_{M1} parameter is equal to 1.5 times the S_{D1} value, but not less than 80% of the values determined in accordance with ASCE 7-16 Section 11.4.4.

**ASCE 7-16
SITE SPECIFIC RISK-TARGETED
MAXIMUM CONSIDERED EARTHQUAKE (MCE_R)**

Project Name: GHD Ellis Creek Outfall
Project Numbr: 1206.195

Latitude: 38.2147
Longitude: -122.5748

General Seismic Parameters
ASCE 7-16 Section 11.4

Site Class: E
S_S (g): 1.73
S_I (g): 0.66
F_w: N/A
F_v: N/A
T_L (sec): 8.0
C_{res}: 0.90
C_{ri}: 0.90

Minimum Design Spectra Parameters
ASCE 7-16 Section 21.3

Site Class: E
S_S (g): 1.73
S_I (g): 0.66
F_w: 1.00
F_v: 4.00
T₀ (sec): 0.30
T_S (sec): 1.52

Deterministic MCE Screening
ASCE 7-16 (Sup #1) 21.2.3

F_a: 1.00
1.2 x F_a (g): 1.20
Max PSHA (g): 2.19
DSHA Rqcd.: YES

Min. Deterministic MCE
ASCE 7-16 (Sup #1) 21.2.2

F_a: 1.00
1.5 x F_a (g): 1.50
Max DSHA (g): 1.85
Min MCE Rqcd.: NO

Probabilistic MCE
ASCE 7-16 Section 21.2.1 - Method 1

Period (sec)	S _R (g)				C _R	S _a (g)
	S _A (g)	S _B (g)	S _C (g)	S _D (g)		
0.01	0.76	1.10	0.83	0.902	0.75	
0.10	1.18	1.10	1.30	0.902	1.17	
0.20	1.56	1.10	1.72	0.902	1.55	
0.30	1.86	1.13	2.09	0.901	1.88	
0.50	2.07	1.18	2.43	0.900	2.19	
0.75	1.87	1.24	2.31	0.898	2.07	
1.00	1.73	1.30	2.25	0.896	2.01	
2.00	1.22	1.35	1.65	0.896	1.48	
3.00	0.84	1.40	1.17	0.896	1.05	
4.00	0.59	1.45	0.85	0.896	0.76	
5.00	0.44	1.50	0.66	0.896	0.59	

Deterministic MCE
NGA West2 2014 - 84th Percentile

Period (sec)	S _R (g)			S _a (g)
	S _A (g)	S _B (g)	S _C (g)	
0.01	0.59	1.10	0.64	0.52
0.02	0.58	1.10	0.64	0.52
0.03	0.56	1.10	0.62	0.50
0.05	0.59	1.10	0.65	0.52
0.08	0.67	1.10	0.74	0.60
0.10	0.78	1.10	0.86	0.69
0.15	0.93	1.10	1.02	0.83
0.20	1.06	1.10	1.17	0.95
0.25	1.20	1.11	1.33	1.08
0.30	1.33	1.13	1.50	1.21
0.40	1.50	1.15	1.72	1.39
0.50	1.56	1.18	1.83	1.48
0.75	1.47	1.24	1.82	1.47
1.00	1.43	1.30	1.85	1.50
1.50	1.27	1.33	1.69	1.36
2.00	1.11	1.35	1.50	1.22
3.00	0.80	1.40	1.12	0.90
4.00	0.56	1.45	0.81	0.66
5.00	0.40	1.50	0.61	0.49
7.50	0.19	1.50	0.29	0.23
10.00	0.10	1.50	0.16	0.13

Scaled Deterministic MCE
ASCE 7-16 (Sup #1) 21.2.2

Period (sec)	S _a (g)
0.01	0.52
0.02	0.52
0.03	0.50
0.05	0.52
0.08	0.60
0.10	0.69
0.15	0.83
0.20	0.95
0.25	1.08
0.30	1.21
0.40	1.39
0.50	1.48
0.75	1.47
1.00	1.50
1.50	1.36
2.00	1.22
3.00	0.90
4.00	0.66
5.00	0.49
7.50	0.23
10.00	0.13

Site Specific MCE_R
ASCE 7-16 Section 21.2.3

Period (sec)	S _a (g)
0.01	0.64
0.02	0.64
0.03	0.62
0.05	0.65
0.08	0.74
0.10	0.86
0.15	1.02
0.20	1.17
0.25	1.33
0.30	1.50
0.40	1.72
0.50	1.83
0.75	1.82
1.00	1.65
1.50	1.69
2.00	1.50
3.00	1.12
4.00	0.81
5.00	0.61
7.50	0.29
10.00	0.16

Site-Specific Design Spectrum
ASCE 7-16 Section 21.3

Period (sec)	S _a (g)
0.01	0.43
0.02	0.43
0.03	0.41
0.05	0.43
0.08	0.49
0.10	0.57
0.15	0.68
0.20	0.78
0.25	0.89
0.30	1.00
0.40	1.15
0.50	1.22
0.75	1.21
1.00	1.24
1.50	1.12
2.00	1.00
3.00	0.74
4.00	0.54
5.00	0.40
7.50	0.19
10.00	0.10

80% General Response Spectrum
ASCE 7-16 Section 21.3

Period (sec)	S _a (g)	80% S _a (g)
0.01	0.48	0.39
0.06	0.60	0.48
0.11	0.71	0.57
0.16	0.82	0.65
0.21	0.93	0.74
0.25	1.04	0.83
0.30	1.15	0.92
0.40	1.15	0.92
0.50	1.15	0.92
0.75	0.98	0.78
1.00	0.85	0.68
1.50	0.75	0.60
2.00	0.68	0.54
2.50	0.61	0.49
3.00	0.56	0.45
3.50	0.52	0.41
4.00	0.48	0.38
4.50	0.45	0.36
5.00	0.42	0.33
6.00	0.39	0.31
7.00	0.37	0.30
8.00	0.35	0.28

T₀ = 0.30
T_S = 1.52



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ASCE 7-16 MCE_R CALCULATIONS

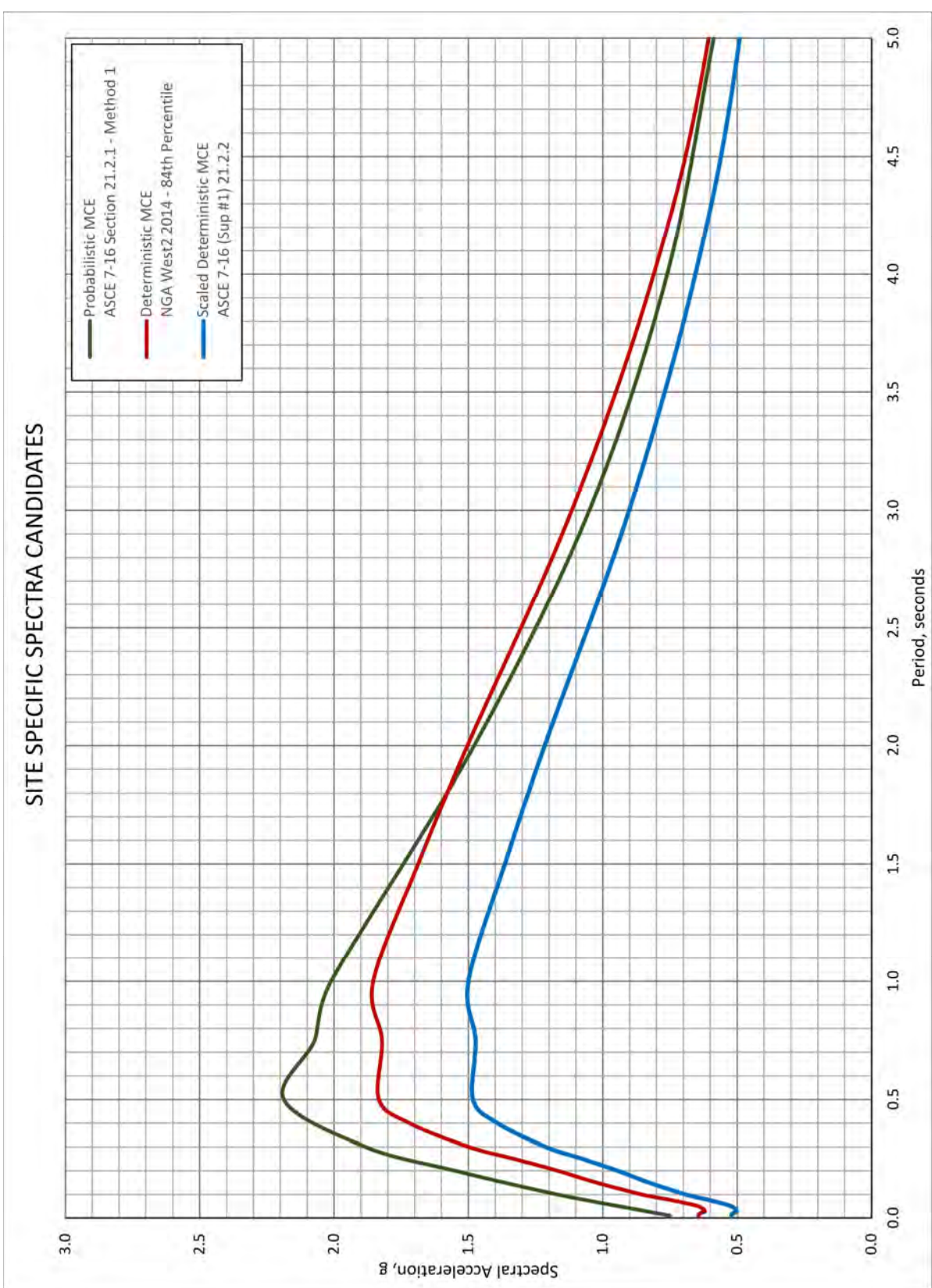
Ellis Creek Outfall
3890 Cypress Drive
Petaluma, California

Project No. 1206.195

Date: 4/13/2022

Drawn: MMT
Checked:

C-1
FIGURE



MPEG
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ASCE 7-16 MCEr CANDIDATE SPECTRA

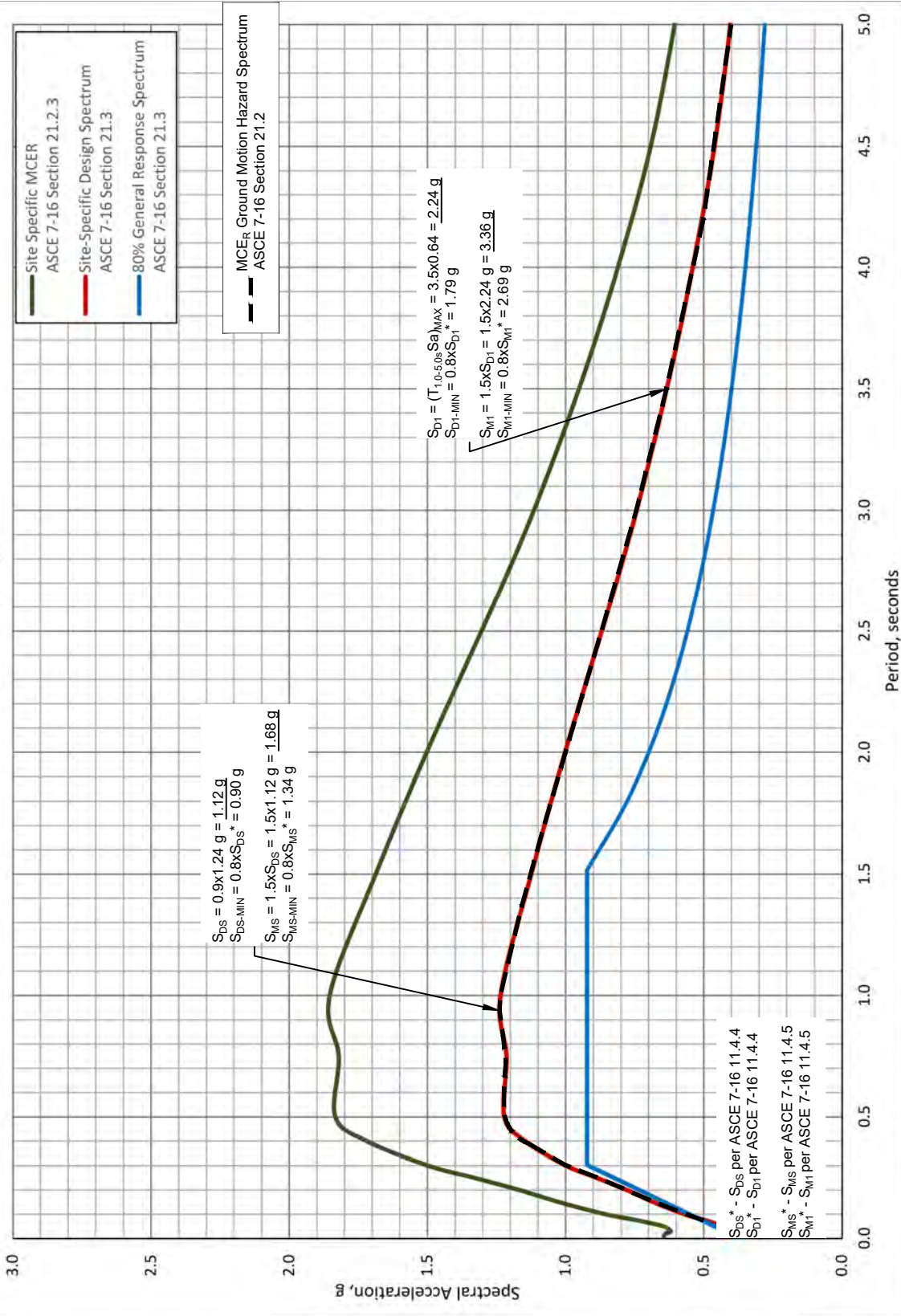
Ellis Creek Outfall
 3890 Cypress Drive
 Petaluma, California

Project No. 1206.195 Date: 4/13/2022

Drawn MMT
 Checked

C-2
 FIGURE

SITE SPECIFIC MCE_R



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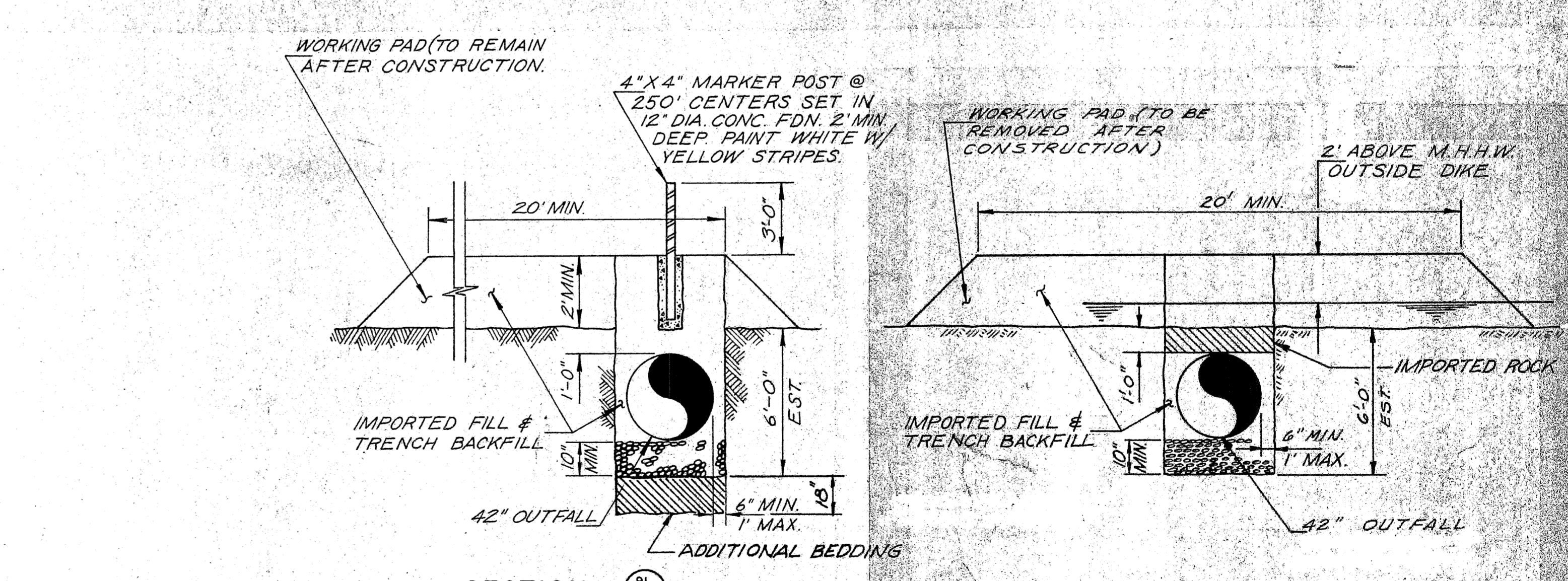
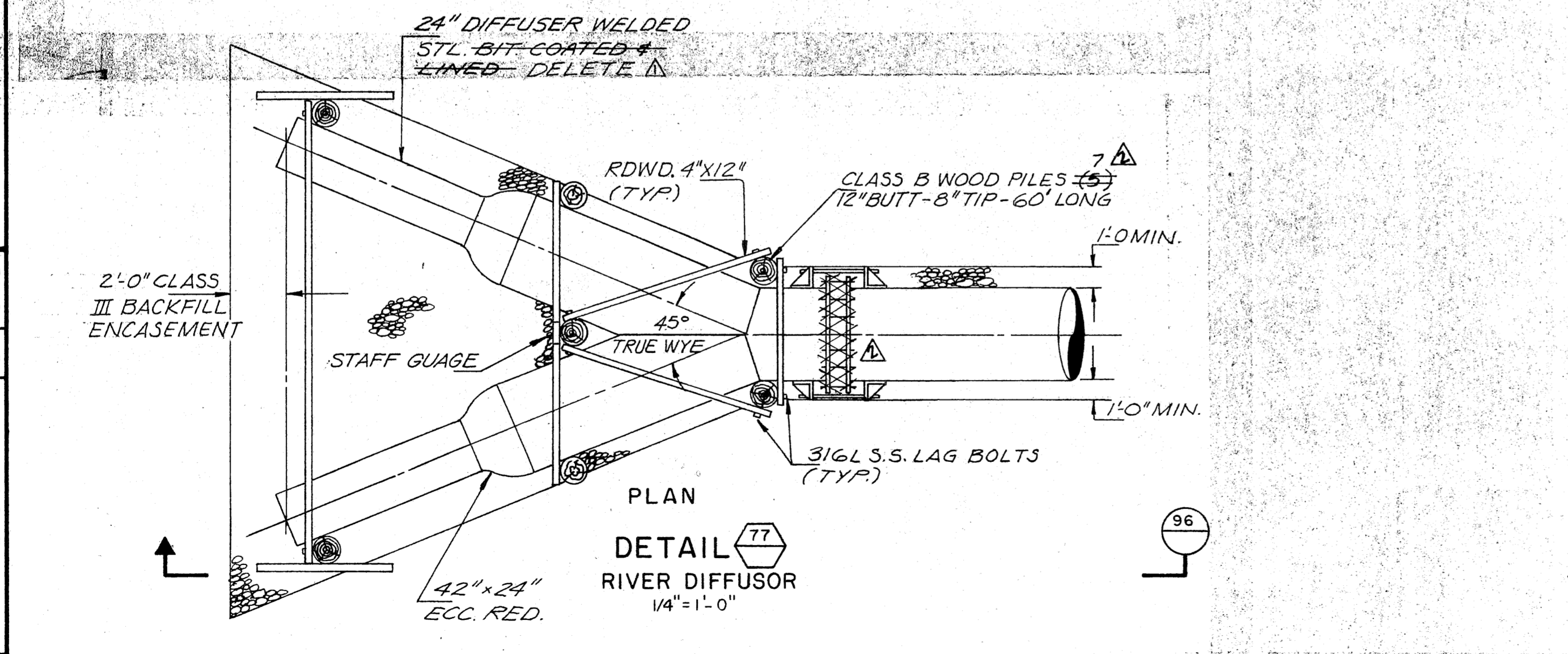
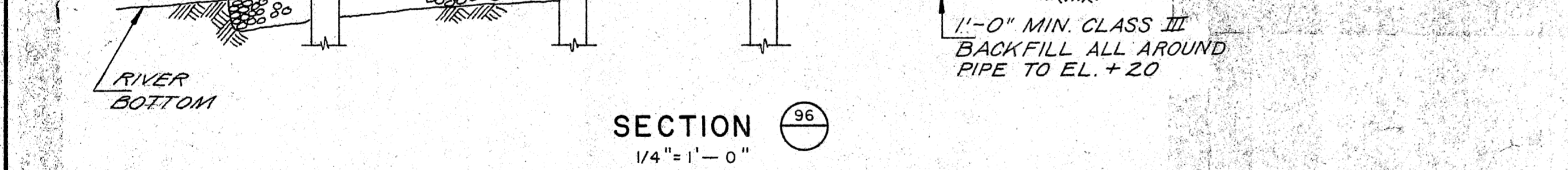
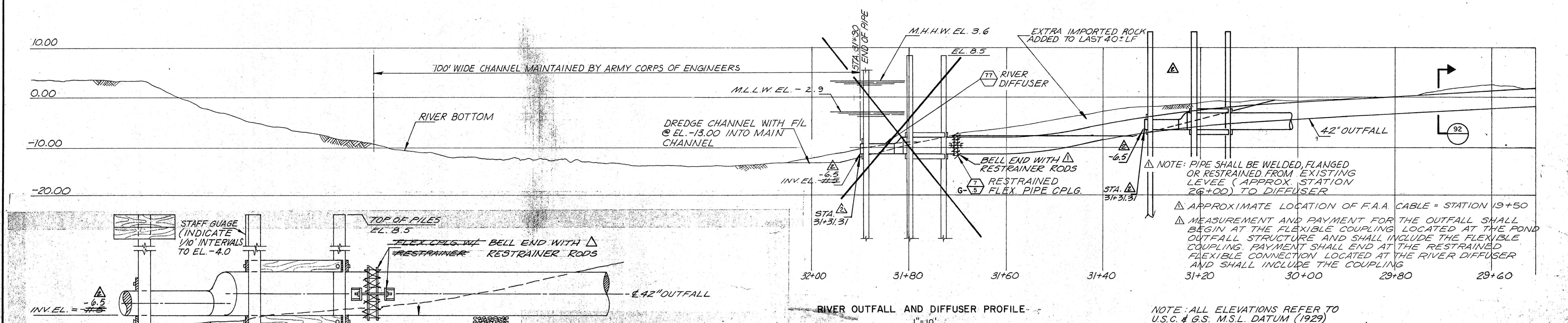
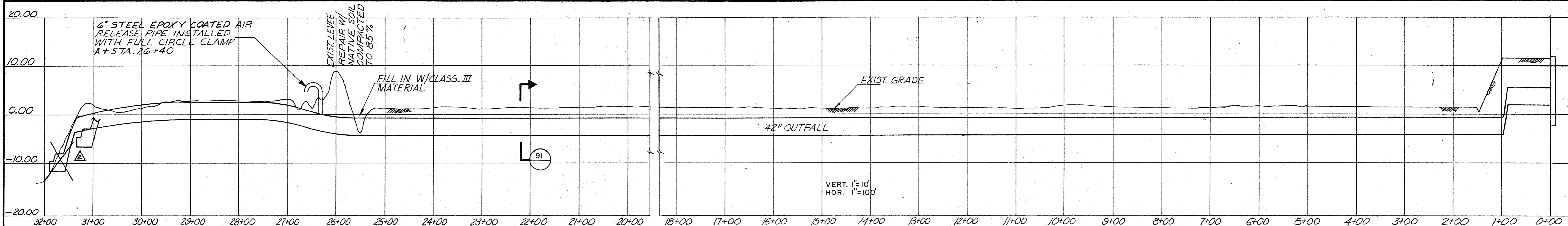
ASCE 7-16 MCE_R DESIGN SPECTRUM

Ellis Creek Outfall
 3890 Cypress Drive
 Petaluma, California

Project No. 1206.195 Date: 4/13/2022

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C-3
 FIGURE



AS BUILT ROE 2/10/71

REV.	DATE	BY
2-9-71		
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NO.	REVISION	

