



BELMONT, CALIFORNIA

**CONTRACT DOCUMENTS
FOR THE CONSTRUCTION OF THE**

**SR101 CROSSING AT PALO ALTO MEDICAL
FOUNDATION (PAMF) WATER MAIN
IMPROVEMENTS PHASE 1**

SAN MATEO COUNTY, CALIFORNIA

June 2020

October 2020 - Conformed



Acknowledgment

Mid-Peninsula Water District

SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1

These specifications and plans have been prepared by or under the direction of the following design professionals, licensed by the State of California, for each of the various disciplines involved:



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5/14/20



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5/14/20

QA/QC



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**MID-PENINSULA WATER DISTRICT
SR101 CROSSING AT PALO ALTO MEDICAL FOUNDATION (PAMF)
WATER MAIN IMPROVEMENTS PHASE 1**

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GENERAL PROVISIONS

TECHNICAL SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS

01 10 00	Summary of Work
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01 33 00	Submittals
01 45 00	Quality Control
01 50 00	Temporary Facilities and Controls
01 52 00	Traffic Control Plan
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DIVISION 13 – SPECIAL CONSTRUCTION

13 47 13	Galvanic Anode Cathodic Protection System
13 47 14	Galvanic Anode Cathodic Protection of Ductile Iron Pipeline

DIVISION 31 – EARTHWORK

- 31 23 19 Control of Water
- 31 23 23.33 Controlled Density Fill
- 31 80 00 Trench Excavation, Bedding, and Backfill

DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 10 00 Paving, Restoration, and Resurfacing Work
- 32 91 00 Landscaping Repairs

DIVISION 33 – UTILITIES

- 33 14 13 Water Main
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APPENDIX

McMillen Jacobs Associates, Geotechnical Investigation Report, SR 101 Crossing at PAMF,
June 2020

ADVERTISEMENT FOR PROPOSALS

Mid-Peninsula Water District
3 Dairy Lane
Belmont, CA 94002

Sealed PROPOSALS for the **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1** whether mailed or personally delivered, must be received by the Mid-Peninsula Water District (MPWD) staff by **2:00 P.M., August 27, 2020** at the District's administrative offices located at 3 Dairy Lane, Belmont, CA 94002. PROPOSALS will then be publicly opened and read aloud at the administrative offices.

PROPOSALS received after 2:00 P.M. will not be accepted. PROPOSALS will not be accepted if they are delivered by fax, telephone or other electronic means. Bidders dropping a PROPOSAL in the District's mail slot are advised to confirm receipt by District staff via e-mail. BIDDER can contact Lindsey Olson, at 530-792-3226 with any questions.

This project will install a new watermain to a future SR101 crossing location. The project consists of constructing approximately 700 LF of 12-inch DIP water main within the PAMF easement; anode test stations; associated tie-ins and appurtenances as shown on the plans. Work also includes roadway restoration including traffic striping and slurry seal.

The project is located in the **City of San Carlos, California**. The work will be done for the **Mid-Peninsula Water District** (i.e., referred to herein as the "Owner" or as the "District").

The CONTRACT DOCUMENTS may be examined at the following locations:

Builders Exchange of Santa Clara
400 Reed Street
Santa Clara, CA 95050
(408) 727-4000
(408) 727-2779 Fax

San Francisco Builders Exchange
850 South Van Ness Avenue
San Francisco, CA 94110
(415) 282-8220
(415) 821-0363 Fax

Bay Area Builders Exchange
3055 Alvarado Street
San Leandro, CA 94577
(510) 483-8880
(510) 352-1509 Fax

To bid the project, potential BIDDER must purchase the CONTRACT DOCUMENTS from the District. Plan houses and Bidders who purchased the CONTRACT DOCUMENTS will receive copies of the addendums and updates.

Copies of the CONTRACT DOCUMENTS may be obtained from the Office of District Engineer. at 5776 Stoneridge Mall Road, Suite 320, Pleasanton CA 94588 upon payment of \$50.00 for each set. **Make checks payable to "Mid-Peninsula Water District" The payment is nonrefundable.**

A mandatory pre-bid meeting and tour is scheduled for, August 5, 2020 at 10:00 A.M. at the MPWD office, located at 3 Dairy Lane, Belmont, CA 94002. BIDDER must have purchased a copy of the CONTRACT DOCUMENTS and attend the mandatory pre-bid meeting to be considered eligible to bid the project. PROPOSALS submitted by parties not attending the pre-bid meeting will be rejected.

The BIDDER must possess a valid Class A Contractor's license in the State of California at the time of CONTRACT award and throughout the CONTRACT term.

In addition, the Bidder or listed subcontractor must have been engaged in the contracting business, under the present business name for ten (10) years and have experience in work of nature similar to this project which extends over a period of five (5) years.

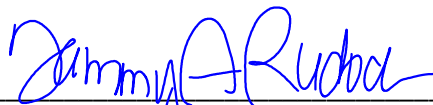
This project includes public works as defined by California Labor Code section 1720. The successful BIDDER shall be responsible for the payment of prevailing wage rates, the training of apprentices and compliance with other related requirements. The prevailing wage rates for the Contract include the California Department of Industrial Relations' General Prevailing Wage Determinations: 2020-1. Copies of applicable prevailing wage rates may be viewed online at <http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>.

Contractors and subcontractors must be registered with the Department of Industrial Relations (DIR) at the time of bid, or else the bid may be rejected as non-responsive. (See Labor Code sections 1725.5 and 1771.1.) Each BIDDER must submit proof of contractor registration with DIR (e.g. a hard copy of the relevant page of the DIR's database found at: <https://efiling.dir.ca.gov/PWCR/Search>) This Contract is subject to monitoring and enforcement by the DIR pursuant to Labor Code Section 1771.4.

Pursuant to Public Contract Code Section 22300, the successful BIDDER may submit certain securities in lieu of the Owner retaining a portion of progress payments during the Project. The successful BIDDER will be required to furnish a Performance Bond and a Payment Bond, both in the amounts not less than one hundred percent (100%) of the contract price.

6/24/20

Date



District Representative Signature

INFORMATION FOR BIDDERS

Hand carried sealed PROPOSALS for the **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1** whether mailed or personally delivered, must be received by the **Mid-Peninsula Water District** staff by **2:00 P.M., August 27, 2020** at the District's administrative offices located at **3 Dairy Lane, Belmont CA 94002**. PROPOSALS will then be publicly opened and read aloud at the administrative offices.

PROPOSALS received after 2:00 P.M. will not be accepted. No telephonic, facsimile or other electronically transmitted PROPOSALS will be accepted. Bidders dropping a PROPOSAL in the District's mail slot are advised to confirm receipt by District staff via e-mail. BIDDER can contact Lindsey Olson, at 530-792-3226 with any questions.

Each PROPOSAL must be submitted in a sealed envelope, addressed to the **Mid-Peninsula Water District**. Each sealed envelope containing a PROPOSAL must be plainly marked on the outside as PROPOSAL for **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1**. The envelope should bear on the outside the BIDDER'S name, address, and license number.

All PROPOSALS must be made on the required PROPOSAL form. All blank spaces for PROPOSAL prices must be filled in (in ink or typewritten), and the PROPOSAL form must be fully completed and executed when submitted. Only one copy of the PROPOSAL form is required.

At its discretion, the DISTRICT may waive minor irregularities in the proposal, or reject any and all PROPOSALS. Any PROPOSAL may be withdrawn prior to the above scheduled time for the opening of PROPOSALS or authorized postponement thereof. Any PROPOSAL received after the time and date specified shall not be considered. No BIDDER may withdraw a PROPOSAL within seventy-five (75) calendar days after the actual date of the opening thereof. Should there be reasons why the CONTRACT cannot be awarded within the specified period, the time may be extended by mutual agreement between the DISTRICT and the BIDDER.

The CONTRACT DOCUMENTS contain the provisions required for completing the project. Information obtained from an officer, agent, or employee of the DISTRICT or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve the CONTRACTOR from fulfilling any of the conditions of the CONTRACT.

Each PROPOSAL must be accompanied by a Bidder's Bond, or a certified or cashier's check, payable to the DISTRICT for ten (10) percent of the total amount of the PROPOSAL. The DISTRICT will return the bonds of the remaining unsuccessful BIDDERS after the CONTRACT is executed. The Bidder's Bond of the successful BIDDER will be retained until the Performance Bond and Payment Bond have been executed and approved, after which it will be returned.

The party, or parties, to whom the CONTRACT is awarded will be required to execute the CONTRACT and obtain the Performance/Payment Bonds (both in the amounts not less than one hundred percent (100%) of the contract price), and insurance within fifteen (15) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary CONTRACT and bond forms. In case of failure of the BIDDER to

execute the CONTRACT, the DISTRICT may consider the BIDDER in default, in which case the Bid Bond accompanying the proposal shall be forfeited by the BIDDER.

After receiving the signed CONTRACT with acceptable bonds and insurance certificates from the successful BIDDER, the DISTRICT will sign the CONTRACT.

As soon as practicable, after execution of the CONTRACT by the DISTRICT, approval by the District of Contract Bonds and all other documents listed in the CONTRACT, and after receipt of acceptable insurance certificates by the DISTRICT, a written NOTICE TO PROCEED will be mailed to the BIDDER. The effective date of the NOTICE TO PROCEED will be the date stated as such in the NOTICE TO PROCEED, provided that the effective date will not be earlier than the day following the issuance of the NOTICE TO PROCEED.

The DISTRICT may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the work, and the BIDDER shall furnish to the DISTRICT all such information and data for this purpose as the DISTRICT may request.

The DISTRICT reserves the right to reject any PROPOSAL if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the DISTRICT that such BIDDER is a "responsible bidder" as defined in Public Contract Code Section 1103.

A conditional or qualified PROPOSAL will not be accepted.

Award will be made to the lowest responsive, responsible BIDDER. The lowest responsive, responsible BIDDER will be determined by: (1) lowest overall cost to the DISTRICT, (2) evaluation of BIDDER's experience to determine that it meets the minimum qualifications, (3) a BIDDER's proposal that complies with all the requirements prescribed in this document. The BIDDER must possess a valid Class A Contractor's license in the State of California at the time of CONTRACT award and throughout the CONTRACT term. The Contractor will also be required to ensure that all subcontractors working on the project are holding valid licenses suitable for their trades. The proposals will be compared on the basis of the "Total Bid Price".

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the CONTRACT throughout.

Each BIDDER shall certify that he, or his representative, has inspected the site and has attended the pre-bid meeting and tour and has read and is thoroughly familiar with the CONTRACT DOCUMENTS. Failure to attend and complete the pre-bid meeting and tour disqualifies the BIDDER. A sign-in sheet will be used to confirm completion of the pre-bid meeting. Late arrivals will also be disqualified. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its PROPOSAL. After PROPOSALS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the nature of the work to be done.

Pursuant to Public Contract Code Section 22300, the successful BIDDER may submit certain securities in lieu of the Owner withholding retention of payments during the project.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the Equal Opportunity Clause.

Each BIDDER shall supply, using the forms provided in this document, the names and addresses of all SUBCONTRACTORS and shall complete and submit the STATEMENT OF QUALIFICATIONS, EXPERIENCE, AND BUSINESS REFERENCES when submitting his PROPOSAL.

The services of the Contractor required under this Contract constitute a "public works" project as defined by the California Labor Code. Therefore, the Contractor agrees to comply with all applicable prevailing wage requirements set forth in California Labor Code Sections 1770 to 1781 inclusive. All workers employed on or in the execution of the project shall be paid not less than the applicable current general prevailing wage as determined by the Director of Industrial Relations. The current General Prevailing Wage Determinations located on the Department of Industrial Relations' website (<https://www.dir.ca.gov/oprl/PWD/index.htm>), shall be incorporated into this Contract. The Contractor shall be responsible for the compliance of its subcontractors. The Contractor's attention is directed to the payroll records requirement of Labor Code Section 1776, and Contractor and its subcontractors will 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 worker in connection with services performed under this Contract, and will make payroll records available upon request.

Pursuant to Labor Code Section 1725.5, no Contractor may submit a Bid Proposal for this project, and no subcontractor may be listed in the Bid Proposal for this project, unless the Contractor/Subcontractor is registered with the California Department of Industrial Relations ("DIR") at the time of the Bid Proposal submission. Failure of the Contractor or any Subcontractor to be registered with the DIR may result in rejection of the Bid Proposal. This project is subject to monitoring and enforcement by the DIR pursuant to Labor Code Section 1771.4. The Contractor must post site notices, as described by Title 8, CCR Section 16541(d).

Also, prior to the beginning of work, a pre-construction meeting will be held at the DISTRICT for the purpose of discussing with the Contractor the scope of work, contract drawings, Specifications, existing conditions, materials to be ordered, equipment used, and all essential matters pertaining to the prosecution of and the satisfactory completion of the project as required. *The Contractor's Project Manager, Project Foreman, and subcontractors shall attend the pre-construction meeting.*

West Yost Associates (Engineer), is the project engineer contracted with Mid-Peninsula Water District (District). Questions should be directed to the Engineer's Davis office as follows:

West Yost Associates
2020 Research Park Drive, Suite 100
Davis, CA 95618
530-792-3226
530-756-5991 fax
Attention: Lindsey Olson
LOlson@westyost.com

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PROPOSAL

**TO: Mid-Peninsula Water District
3 Dairy Lane
Belmont, CA 94002**

**PROJECT TITLE: SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements
Phase 1**

BIDDER'S DECLARATIONS AND AGREEMENTS

The undersigned, _____ hereinafter called the Bidder,
(Contractor's Name)

hereby proposes to perform all work and to furnish all labor, services, materials, tools, equipment, supplies, transportation and all other items and facilities necessary to complete all work for the above-named Project as specified or indicated in the Contract Documents for the price set forth below in this Proposal.

The Bidder has carefully examined all of the Contract Documents for the Project, including the Notice to Contractors, this Proposal and documents submitted together with it, the Contract, the General Provisions, the Special Provisions, the Specifications, the Contract Drawings and all Addenda. All provisions of the Contract Documents are hereby accepted and all representations and warranties required thereby are hereby affirmed.

The Bidder has by investigation of the site of the work and otherwise satisfied himself as to the nature, scope and location of the work and has fully informed himself as to all conditions and matters which can in any way affect the work or the cost thereof, including quantities of materials and equipment required. The Bidder has exercised his own judgment regarding the interpretation of subsurface information and has utilized all data, which he believes pertinent from the District and other sources in arriving at his conclusions.

The Bidder has carefully checked all the words and figures inserted in this Proposal and understands that it may not be revoked or withdrawn for seventy-five (75) calendar days after the date on which Proposals are opened and all bids shall be subject to acceptance by the District.

QUALIFICATIONS OF THE BIDDER

The Bidder certifies that he or she is familiar with all applicable federal, state, and local laws applicable to the work, and hereby agrees to comply with all such laws.

Furthermore, the Bidder hereby declares that he or she can perform all work as described in the advertisement of proposal.

The Bidder (and subcontractors) has (have) fully described his or her qualifications and experience of the most current projects within the last five (5) years in which have completed three (3) DIP water main installation projects on the respective forms entitled, "Bidder's Statement of Qualifications, Experience, and Business References," included with the Proposal documents. Failure to comply with this section will be grounds for rejecting the bid as non-responsive. Note that this form includes mandatory minimum experience requirements which the Bidder must

meet in order to have its bid accepted. In addition, the project foreman must verify that he/she was in charge of at least five (5) previous projects, three (3) of which are exclusively DIP water main installation projects.

CONTRACT EXECUTION AND BONDS

The Bidder agrees that if this Proposal is accepted, they will, within fifteen (15) calendar days after having received notice of award, sign and deliver the Contract in the form included in the Contract Documents and will at that time deliver to the District the Performance Bond and Payment Bond required herein.

CERTIFICATES OF INSURANCE

The Bidder agrees that if this Proposal is accepted, he will, within fifteen (15) calendar days after receiving notice of award, furnish the District with certificates and policies of insurance as specified in the Contract Documents.

START OF CONSTRUCTION AND CONTRACT COMPLETION TIME

If awarded the Contract, the Bidder agrees to begin work within five (5) working days after the effective date of the Notice to Proceed, and to complete the work, in all respects, within **thirty (30) working days** from the effective date of the Notice to Proceed.

LIQUIDATED DAMAGES

If the Bidder is awarded the Contract but fails to complete the work within the Contract time of completion limit set forth above, or as it may be extended as provided in the Contract Documents, the Bidder agrees to pay liquidated damages to the District at the rate of **One Thousand Seven Hundred Fifty Dollars (\$1,750.00)** per day until the work is completed.

ADDENDA

The Bidder hereby acknowledges that they have received the following attached Addenda Nos.: _____ (Bidder: insert number of each Addendum received **and** attach a copy to this Proposal) and agrees that all Addenda issued are a part of the Contract Documents. The Bidder agrees that this Proposal includes all impacts resulting from these Addenda.

SALES AND USE TAXES

The Bidder agrees that all federal, state and local sales and use taxes are included in the price for the work set forth below.

BID SECURITY

Bidder has accompanied this proposal with a Bid Security in the amount and in the form required by these Contract Documents. The Bid Security and the proceeds there from shall become the property of the District in the event that Bidder's proposal is accepted by the District and Bidder

fails to sign and deliver the Contract and to furnish the required bonds and certificates of insurance within the time period set forth in this Proposal and in the Contract Documents.

AWARD OR REJECTION OF BIDS

Award will be made or proposals rejected by the District within the time specified in the Special Provisions or proposal documents, or if not specified, within a reasonable time after bids have been opened. The District may reject any or all bids, and shall reject a bid of any party who has been delinquent or non responsible in any former Contract with the District. The District also reserves the right to waive any minor irregularities in any bid or in the bidding procedures.

Contractor shall submit for review a Bidder's Statement of Qualifications, Experience, and Business References for this type of work.

All bids will be compared on the basis of the **"Total Bid Price."**

All Bidders shall be notified of the award.

PROPOSAL DOCUMENTS

Accompanying this Proposal are the following documents, which have been properly completed and executed, and the same hereby are made a part of this Contract by reference: List of Subcontractors, Non-Collusion Declaration, Bidder's Bond or Bid Security Form, Bidder's Statement of Qualifications, Experience, and Business References

BID SCHEDULE

The Bidder agrees to accept as full payment for the construction of the Project, in accordance with the Contract Documents, the amount computed in accordance with the following prices, which includes all costs for labor, materials, tools, equipment, services, taxes, insurance, overhead, profit, warranty performance and all other costs necessary to perform the work in accordance with the Contract Documents. It is expressly agreed that unit prices are not dependent on the exact quantity furnished. Bid prices shall be shown in both words and figures. In case of a discrepancy, the amount in words has precedence.

SURETY

If the Bidder is awarded the Contract, the surety who will provide the Performance Bond

and Payment Bond will be _____,

Whose address is _____

(City)

(State)

(Zip Code)

BIDDER

The name of the Bidder submitting this Proposal is _____

The address to which all communications concerned with this Proposal and the

contract shall be sent is _____,

(City)

(State)

(Zip Code)

The Bidder declares under penalty of perjury that the Bidder's Contractor's License

No. is _____ and that this license expires on _____,
Date

and Bidder is registered with the Department of Industrial Relations (DIR)

No. is _____ and that this license expires on _____.
Date

The Bidder's Telephone Number () _____

SIGNATURE

1. If Sole Owner

I sign as sole owner of the business named above as Bidder.

Signature of Bidder

Name: _____ Date: _____, 20 ____

2. If Partnership

The undersigned certifies that he is a general partner in the Partnership named above as Bidder and that he has full authority to sign this Proposal on behalf of the Partnership.

Signature of Partner

Name: _____ Date: _____, 20 ____

3. If Corporation

The undersigned certify that they are officers of the Corporation named above as Bidder and have full authority to sign this Proposal on behalf of the Corporation.

Name of Corporation *

*If Bidder is a Corporation, two corporate officers must execute the proposal (or agreement) consisting of the following: 1.) the President, Vice President or Chair of the Board and 2.) the Secretary, Assistant Secretary, Chief Financial Officer or Assistant Treasurer. If only one officer signs or an officer other than those specified above, the Corporation shall provide satisfactory evidence that the individual signing is authorized to sign on behalf of the corporation (e.g. copy of a certified resolution delegating authority, copy of the corporation bylaws addressing execution of contracts.)

By: _____
Signature

Name: _____
Print

Title: _____

Date: _____, 20 ____

By: _____
Signature

Name: _____
Print

Title: _____

Date: _____, 20 ____

4. If Joint Venture

The undersigned certify that they have full authority to sign this Proposal on behalf of the Joint Venture named above as Bidder.

Name of Joint Venture

By: _____
Signature

Name: _____
Print

Title: _____

Date: _____, 20 _____

By: _____
Signature

Name: _____
Print

Title: _____

Date: _____, 20 _____

(Submit statement explaining the nature of the individual entities which comprise the Joint Venture and evidence of authority of individuals who sign this Proposal to do so on behalf of the Joint Venture.)

5. If Limited Liability Company (LLC)

The undersigned certifies that he/she is an officer or member of the LLC named above as Bidder and full authority to sign this Proposal on behalf of the LLC.

Name of LLC

By: _____
Signature

BID SCHEDULE
SR101 CROSSING AT PALO ALTO MEDICAL FOUNDATION (PAMF)
WATER MAIN IMPROVEMENTS PHASE 1

ITEM NO.	ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT COST	TOTAL COST
1	Mobilization and Demobilization	LS	1		
2	Sheeting, Shoring, and Bracing	LS	1		
3	Traffic Control	LS	1		
4	Construct 12-inch Dia. DIP Water Main by Open Cut	LF	674		
5	Cathodic Protection	LS	1		
6	12-inch Tie-In to Existing Water Main	EA	1		
7	Install 12-inch Gate Valve and Box	EA	1		
8	Install 1-inch Combination Air Valve Assembly	EA	1		
9	Remove Trees	EA	9		
10	Dewatering	LS	1		
11	Type II Slurry Seal	SF	7,300		
12	Install 6-inch Blow Off Assembly	EA	1		
13	Over Excavate and Install Crushed Drain Rock As Authorized by the Construction Manager	LF	70		
Total Bid Price					

LIST OF SUBCONTRACTORS

The Bidder is required to furnish the following information in accordance with the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California. This list and information shall include all subcontractors that will perform work, provide labor or render services to the Bidder in connection with the project in an amount in excess of one-half of one percent of the total amount of Bidder's proposal. Each subcontractor shall be registered with the Department of Industrial Relations (DIR) and shall provide and list their Registration Number.

1. Name of Subcontractor:	_____
Licensed Number:	_____
DIR Registration No:	_____
Address:	_____ _____
Description of Work to be Done Under Subcontractor:	_____
Total Value of Work:	_____
2. Name of Subcontractor:	_____
Licensed Number:	_____
DIR Registration No:	_____
Address:	_____ _____
Description of Work to be Done Under Subcontractor:	_____
Total Value of Work:	_____
3. Name of Subcontractor:	_____
Licensed Number:	_____
DIR Registration No:	_____
Address:	_____ _____
Description of Work to be Done Under Subcontractor:	_____
Total Value of Work:	_____

Do not list alternative subcontractors for the same work.

NON-COLLUSION DECLARATION
TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

The undersigned declares:

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

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

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

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____[date], at _____[city], _____[state]."

Signature of Bidder

Title

Date

INTENTIONALLY LEFT BLANK

BIDDER'S BOND

BOND NO. _____

AMOUNT: \$ _____

KNOW ALL PERSONS BY THESE PRESENTS, that
_____ hereinafter called
the PRINCIPAL, and _____,
a corporation duly organized under the laws of the State of _____ having its
principal place of business at _____, in
the State of _____, and authorized to do business in the State of California,
hereinafter called the SURETY, are held and firmly bound unto the **Mid-Peninsula Water District**,
hereinafter called the OBLIGEE, or order in the sum of _____
Dollars (\$ _____) (being at least ten percent (10%) of the total amount of Principal's
proposal) lawful money of the United States, for the payment of which we bind ourselves, our
heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these
presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the PRINCIPAL has submitted its Proposal for the project entitled **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1 ("the Contract")** to the OBLIGEE, said Proposal, by reference thereto, being hereby made a part hereof.

NOW, THEREFORE, if said Proposal is rejected, or in the alternate, if said Proposal is accepted and the PRINCIPAL signs and delivers a Contract and furnishes a Performance Bond, Payment Bond, and a Certificate of Insurance evidencing the required insurance in the form and within the time required by the Proposal and the Contract Documents, then this obligation shall become null and void, otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the SURETY for any and all default of the PRINCIPAL shall be the amount of this obligation as herein stated.

The SURETY, for value received, hereby agrees that the obligations of said SURETY and its bond shall not be impaired or affected by any extension of the time within which the OBLIGEE may accept such Proposal, and the SURETY hereby waives notice of any such extension.

In the event suit is brought upon this bond by the OBLIGEE and judgment is recovered, the SURETY shall pay, in addition to the sum set forth above, all costs incurred by the OBLIGEE in such suit, including a reasonable attorney's fees, to be fixed by the Court.

BIDDER'S BOND No. _____

Signed this _____ day of _____, 2020 _____

Principal: _____

(SEAL)

By: _____

Surety: _____

(SEAL AND NOTARIAL
ACKNOWLEDGEMENT
OF SURETY)

By _____

Attorney-in-Fact

* * *

Note: To be considered complete, both the principal and the surety must sign this bidder's bond. In addition, the surety's signature must be notarized and a copy of the surety's power of attorney must be attached.

BID SECURITY FORM

(TO BE USED IF A CHECK, RATHER THAN A
BIDDER'S BOND, ACCOMPANIES PROPOSAL)

Accompanying this Proposal is a cashier's check or certified check payable to the **Mid-Peninsula Water District** (hereinafter referred to as "Owner")

for _____ Dollars (\$ _____) this amount being at least 10 percent of the total amount of the Proposal. This check shall become the property of the Owner, and it shall be entitled to its proceeds, if the Bidder's Proposal is accepted by the Owner and the Bidder fails to sign and deliver the Contract and to furnish the required bonds and a Certificate of Insurance evidencing the required insurance within the time set forth in the Proposal and other Contract Documents. Otherwise the check shall be returned to the Bidder at the time set forth in the Contract Documents.

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**BIDDER'S STATEMENT OF QUALIFICATIONS
EXPERIENCE AND BUSINESS REFERENCES**

**MID-PENINSULA WATER DISTRICT
SR101 CROSSING AT PALO ALTO MEDICAL FOUNDATION (PAMF)
WATER MAIN IMPROVEMENTS PHASE 1**

The Bidder shall provide all of the following information requested, and shall ensure that all items are filled out completely. The Bidder hereby agrees that the submission of incomplete or false information may be considered as just cause for rendering the Bidder's Proposal as "non-responsive."

Name of Bidder _____

Address of Principal Office _____

1. Are you an individual _____, a partnership _____, a corporation _____, or a joint venture _____, or LLC _____? (Check as applicable)

If a partnership, list names and addresses of partners; if a corporation or LLC, list names of officers and directors and State of incorporation; if a joint venture, list names and addresses of venturers and if any venturer is a corporation, partnership or joint venture, list the same information for each such corporation, partnership and joint venture.

For the following questions, if a joint venture, give information for each of the venturers, by name. Attach additional sheets if necessary.

2. How many years has your organization been in business as a Contractor under your present business name? _____

3. How many years of experience has your organization had in construction work similar to the work you are interested in bidding?

(a) As a general contractor? _____

(b) As a subcontractor? _____

MANDATORY MINIMUM EXPERIENCE AND QUALIFICATION REQUIREMENTS

Bidders must satisfy each of the following mandatory minimum experience and qualification requirements. The requirements are "Pass/Fail" in that, if a bidder does not satisfy any of the mandatory requirements, the bid may be rejected as non-responsive.

Name of Contractor _____

4. Are you licensed as a Contractor to do business in California? _____

License No. _____ Classification _____

Department of Industrial Relations (DIR) Registration No. _____

i. Please specify all other license classifications you expect to have at the time of contract award: _____

5. It is mandatory that the bidder has successfully completed, or is currently working on at least three (3) DIP water main installation projects over the last five (5) years. Accordingly, the following information must be provided for each project:

(a) Project: _____ Year: _____

Value of Work: \$ _____ Location: _____

Owner Reference: _____

Phone Number: _____

(b) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(c) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(d) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(e) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

6. It is mandatory that the foreman designated for this project must have been the person in charge for at least (5) previous construction projects three (3) of which must be exclusively DIP water main installation projects. Accordingly, the following information must be provided for each project for which the foreman was in charge.

Name of Individual _____

Detail of Similar Projects

- (a) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference Name: _____
Phone Number: _____
- (b) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference Name: _____
Phone Number: _____
- (c) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference Name: _____
Phone Number: _____
- (d) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference Name: _____
Phone Number: _____
- (e) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference Name: _____
Phone Number: _____

BIDDER'S GENERAL QUALIFICATION INFORMATION

8. Please provide the following information on all projects performed over the last five (5) years:

(a) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(b) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(c) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(d) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

(e) Project: _____ Year: _____
Value of Work: \$ _____ Location: _____
Owner Reference: _____
Phone Number: _____

9. Please provide the following information regarding the individual designated as the project foreman:

Name of Foreman: _____

All Construction Training and Education: _____

All Construction – Related Certifications: _____

10. Have you or your organization, or any officer or partner thereof, failed to complete a contract? _____ If so, give details.

11. In what other lines of business are you financially interested?

12. Name the persons with whom you have been associated in business as partners or business associates in each of the last four years.

13. Provide information below about the experience of the principal individuals of your present organization including those individuals to be in responsible charge of this project.

Name: _____

Present Position: _____ No. Years of Construction Experience _____

Type of Work: _____

Name: _____

Present Position: _____ No. Years of Construction Experience _____

Type of Work: _____

Name: _____

Present Position: _____ No. Years of Construction Experience _____

Type of Work: _____

14. Provide information below about your five (5) most current contracts underway, or for which you are committed.

(a) Type of Work _____ Location _____

Value \$ _____ Percent Complete % _____ Completion Date _____

Performed for Whom? _____

(b) Type of Work _____ Location _____

Value \$ _____ Percent Complete % _____ Completion Date _____

Performed for Whom? _____

(c) Type of Work _____ Location _____

Value \$ _____ Percent Complete % _____ Completion Date _____

Performed for Whom? _____

(d) Type of Work _____ Location _____

Value \$ _____ Percent Complete % _____ Completion Date _____

Performed for Whom? _____

(e) Type of Work _____ Location _____

Value \$ _____ Percent Complete % _____ Completion Date _____

Performed for Whom? _____

15. References: Provide the names of at least five (5) engineers, architects, or owners, including public bodies, for whom you have done work recently:

(a) Name _____ Title _____
Company _____
Address/City/State _____
Phone Number _____

(b) Name _____ Title _____
Company _____
Address/City/State _____
Phone Number _____

(c) Name _____ Title _____
Company _____
Address/City/State _____
Phone Number _____

(d) Name _____ Title _____
Company _____
Address/City/State _____
Phone Number _____

(e) Name _____ Title _____
Company _____
Address/City/State _____
Phone Number _____

16. References: The following bank or banks can provide references as to the financial responsibility of the Bidder:

(a) Name of Bank: _____
Street Address: _____
City, State and Zip Code: _____
Officer Familiar with Bidder's Account: _____
Telephone: _____

(b) Name of Bank: _____
Street Address: _____
City, State and Zip Code: _____
Officer Familiar with Bidder's Account: _____
Telephone: _____

(c) Name of Bank: _____
Street Address: _____
City, State and Zip Code: _____
Officer Familiar with Bidder's Account: _____
Telephone: _____

17. References: The following surety company or companies can provide references as to the financial responsibility and general reliability of the Bidder:

(a) Name of Surety Company: _____
Name of Local Agent (if different) _____
Street Address: _____
City, State and Zip Code: _____
Person Familiar with Bidder's Account: _____
Telephone: _____

(b) Name of Surety Company: _____
Name of Local Agent (if different) _____
Street Address: _____
City, State and Zip Code: _____
Person Familiar with Bidder's Account: _____
Telephone: _____

18. Is any litigation pending against your organization in the past 2 years? _____ If so, provide details below and on attached pages, if needed.

The undersigned bidder represents and warrants that the foregoing information is true and accurate to the best of his knowledge and the undersigned intends that the **Mid-Peninsula Water District** rely thereof in awarding the attached contract.

Signature of Bidder: _____

Title: _____

Dated: _____

CONTRACT

THIS CONTRACT is made and entered into as of this ____ day of _____, 20__, by and between the **MID-PENINSULA WATER DISTRICT**, hereinafter called the "Owner" or "District" and _____, hereinafter collectively called the "Contractor."

THE PARTIES AGREE AS FOLLOWS:

1. **SCOPE OF WORK.** The Contractor shall perform all the work and furnish all the labor, materials, tools, equipment, machinery, services, transportation, incidentals and appurtenances required to complete the construction and installation of the work in accordance with the plans and specifications approved by the District entitled: **SR101 CROSSING AT PALO ALTO MEDICAL FOUNDATION (PAMF) WATER MAIN IMPROVEMENTS PHASE 1**, dated **May 2020**, and which are appended hereto and made part of this agreement.

2. **BEGINNING OF WORK AND CONTRACT TIME OF COMPLETION.** After the Contract has been executed by the Owner, the Contractor shall begin work within five (5) working days from the effective date of the Notice to Proceed, issued by Owner, and shall complete all items required under this Contract within **thirty (30) working days from the effective date of the Notice to Proceed.**

3. **CONTRACT PRICE.** In consideration of the performance of the work as set forth in the Contract Documents, the Owner agrees to pay to the Contractor the amounts set forth in the Contractor's Proposal dated _____ 20__, as it may be hereafter adjusted in accordance with the Contract Documents, and to make such payments in the manner and at the times provided in the Contract Documents. The Contractor agrees to complete the work within the time specified herein and to accept as full payment the amounts provided for herein.

4. **COMPONENTS OF CONTRACT.** This Contract shall consist of the following documents each of which is on file in the Owner's office and all of which are hereby referred to and by this reference made a part hereof as fully and completely as if they were fully set forth herein:

- a) This Contract
- b) Notice Inviting Sealed Bids
- c) The Contractor's signed Proposal
- d) General Provisions
- e) Special Provisions (including permits)
- f) Technical Specifications
- g) Contract Drawings
- h) Addenda (if any)
- i) Contract Bonds
- j) Standard Specifications

The Contract will also include Contract Change Orders, if any, issued by the Owner as provided in the Contract Documents. The Contract represents the entire integrated agreement between the parties hereto and supersedes prior negotiations, agreements or representations, whether

written or oral, except representations contained in the Contractor's Qualifications Statement submitted prior to the award of Contract, if one was required. In the event of a conflict or inconsistency between Contractor's Proposal and this Contract, this Contract shall prevail.

5. **WORKERS' COMPENSATION CERTIFICATION.** By its signature hereunder, the Contractor certifies that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and agrees to comply with such provisions before commencing the performance of the work of this Contract.

6. **NOTICES.** Any notices required or permitted under this Contract may be given by personal delivery to an authorized representative of the recipient or by certified or registered United States mail. In the case of the Contractor, notices shall be addressed to the business address specified in its Proposal. In the case of the Owner, notices shall be addressed to:

**Mid-Peninsula Water District
3 Dairy Lane
Belmont, CA 94002
Attn: Tammy Rudock**

A copy of any notices to the Owner shall also be concurrently mailed or delivered personally to the District Engineer.

Notice shall be presumed to be received three (3) business days after deposit in the mail, postage prepaid, or upon the date of delivery, if personally given.

7. **GOVERNING LAW.** This Contract is executed and shall be performed in San Mateo County, California. It shall be governed by and construed in accordance with the laws of the State of California.

8. **RECORDS.** Owner representatives shall have the right to review and inspect any records of the Contractor related to this Contract during normal business hours at the location where such records are maintained.

9. **LEGAL ACTIONS; AGENT FOR SERVICE OF PROCESS.** Any action relating to this Contract, including all disputes between the parties, shall be instituted and prosecuted in a court of competent jurisdiction in San Mateo County in the State of California.

Each party hereby appoints the individual listed opposite its name to act as its initial agent for service of process relating to any such action.

Mid-Peninsula Water District

3 Dairy Lane
Belmont, CA 94002
(650) 591-8941

Name of Individual Agent for
Service of Process

CONTRACTOR:

Name of Individual Agent for
Service of Process

Street Address

Owner, State, Zip Code

Telephone

IN WITNESS WHEREOF, the parties hereto have signed this Contract as of the day and year first above written.

MID-PENINSULA WATER DISTRICT:

CONTRACTOR:

BY: _____
President, Board of Directors

Name Under Which Business is Conducted

ATTEST: _____
District Secretary

BY: Name: _____

Title: _____
(President or Vice President)

APPROVED AS TO FORM:

California Contractor License No.:

District Attorney

Expiration Date: _____

Business Address:

Note: Format for Contract execution by Contractor will be adapted for a sole owner, partnership, corporation or joint venture, as appropriate.

INTENTIONALLY LEFT BLANK

PERFORMANCE BOND

BOND NO. _____
AMOUNT: \$ _____

KNOW ALL PERSONS BY THESE PRESENTS, that _____,
hereinafter called the PRINCIPAL, and _____,
a corporation duly organized under the laws of the State of _____
having its principal place of business at _____ in
the State of _____, and authorized to do business in the State
of California, hereinafter called the SURETY, are held and firmly bound unto the MID-PENINSULA WATER
DISTRICT, hereinafter called the OBLIGEE, in the sum of _____
Dollars (\$ _____)
lawful money of the United States, for the payment of which, well and truly to be made, we bind ourselves,
our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the PRINCIPAL has entered into a Contract with the OBLIGEE for **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1 ("the Contract")** and said PRINCIPAL is required under the terms of said Contract to furnish a bond of faithful performance of said Contract.

NOW, THEREFORE, if the PRINCIPAL shall well and truly perform and fulfill all of the undertakings, covenants, terms and agreements of said Contract, and any modification thereto made as therein provided, at the time and in the manner therein specified, then this obligation shall become null and void, otherwise it shall be and remain in full force and virtue.

The SURETY, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the Specifications incorporated therein shall impair or affect its obligations under this bond, and it hereby waives notice of any such change, extension of time, alteration or addition.

As a condition precedent to satisfactory completion of the Contract, the above obligations to the amount of _____ Dollars (\$ _____) being not less than one hundred percent (100%) of the total amount payable by OBLIGEE under the Contract, shall hold good for a period of two (2) years after completion and acceptance of the work, during which time, if the PRINCIPAL makes full, complete and satisfactory repair and replacement of defective materials, faulty workmanship, and work not conforming to the requirements of the Contract, and protects the OBLIGEE from cost and damage caused by the same, then the above obligation in the sum _____ Dollars (\$ _____) shall become null and void, otherwise it shall remain in full force and virtue.

In the event suit is brought upon this Bond by the OBLIGEE and said OBLIGEE is the prevailing party, the SURETY shall pay, in addition to the sums set forth above, all costs incurred by the OBLIGEE in such suit, including reasonable attorneys' fees to be fixed by the court.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument this ____ day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

PRINCIPAL:

By: _____

SURETY:

By: _____

Attorney-In-Fact

* * *

Note: To be considered complete, both the principal and surety must sign this performance bond. In addition, the surety's signature must be notarized and a copy of the surety's power of attorney must be attached.

PAYMENT BOND

BOND NO. _____

AMOUNT: \$ _____

KNOW ALL PERSONS BY THESE PRESENTS, that _____ hereinafter called the PRINCIPAL, and _____, a corporation duly organized under the laws of the State of _____ having its principal place of business at _____, in the State of _____, and authorized to do business in the State of California, hereinafter called the SURETY, are held and firmly bound unto the **MID-PENINSULA WATER DISTRICT** hereinafter called the OBLIGEE, or order in the sum of _____ Dollars (\$ _____) lawful money of the United States, being a sum equal to the total Contract price, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

WHEREAS, the PRINCIPAL has entered into a Contract with the OBLIGEE for the construction of **SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1 ("the Contract")** and said PRINCIPAL is required under the terms of said Contract to furnish a bond securing payment of claims to which reference is made in Section 9554 of the Civil Code.

NOW, THEREFORE, if said PRINCIPAL or any of its subcontractors fails to pay any of the persons named in Section 9100 of the Civil Code, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the Contract, or any amounts required to be deducted, withheld and paid over to the Employment Development Department from the wages of employees of the Contractor and his subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, the SURETY will pay for the same, in an amount not exceeding the sum specified in this bond, and also will pay, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court.

This bond will inure to the benefit of any of the persons named in Section 9100 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

This bond is given to comply with Sections 9550 and 9554 of the Civil Code. The liability of the PRINCIPAL and SURETY hereunder is governed by the provisions of said Code, all acts amendatory thereof, and all other statutes referred to therein.

PAYMENT BOND No. _____

The SURETY, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications incorporated therein shall impair or affect its obligations and its bond and it hereby waives notice of any such change, extension of time, alteration or addition.

IN WITNESS WHEREOF the above-bounded parties have executed this instrument this ____ day of _____, 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representatives, pursuant to authority of its governing body.

PRINCIPAL:

By: _____

SURETY:

By: _____

Attorney-In-Fact

* * *

Note: To be considered complete, both the principal and surety must sign this payment bond. In addition, the surety's signature must be notarized and a copy of the surety's power of attorney must be attached.

**GENERAL PROVISIONS
FOR**

**SR101 CROSSING AT PALO ALTO MEDICAL
FOUNDATION (PAMF) WATER MAIN
IMPROVEMENTS PHASE 1**

MID-PENINSULA WATER DISTRICT
SR101 CROSSING AT PALO ALTO MEDICAL FOUNDATION (PAMF) WATER MAIN IMPROVEMENTS
PHASE 1
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SECTION 1 DEFINITIONS AND TERMS

G1.01 GENERAL

Whenever the following abbreviations and terms, or pronouns in place of them, appear in the Contract Documents, the intent and meaning shall be interpreted as provided in this Section 1. Working titles having a masculine gender, such as “workman” and “flagman” and the pronoun “he,” are used for the sake of brevity, and are intended to refer to persons of either sex.

G1.02 DEFINITIONS

As used herein, unless the context otherwise requires, the following terms have the following meaning:

Acceptance: The formal written acceptance by the Owner of an entire contract which has been completed in all respects in accordance with the Contract Documents.

Addenda: Written interpretations or revisions to any of the Contract Documents issued by the Owner before the bid opening.

Agents: The term “agents” means, in the case of the Owner, its Consulting Engineer/Architect, (if not the Engineer of the work and defined as the Engineer in the Contract Documents) and the Owner’s Legal Counsel.

As Approved: The words “as approved,” unless otherwise qualified, shall be understood to be followed by the words “by the Engineer/Architect for conformance with the Contract Documents.”

As Built Drawings: Hand drawings which depict field dimensions on the Project site.

As Shown; and As Indicated: The words “as shown” and “as indicated” shall be understood to be followed by the words “on the Contract Plans,” “in the Specifications” or “by the Contract Documents” as appropriate.

Bidder: Any individual, firm, partnership, corporation or combination thereof, submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

Board, Board of Directors or Directors: The Board of Directors of the **Mid-Peninsula Water District**, the Owner

CalTrans: The Department of Transportation, Business & Transportation Agency, State of California.

Contract Change Order: An order authorized by the Owner and issued to the contractor amending the Contract Documents. An “approved Contract Change Order” is an order signed by the Engineer or the General Manager. An “executed Contract Change Order” is an order signed by the Engineer or the General Manager and the Contractor.

Contract: The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The Contract shall include the Contract Documents, and any and all supplemental agreements. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract and include contract change orders.

Contract Completion: The date the Owner accepts the entire work as being in compliance with the Contract Documents, or formally waives nonconforming work to the extent of nonconformity, and issues the final payment in accordance with Section 9 of these General Provisions.

Contract Documents: The Contract Documents consist of the Advertisement for Proposals, Information for Bidders, Notice to Contractors, General Provisions, Specifications, Technical Specifications, Proposal and Proposal Documents, Contract, Contract Drawings, Addenda, Change Orders, Clarifications, Responses to RFIs, and Field Changes.

Contractor: The person or persons, firm, partnership, corporation or combination thereof, private or municipal, who enters into the Contract with the Owner.

Contract Drawings: The official plans, profiles, cross sections, elevations, details, and supplemental drawings furnished by the Engineer, which show the locations, character, dimensions and details of the work to be performed. Contract Plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets and are a part of the Contract Documents regardless of the method of binding, also referred to as "Contract Plans," "Plans" and "Drawings."

County: The County of San Mateo.

Days: Unless otherwise designated, "days" will be understood to mean calendar days.

DIR: Department of Industrial Relations, State of California

District: The Mid-Peninsula Water District.

Engineer: Pakpour Consulting Group, Inc., the District Engineer and West Yost Associates, the Design Engineer unless otherwise defined in the Special Provisions.

Engineer Estimate: The list of estimated quantities of work to be performed as contained in the Proposal Form.

Federal Agencies: Whenever, in the Specifications, reference is made to any Federal agency or officer, such reference shall be deemed made to any agency or officer succeeding, in accordance with law, to the powers, duties, jurisdiction and authority of the agency or officer mentioned.

Field Changes: A document that records minor variations or changes in the plans and/or specifications, which minor variations do not affect the basic design, schedule, compensation or other material terms of the contract.

Fixed Costs: Any necessary labor, material and equipment costs directly expended on the item or items under consideration which remain constant regardless of the quantity of the work done.

General Manager: General Manager of the Mid-Peninsula Water District.

General Notes: The written instructions, provisions, conditions or other requirements appearing on the Contract Drawings, and so identified thereon, which pertain to the performance of the work.

Legal Holidays: Those days designated as State holidays by the Government Code or declared by the Board.

Liquidated Damages: The amount prescribed in the Contract Documents to be paid to the Owner or to be deducted from any payments due or to become due the Contractor for each calendar day's delay in completing the whole, or any specified portion, of the work beyond the time allowed in the Contract Documents.

Notice to Proceed: A written notice given by the Owner to the Contractor fixing the date on which the Contract time will commence to run and on which the Contractor shall start to perform his obligation under the Contract Documents.

Office of the Owner: Whenever reference is made to the Office of the Owner or the Owner's office, such reference shall be deemed made to the Owner's office at 3 Dairy Lane, California, 94002.

Or Equivalent: The term "or equivalent" shall mean that the "equivalent" product is the same or better than the product named in function, performance, reliability, quality and general configuration. Determination of equality in reference to the project design requirements will be made by the Engineer. Such equivalent products shall not be purchased or installed by the Contractor without written acknowledgement of the Engineer.

Owner: The Mid-Peninsula Water District.

Plans: Refer to Contract Drawings.

Professional Engineer: An engineer licensed by the Board of Registration for Professional Engineers, State of California.

Project: A term sometimes used to reference the work of improvement called for under the Contract.

Proposal: The offer of the bidder for the work, when made out and submitted on the prescribed proposal form, properly executed and guaranteed, and all related documents submitted with the proposal.

Proposal Form: The approved form upon which the Owner requires formal bids be prepared and submitted for the work.

Proposal Guaranty: The cashier's check or Bidder's Bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the Owner for the performance of the work, if the Contract is awarded to him. Also referred to as "Bidder's Security."

Provide: The term "provide" shall be understood to mean "furnish and install, complete and in place."

Record Drawings: Contract plans which depict the Project as finally constructed, including any modifications during the construction phase.

Responsive: A "responsive" Proposal is one which complies with the requirements prescribed in the Contract Documents for Proposals.

Standards Specifications: The current revision of the Standard Specifications of the State of California, Department of Transportation, unless noted otherwise on the plans and Technical Specifications. Any reference there in to the State of California or state agency, office of officer shall be interpreted to refer to the County or its corresponding agency, office or officer acting under this contract.

Special Provisions: The Special Provisions are specific clauses setting forth conditions or requirements of the work and supplementary to these General Provisions, and also may be referred to as Division 1 Specifications. In this document Special Provision are referred to as Technical Specifications.

Standards Specifications: The current revision of the Standard Specifications of the State of California, Department of Transportation, unless noted otherwise on the plans and Technical Specifications. Any reference therein to the State of California or a state agency, office or officer shall be interpreted to refer to the County or its corresponding agency, office or officer acting under this contract.

Specifications: The term “Specifications” refers to those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the work and certain administrative details applicable thereto. Where standard specifications, such as those of ASTM, AASHTO, etc., have been referred to, the applicable portions of such standard specifications shall become a part of these Contract Documents. If referenced specifications conflict with Specifications contained herein, the requirements contained herein shall prevail. Also referred to as “Technical Specifications.”

State: The State of California.

Work: The word “work” includes all material, labor, tools, and all appliances, machinery, transportation, and appurtenances necessary to perform and complete the Contract, and such additional items not specifically indicated or described which can be reasonably inferred as belonging to the item described or indicated and as required by good practice to provide a complete and satisfactory system or structure.

Work Site: The area or areas of actual construction and the areas immediately adjacent thereto.

G1.03 ABBREVIATIONS

As used herein, unless the context otherwise requires, the following abbreviations have the following meanings:

AAMA	Architectural Aluminum Manufacturers’ Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
APWA	American Public Works Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASA	American Standards Association

ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AT&T	American Telephone and Telegraph
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CS	Commercial Standards (US Department of Commerce)
CSI	Construction Specifications Institute
DIR	Department of Industrial Relations
DOT	United States Department of Transportation
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
FGMA	Flat Glass Marketing Association
FHWA	Federal Highway Administration
FM	Factory Mutual
FS	Federal Specification
IAMPO	International Association of Mechanical and Plumbing Officials
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Owner Council Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFC	National Fire Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PEI	Porcelain Enamel Institute
PG&E	Pacific Gas and Electric Company
PS	Product Standard (US Department of Commerce)
SAE	Society of Automotive Engineers
SCPO	Structural Clay Products Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TPI	Truss Plate Institute
UBC	Uniform Building Code
UL	Underwriters' Laboratory
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WWPA	Western Wood Products' Association

SECTION 2 PROPOSAL REQUIREMENTS, INSTRUCTIONS TO BIDDERS

G2.01 OBTAINING PROPOSAL FORMS

Proposal forms and other bid documents shall be obtained from the **Mid-Peninsula Water District, 3 Dairy Lane, Belmont, California 94022.**

G2.02 ENGINEER'S ESTIMATE

If an Engineer's Estimate of quantities is given in the Proposal, the quantities are approximate only, being given as a basis for the comparison of bids. The Owner does not, expressly or by implication, agree that the actual amount of work will correspond to the estimate. The Owner reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work.

G2.03 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK

The bidder shall examine carefully the Contract Documents and the site of work and shall inform himself of the conditions relating to the execution of the work. Failure to do so will not relieve the successful bidder of his obligation to enter into a Contract and complete the work in strict accordance with the Contract Documents. If the bidder does not investigate the site, the bidder is responsible for all site conditions had the bidder performed a reasonable site inspection. "Conditions relating to the execution of the work" include the requirements of federal, state and local laws, statutes and ordinances relative to the execution of the work, including, but not limited to, applicable regulations concerning minimum wage rates, non-discrimination in the employment of labor, protection of public and employee health and safety, and environmental protection. The submission of a Proposal shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, the character, quality and scope of work to be performed, the quantities of materials to be furnished and the requirements of the Contract Documents.

G2.04 SURFACE TOPOGRAPHY; SUBSURFACE CONDITIONS DATA

Where an investigation of surface topography and/or subsurface conditions has been conducted in areas where work is to be performed, prospective bidders may inspect the records of such investigations at the Owner's office subject to and upon the conditions set forth in these Contract Documents.

Investigations of surface topography and/or subsurface conditions were made for the purpose of study and design only and neither the Owner nor the Engineer(s) which conducted such investigations assumes any responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of the interpretations set forth therein or made by the Owner in its use thereof. There is no warranty or guaranty, either express or implied, that the conditions indicated by such investigations are representative of those existing throughout such areas, or any part thereof, or hat unforeseen developments may not occur, or that materials other than or in proportions different from those indicated may not be encountered.

Logs of test borings, geotechnical reports, or topographic maps showing a record of the data obtained by the Owner's investigations of surface and subsurface conditions that are made available shall be considered a part of the Contract Documents. While such logs, reports and maps represent the opinion of the consultant retained by the Owner as to the character of the materials encountered by him in his

investigations, the Owner provides no assurances as to their accuracy and they are made available only for the convenience of the bidder and Contractor. In the event that Contractor encounters differing site conditions, please refer to General Provision G4.03.

The availability or use of information described in this Section G2.04 is not intended to be and shall not be construed to be a waiver of the provisions of Section G2.03, and will not relieve the bidder or Contractor from any risk, or from properly examining the site and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.

G2.05 EXPLANATIONS

Any explanation of the Contract Documents desired by a prospective bidder shall be requested in writing from the Engineer, and delivered to Owner no less than fourteen (14) calendar days prior to the date for opening of proposals. Any explanation, instruction, or change to Contract Documents will be made by written addendum which will be mailed or delivered to each firm receiving a set of the Contract Documents. Upon mailing or delivery, such addendum will become a part of Contract Documents and binding on all bidders. The receipt of the addendum by the bidder shall be acknowledged and so noted in the space provided on the Proposal Form. All addenda shall be attached to the Proposal. Only written explanations, instructions or changes so given by the Owner will be effective. Oral explanations or instructions will not be binding on the Owner.

G2.06 PREPARATION OF PROPOSALS

The form of Proposal in this book, when filled out and executed by the bidder, shall be submitted as his bid. Bids not presented on such forms will be disregarded.

All blank spaces in the Proposal form must be filled in, as required, preferably in black ink. All price information shall be shown, clearly legible, in both words and figures, where required. No changes shall be made in the phraseology of the forms. Written amounts shall govern in the case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and extended totals, unit prices shall prevail.

The bidder shall sign his Proposal in the blank space provided for that purpose. If bidder is the sole owner, the Proposal shall be signed by the owner. If bidder is a corporation, it must be signed by two officers of the corporation consisting of (1) the chair of the board, president or vice president; and (2) the secretary, assistant secretary, chief finance officer or assistant treasurer, or by a person authorized by the corporation to execute written contracts on its behalf, and the corporate seal affixed thereto. If the corporate seal is not affixed to the contract, or if it is executed by a person other than an officer, or by only one officer, there must be attached to the contract a certified copy of a resolution of the corporation authorizing such officer or person to execute written contracts for and on behalf of the corporation. If bidder is a partnership, the true name of the firm shall be set forth above, the names and addresses of all partners shall be given and the Proposal shall be signed by a partner in the firm authorized to sign contracts on behalf of the partnership. If the bidder is a joint venture, the Proposal shall be signed by each participating company by officers or other individuals who have the full and proper authorization to do so. If the Proposal is signed by an agent of the bidder other than an officer of a corporation or a member of a partnership, a notarized power of attorney must be on file with the Owner prior to opening of Proposals or must be submitted with the Proposal. If requested by the Owner, the bidder shall promptly submit evidence satisfactory to the Owner of the authority of the person signing the Proposal.

G2.07 SUBMISSION OF PROPOSALS

All Proposals must be submitted not later than the time prescribed, at the place, and in the manner set forth in the Notice to Contractors. Proposals must be made on the Proposal forms provided. Proposals and other required forms may be copied and submitted as a separate package or may be left attached to this book. Any Proposal received after the prescribed time shall be rejected, regardless of whether or not Proposals are opened exactly at the prescribed time.

Each Proposal must be submitted in a sealed envelope. The envelope must be clearly marked to show the bidder's name and the Contract name, without being opened, and be addressed in conformance with the instructions in the Information for Bidders.

G2.08 LIST OF SUBCONTRACTORS

The bidder shall submit with his Proposal, on the List of Subcontractors provided, the names and business addresses of each subcontractor who will perform work under this Contract in excess of one-half (1/2) of one percent (1%) of the amount of the total Proposal, and shall list the portion of the work which will be done by each such subcontractor as required by Public Contract Code Sections 4100 et. seq. If the bidder fails to specify a subcontractor for any portion of the work, the bidder agrees to perform that portion of the work himself, and represents that he is qualified to perform that portion of the work himself.

Pursuant to Labor Code Section 1725.5, no subcontractor may be listed on a Bid Proposal for a public work project unless they are registered with the DIR.

G2.09 PROPOSAL GUARANTY

All Proposals shall be accompanied by a cashier's check or certified check, payable to the Owner or a Bid Bond so payable executed by a corporation admitted and authorized to transact business as a surety in the State of California in an amount not less than ten percent (10%) of the total amount of the Proposal submitted.

This bid security shall be given as a guaranty that the bidder will not withdraw his Proposal for seventy-five (75) days after bid opening, and that if awarded the Contract, the successful bidder will execute the attached Contract and furnish a properly executed Performance Bond and Payment Bond each in the full amount of the Contract price within the time specified.

If the bidder elects to furnish a Bid Bond, he shall use the Bid Bond form bound herewith; additional forms may be obtained from the Owner. The Attorney-in-Fact who executes this bond on behalf of the surety must attach a notarized copy of his power of -attorney as evidence of his authority to bind the surety on the date of execution of the bond. Any conditions or limitation placed upon the check or any alteration of the form of said bond, or imperfection in the execution thereof, will render it informal and may, at the option of the Owner, result in the rejection of the Proposal.

If the Bidder elects to furnish a certified or cashier's check, he shall also submit therewith the Bid Security Form included herewith.

G2.10 NON-COLLUSION DECLARATION

All Proposals shall be accompanied by an executed non-collusion declaration in the form required by Public Contract Code Section 7106.

G2.11 WITHDRAWAL OF PROPOSALS

A bidder may withdraw his Proposal at any time prior to the time fixed in the Information for Bidders for the opening of bids only by filing a written notice with the Owner. The notice shall be executed by the bidder in conformance with Section G2.06. A telegraphic notice of withdrawal is not effective. Withdrawal of a Proposal does not prejudice the right of a bidder to submit a new Proposal. No Proposal may be withdrawn after the time scheduled for opening of Proposals, unless and until the time specified in Section G3.02, Time of Award, has elapsed.

G2.12 PUBLIC OPENING OF PROPOSALS

Proposals will be opened and read aloud publicly at the date, time and place designated in the Information for Bidders. Bidders and their authorized representatives are invited to be present.

G2.13 REJECTION OF PROPOSALS

Proposals may be rejected if they show such items as: any alteration of form; additions not called for; conditional bids; incomplete bids; erasures; irregularities which make the Proposals incomplete, indefinite or ambiguous; obviously unbalanced prices; no acceptable Bid Security; or if the Proposal is not properly executed.

Proposal may be rejected if contractor or subcontractor(s) is not registered with the Department of Industrial Relations (DIR).

G2.14 DISQUALIFICATION OF BIDDERS

More than one Proposal from an individual, firm, partnership, corporation or combination of such under the same or different names will not be considered. Reasonable grounds for believing that any individual, firm, partnership, corporation or combination of such is interested in more than one Proposal for the work contemplated may cause the rejection of all Proposals in which such individual, firm, partnership, corporation or combination thereof is interested. If there is reason for believing that collusion exists among the bidders, any or all Proposals may be rejected. A party who has quoted prices on materials or work to a bidder is not thereby disqualified from quoting prices to other bidders, or from submitting a bid directly for the materials or work. A Proposal may be rejected on the basis of a bidder, any officer of such bidder, or any employee of such bidder who has a proprietary interest in such bidder, having been disqualified, removed, or otherwise prevented from bidding on or completing, a federal, state or local project because of a violation of law or a safety regulation.

G2.15 LICENSING AND REGISTRATION OF BIDDERS

Bidders and their proposed subcontractors shall hold such licenses as may be specified in the Information for Bidders and as may be required by Division 3, Chapter 9 of the California Business and Professions Code concerning the licensing of contractors. As a matter of bidder responsibility, each bidder shall be

properly licensed in accordance with the laws of the State of California at the time of bid award. This Contract is subject to monitoring and enforcement by the DIR pursuant to Labor Code Section 1771.4. Contractor must post notices, as prescribed by Title 8 California Code of Regulations Section 16451(d). Contractor and all of its subcontractors must be registered with the DIR.

G2.16 RESPONSIBILITY OF BIDDERS

Bidders shall, if requested by the Owner, submit a statement of qualifications which shall include experience in the type of work to be performed, financial condition, available construction equipment, and listing of all agencies for which work has been performed during the past two years. The Owner may reject the Proposal of any bidder on the basis of insufficient work experience, insufficient financial capability, inadequate equipment, poor performance on work previously completed for the Owner or other agencies or previous violation of safety or other legal requirements resulting in disqualification or otherwise being prevented from bidding on federal, state or local agency projects.

G2.17 RELIEF OF BIDDERS

Unless the Owner in its sole discretion elects otherwise, a bidder shall not be relieved of his bid nor shall any change be made in his bid because of mistake, but he may bring an action against the Owner in a court of competent jurisdiction in the county in which the bids were opened for the recovery of the amount forfeited, without interest or costs. In the event the bidder who brings an action against the District fails to recover a judgment, the bidder shall pay all costs incurred by the District in the suit, including reasonable attorneys' fees to be fixed by the court.

If the bidder brings such action it shall be his responsibility to establish that:

- A. A mistake was made;
- B. He gave the Owner written notice within five (5) days after the opening of the Proposals of the mistake, specifying in the notice in detail how the mistake occurred;
- C. The mistake made the Proposal materially different than he intended it to be; and
- D. The mistake was made in filling out the Proposal and was not due to error in judgment nor to carelessness in inspecting the site of the work, nor in reading the Contract Documents.

G2.18 INELIGIBLE CONTRACTORS

Pursuant to Public Contract Code Section 6109, by submitting its bid, a bidder certifies that it has not been deemed ineligible to bid, work on or be awarded a public works project pursuant to California Labor Code Sections 1777.1 or 1777.7 and that it will not use any subcontractors to perform work on the public works project that have been deemed ineligible to perform work on a public works project pursuant to California Labor Code Sections 1777.1 and 1777.7. Any contract on a public works project between a contractor and a debarred subcontractor by the Contractor is void as a matter of law. Any public money paid to a debarred subcontractor by the Contractor shall be returned to the City. The Contractor shall be responsible for the payment of wages to any workers of the debarred subcontractor who worked on the project.

SECTION 3 AWARD AND EXECUTION OF CONTRACT

G3.01 AWARD OF CONTRACT

The Owner reserves, in its sole discretion, the right to reject any and all Proposals and to waive any informalities and irregularities in Proposals received, other provisions in the Contract Documents notwithstanding.

The Proposals will be compared on the basis of the Total Bid Price which is the sum of the lump sum bid items and, for unit price items, the sum of the products of the Engineer's Estimate of quantities shown in the Proposal multiplied by the unit bid price. In the event of a discrepancy between the unit bid price and the extension price, the unit price shall govern and the mathematical error corrected accordingly. Any mathematical errors that appear on the face of the bid will be corrected by the Owner and the Owner will use the mathematically correct Total Bid Price to determine the lowest monetary bidder.

The award of the Contract, if it be awarded, will be made to the lowest responsible, responsive bidder.

In addition, the Owner reserves, in its sole discretion, the right to award the Contract for all or some of the bid items included in the Bid Schedule. The Owner may eliminate some of the bid items prior to or after award of the Contract due to budgetary constraints.

G3.02 TIME OF AWARD

Within sixty (60) days after the opening of Proposals, the Owner will either reject all Proposals or award the Contract to the lowest responsible, responsive bidder. If the lowest responsible, responsive bidder refuses or fails to execute the Contract and provide an acceptable Performance Bond, Payment Bond and insurance certificate(s), the Owner may award the Contract to the second lowest responsible, responsive bidder. Such award, if made, will be made within seventy-five (75) days after the opening of Proposals. If the second lowest responsible, responsive bidder refuses or fails to execute the Contract and provide an acceptable Performance Bond, Payment Bond and insurance certificate(s), the Owner may award the Contract to the third lowest responsible, responsive bidder. Such award, if made, will be made within ninety (90) days after the opening of Proposals. The periods of time specified above within which an award of Contract may be made shall be subject to extension for such further period as may be agreed upon in writing by the Owner and the bidder or bidders concerned.

G3.03 EXECUTION OF CONTRACT

The successful bidder shall, within fifteen (15) calendar days after having received notice that the Contract has been awarded, sign and deliver to the Owner a Contract in the attached form together with the Contract Bonds and insurance certificates executed as required in the Contract Documents. After receiving the signed Contract with acceptable bonds and insurance certificates from the successful bidder, the Owner will promptly sign the Contract.

G3.04 MANNER OF EXECUTION OF CONTRACT

If the Contractor is an individual, the contract shall be executed personally by the Contractor. If the Contractor is a co-partnership, it is desirable that the contract be executed by all of the partners, but it may be executed by one of them. If the Contractor is a corporation, it must be executed by two officers

of the corporation consisting of (1) the chairman of the board, president or vice president; and (2) the secretary, assistant secretary, chief finance officer or assistant secretary, or by a person authorized by the corporation to execute written contracts on its behalf, and with the corporate seal affixed. If the corporate seal is not affixed to the contract, or if it is executed by a person other than an officer, or by only one officer, there must be attached to the contract a certified copy of a resolution of the corporation authorizing such officer or person to execute written contracts for and on behalf of the corporation. If the Contractor is a joint venture, the contract must be executed on behalf of each participating firm by officers or other individuals who have the full and proper authorization to do so. If the Contractor is a limited Liability Company (LLC), the contractor must be executed by an officer or member who has full and proper authorization to do so.

G3.05 CONTRACT BONDS

The bidder to whom the Contract is awarded shall furnish the following bonds ("Contract Bonds"):

- A. Performance Bond, in an amount not less than one hundred percent (100%) of the Contract price, to secure faithful performance of the Contract and in an amount not less than ten percent (10%) of the Contract price to guarantee the correction of work during the warranty period of two (2) years from the date of final acceptance by the Owner.
- B. Payment Bond, in an amount not less than one hundred percent (100%) of the Contract price, to secure payment of all persons supplying labor or materials for the construction of the work.

Contract Bonds shall be on the attached forms and shall be executed as surety by a corporation admitted and authorized to issue surety bonds in the State of California, with a financial condition and record of service satisfactory to Owner.

All alterations, extensions of time, extra and additional work and other changes authorized by the Contract Documents may be made without securing the consent of the surety or sureties on the Contract Bonds.

G3.06 FAILURE TO EXECUTE CONTRACT

Failure of a bidder to whom the Contract is awarded to promptly and properly execute the Contract or furnish acceptable Contract bonds, or certificates of insurance, shall be just cause for the annulment of the award and the forfeiture of such bidder's Proposal Guaranty. The Proposal Guaranty shall be retained by the Owner as liquidated damages and it is agreed that this sum is a fair estimate of the amount of damages the Owner will sustain in case the successful bidder fails to enter into a Contract.

G3.07 RETURN OF PROPOSAL GUARANTY

Within fifteen (15) days after the award of the Contract, the Owner will return the Bidder's Bond, or the certified or cashier's check to all the BIDDERS except for the three lowest responsible BIDDERS. When the CONTRACT is executed, the bonds of the two remaining unsuccessful BIDDERS will be returned. Retained Proposal guaranties will be held until seventy-five (75) days after opening of Proposals or until the Contract has been finally executed, whichever occurs first, after which all Proposal guaranties, other than Bidder's Bonds and any guaranties that have been forfeited, will be returned.

G3.08 BID PROTESTS

The Owner will consider written bid protests subject to the following procedures. All protests must clearly specify in writing the grounds and evidence on which the protest is based. Protests based upon restrictive specifications or alleged improprieties in the bidding procedure which are apparent or reasonably should have been discovered prior to the bid opening shall be filed in writing with the Owner, at least five (5) days prior to bid opening. Protests based upon alleged improprieties that are not apparent or which could not reasonably have been discovered prior to bid opening shall be submitted in writing to the Owner, within forty-eight (48) hours from receipt of notice from the Owner advising of the recommendation for award of contract.

Failure to comply with these requirements may result in rejection of the protest.

SECTION 4 SCOPE OF WORK

G4.01 INTENT OF CONTRACT DOCUMENTS

The Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. The intent of the Contract Documents is to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. When the Contract Documents describe portions of the work in general terms but not in complete detail, it is understood that the best general practice shall be followed and only materials and workmanship of the best standard quality shall be used. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied, whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials or equipment, such words shall be interpreted in accordance with that meaning.

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 on the first published date of the Advertisement for Proposals, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of Owner or 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 Owner, or any of Owner's 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 other provisions of the Contract Documents.

The Contract Documents are divided into parts, divisions and sections for convenient organization and reference. Generally, there has been no attempt to divide the specification sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the project.

The Owner makes no warranty whatsoever, express or implied, with respect to the Contract Documents other than that the Contract Plans and Specifications were prepared by a professional engineer registered to practice in the State of California.

G4.02 EXAMINATION AND VERIFICATION OF CONTRACT DOCUMENTS

The Contractor shall thoroughly examine and become familiar with all of the various parts of these Contract Documents and determine the nature and location of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contract. Failure to make an examination necessary for this determination shall not release the Contractor from the obligations of this Contract. No oral agreement or conversation with any officer, agent or employee of the Owner, or with the Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations contained in the Contract Documents.

G4.03 DIFFERING SITE CONDITIONS

Pursuant to Public Contract Code Section 7104, the Contractor shall promptly, and before such conditions are disturbed, notify the Engineer in writing of: (1) material that the Contractor believes may be material that is hazardous waste, as defined in California Health and Safety Code Section 25117, that is required to be removed to a Class I, Class II or class III disposal site in accordance with provisions of existing law; (2) subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or (3) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract.

The Engineer/Architect shall promptly investigate the conditions. If the Engineer/Architect finds that such conditions do materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this Contract, whether or not changed as a result of such conditions, then an equitable adjustment shall be made and the Contract modified in accordance with the change order procedures set forth below. In the event of any dispute between the Owner and the Contractor over the significance or existence of the changed conditions, the Contractor shall not be excused from the scheduled completion date, but shall retain such rights it may have as provided in these Contract Documents.

No claim of the Contractor under this clause shall be allowed unless the Contractor has given the notice required by this Section, except that the Owner may extend the prescribed time. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

G4.04 CHANGES; CONTRACT CHANGE ORDER

The Owner may, without notice to the sureties, and without invalidating the Contract, at any time make alterations, deviations, additions to or deletions from the Contract Documents, and may increase or decrease the quantity of any item or portion of the work, or delete any item or portion of the work, and may require extra work, as determined by the Owner to be necessary or advisable. All such work shall be performed under applicable provisions of the Contract Documents, unless specifically provided otherwise at the time the change is ordered.

Any such changes will be set forth in a written Contract Change Order issued by the Owner. The Contract Change Order will specify: (1) the work to be done in connection with the change to be made; (2) the amount of the adjustment of the Contract price, if any, and the basis for compensation for the work ordered; and (3) the extent of the adjustment in the Contract time, if any. A Contract Change Order shall not become effective until it has been signed by the General Manager. When signed by the General Manager it is an "approved Contract Change Order."

No changes or deviations from the Contract Documents shall be made without the authority of an approved Contract Change Order, except that in cases of emergency the Engineer/Architect may direct a change in writing. Upon receipt of such written directive, the Contractor shall proceed with the ordered work and the Engineer will prepare a written Contract Change Order for approval and issuance to the Contractor as soon as practicable.

Upon receipt of an approved Contract Change Order, the Contractor shall promptly proceed with the ordered work, unless otherwise provided in the approved Contract Change Order. When ordered by the Engineer/Architect, the Contractor shall halt work in the area affected by a proposed change.

Whenever it appears to the Contractor that a change is necessary, the Contractor shall immediately, but no later than five (5) days after becoming aware of the need for a change, notify the Engineer/Architect in writing of the change he believes necessary and the reasons for such change. However, work in the area affected shall not be discontinued unless ordered by the Engineer/Architect.

G4.05 REQUEST FOR QUOTATIONS FOR CHANGE IN WORK

Owner may request Contractor to provide quotations for performing proposed changes to the work. Such requests for quotations shall not be considered authorization to proceed with the change prior to issuance of an approved Contract Change Order, nor shall such request justify any delay in executing existing work. Contractor shall, upon such a request, provide quotations for increases or decreases in the Contract Price and the Contract time associated with performing the proposed change. Quotations shall be in the form specified by the Engineer/Architect and shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, materials, rentals, services, overhead and profit. The cost of preparing such quotations is included in the Contract price and Contractor shall not be entitled to any additional compensation for preparing them.

G4.06 PROPOSED CONTRACT CHANGE ORDER

A Contract Change Order may be presented to the Contractor for his consideration prior to its having been approved. If the Contractor accepts the terms and conditions of such proposed Contract Change Order, and if the Contract Change Order is then approved and issued to the Contractor, the Contract Change Order shall be considered to be an executed Contract Change Order for all purposes to the same extent as if the Contract Change Order had been initially issued to the Contractor as an approved Contract Change Order. The Owner need not present a proposed Contract Change Order to the Contractor for his review prior to issuing it as an approved Contract Change Order.

G4.07 EXECUTED CONTRACT CHANGE ORDER

An approved Contract Change Order which has been signed by the Contractor is an “executed Contract Change Order.” Compensation paid pursuant to Contract Change Orders shall comprise the total compensation for the work described in the Contract Change Order. By signing the Contract Change Order, the Contractor agrees that the specified compensation constitutes full compensation for the work or change, including payment for interruption of schedules, extended overhead, delay or any other “impact” claim or “ripple effect” claim, and by signing, the Contractor specifically waives any reservation or claim for additional compensation in respect to the Contract Change Order.

G4.08 CONTRACT PRICE ADJUSTMENT

If a Contract Change Order provides for an adjustment to the Contract price, the increased payment to Contractor, or the deduction to the credit of the Owner, shall be determined by one of the following methods, or a combination of these methods, as determined by the Owner and at its sole option:

- A. **Unit Prices.** The unit prices set forth in the Proposal shall be utilized where they are applicable. If the Contract Change Order increases or decreases the quantity of an item of work by more than twenty-five percent (25%), such that the application of unit prices in the Proposal will cause substantial inequity to the Owner or Contractor, unit prices will be adjusted by mutual agreement or, in the absence of agreement, as determined by the Engineer and subject to protest by the Contractor pursuant to Section G4.09. Unit prices for new items included in the Contract Change Order shall be as mutually agreed upon or, in the absence of agreement, as determined by the Engineer/Architect and subject to protest by the Contractor pursuant to Section G4.09.

Payment for any contract item of work which has a final total value of less than five percent of the total contract bid price will be made at the contract unit price regardless of increased or decreased quantities.

- B. **Lump Sum.** A total lump sum addition or deduction from the Contract Price as mutually agreed upon.

Lump sum quotations for changes to the work shall include substantiating documentation with an itemized breakdown of Contractor and Subcontractor costs, including labor, materials, equipment rental, approved services, overhead and profit, all as negotiated. The costs of a negotiated change order for work performed by Contractor's own forces shall be limited to a maximum markup of fifteen percent (15%) to include up to ten percent (10%) for overhead and up to five percent (5%) for profit. Where the whole or a part of the work under a negotiated change order is performed by a first tier subcontractor, the Owner shall limit the Contractor's markup on the direct costs of the subcontractor to a total of eight percent (8%) to include up to five percent (5%) for overhead and three percent (3%) for profit. No markup will be considered or allowed for costs of a negotiated change order involving subcontractors below the first tier. The overhead markup percentages referenced above shall cover all overhead costs of the Contractor, including administrative, insurance, extended overhead and similar costs and expenses.

- C. **Force Account Payment.** Payment for the work will be made on a time and expense basis, that is, on an accounting of the Contractor's forces, materials, equipment and other items of cost as required to do the work.

If compensation for work done under a Contract Change Order is to be made on a force account basis, the compensation will be calculated as set forth in Section G9.03, "Force Account Payment." Contractor agrees that the markups provided in Section G9.03 are adequate.

In any case in which the method of payment cannot be agreed upon prior to the beginning of the work, the Owner may direct that the work be done on a unit price, lump sum or force account basis depending on the nature of the work and at the sole discretion of the Owner.

G4.09 PROTEST PROCEDURE

If the Contractor disagrees with any terms or conditions set forth in an approved Contract Change Order which he has not executed, he shall submit a written protest to the Engineer/Architect within fifteen (15) days after receipt of such approved Contract Change Order. The protest shall state the points of disagreement, Contract Document references, quantities and costs involved and shall propose a modification of the items with which he does not agree. If a written protest is not submitted within this 15-day period, payment will be made as set forth in the approved Contract Change Order. Approved

Contract Change Orders which are not protested within fifteen (15) days will be considered as executed Contract Change Orders and such payment will constitute full compensation for all work included therein or required thereby. In the event that the Contractor disagrees with the Engineer's response to a protest, the Contractor may submit a claim pursuant to G9.15.

When the protest of an approved Contract Change Order relates to compensation, the Contractor shall keep full and complete records of such work and shall permit the Owner and the Engineer to have access to all records relating to the protested Contract Change Order to determine the compensation payable. The Contractor shall cooperate with the Engineer to reach agreement at the earliest practical date on the terms of compensation for the Contract Change Order. When agreement has been reached, a revised Contract Change Order may be approved by the Owner and issued to the Contractor for signature. Unless and until the Owner and Contractor agree upon other terms of compensation incorporated in a revised executed Contract Change Order, the compensation shall be as specified under the protested approved Contract Change Order.

When the protest of an approved Contract Change Order relates to the adjustment of Contract Time for the completion of the work, the time will be determined in accordance with the provisions of Section G8.11.

G4.10 CONTINUANCE OF CONSTRUCTION

Disagreement by the Contractor with the Owner's determination of the need for, or amount of, an adjustment in Contract price or Contract time associated with an approved Contract Change Order (or disagreement by the Contractor with the Owner's determination that a change has not occurred and no Contract Change Order is needed) shall not, under any circumstances, relieve the Contractor from its obligation to promptly begin and diligently perform the work, including the change, as described in the approved Contract Change Order.

G4.11 FIELD CHANGES

Conditions may arise during the prosecution of the work on construction necessitating minor variations in the contract plans and/or specification. In order to address these conditions, the Owner may without notice to the sureties and without invalidating the contract, make minor alterations, deviations or changes to the Contract, including the plans or specifications, without affecting any of the material or basic terms of the contract, including the contract price, schedule for performance, the basic design, or other terms. Such minor alterations, deviations or changes shall be documented in a Field Change on a form provided by the Owner and executed by the Engineer and the Contractor. By execution of the Field Change, Contractor agrees to make the specified change at no additional cost and without an alteration in the schedule of performance or other terms and conditions of the Contract.

G4.12 DETOURS

When required by the Technical Specifications, or shown on the Contract Plans, or required by responsible public agencies, the Contractor shall construct, maintain and remove detours for the use of public traffic, without additional cost to the Owner, unless separate payment is specified in the Technical Specifications.

The failure or refusal of the Contractor to construct and maintain detours at the proper time shall be sufficient cause for closing down the work until such detours are in satisfactory condition for use by public traffic.

G4.13 ARCHAEOLOGICAL DISCOVERIES

All articles of archaeological interest which may be uncovered by the Contractor during the progress of the work shall be reported immediately to the Engineer/Architect. The further operations of the Contractor with respect to the find will be decided under the direction of the Engineer.

G4.14 PRESERVATION AND CLEANING

The Contractor shall clean up the work at frequent intervals and at other times when directed by the Engineer/Architect. While finish work is being accomplished, floors shall be kept clean, free of dust, construction debris and trash.

Before final inspection of the work, the Contractor shall clean the project site, material sites, surrounding roadways and all ground occupied by him in connection with the work, of all rubbish, excess materials, false work, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Final cleaning shall include washing, dusting and sweeping, as applicable, of exposed architectural finish surfaces. Full compensation for final cleaning up will be considered as included in the prices paid for the various Contract items of work and no separate payment will be made therefore.

G4.15 GUARANTY OF WORK

Notwithstanding inspections and acceptance by the Owner of work furnished under this Contract, the Contractor warrants to the Owner that all materials and equipment furnished under the Contract, including that provided pursuant to Change Orders, will be of good quality and new, that the work will be free from defects in material or workmanship, and that the work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective.

This warranty by the Contractor is in addition to any warranties or guarantees required by the Technical Specifications for specified items of equipment or materials. This warranty shall be in effect notwithstanding any disclaimers, or limiting or conditional terms contained in such separate warranties furnished by manufacturers or suppliers.

G4.16 CORRECTION OF WORK DURING WARRANTY PERIOD

If, within two (2) years after the date of final acceptance of the work by the Owner, any of the work is found not to be in accordance with the Contract Documents, specifically including Section G4.15 ("Guaranty of Work"), the Contractor shall correct it promptly after written notice from the Owner to do so, and pay for any damage to other property resulting from such non-conforming work. If the Contractor fails to make the repairs or replacements promptly, or in an emergency when delay could cause risk of damage or loss, the Owner may have the non-conforming work removed, replaced or corrected at the expense of the Contractor and his surety. Non-conforming work which is remedied under this Section shall

be subject to an extended warranty obligation, identical in terms to that provided by Section G4.15 and this Section for a period of two (2) years after the non-conforming work has been remedied.

Nothing contained in this Section G4.16 shall be construed to establish a period of limitation with respect to other obligations which the Contractor may have under the Contract Documents. Establishment of the period of two (2) years as described in this Section relates only to the specific obligation of the Contractor to correct the work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the work.

SECTION 5 CONTROL OF WORK

G5.01 AUTHORITY OF ENGINEER/ARCHITECT

The Engineer/Architect shall decide 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 may arise as to the interpretation of the Contract Documents; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor; and all questions as to compensation. The Engineer/Architect will have authority to reject work which does not conform to the Contract Documents. His decision shall be final and he shall have authority to enforce and make effective such decisions and orders which the Contractor fails to carry out promptly.

G5.02 CONTRACT DRAWINGS

The Contract Drawings furnished consist of general drawings and show such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on the Contract Drawings shall be in writing.

Upon written request, the Owner will furnish to the Contractor for his use, at no expense to the Contractor, up to twenty (20) copies of all Contract Documents, including the Contract Drawings. Additional copies may be obtained at cost.

G5.03 SHOP DRAWINGS

The Contract Drawings shall be supplemented by shop drawings furnished by the Contractor. Shop drawings shall have been reviewed by the Engineer/Architect before any work involving such drawings is performed. No change shall be made by the Contractor in any shop drawing after it has been approved by the Engineer/Architect.

Shop drawing submittals shall contain adequate information to permit the Engineer to evaluate each submission for conformance with the Contract Documents. Each submittal shall be complete; partial submittals will not be reviewed. All drawings shall include a graphical scale and indicate the amount of reduction used, if any. The quality of lettering and draftsmanship shall be such as to insure easily read reproductions by microfilming process.

Each shop drawing submitted by the Contractor (including any provided by suppliers and/or subcontractors) shall bear the approval stamp of the Contractor, and shall be clearly and conspicuously marked to indicate any deviation in the shop drawing from the requirements of the Contract Documents. By approving and submitting shop drawings, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, and that he has checked and coordinated each shop drawing with the requirements of the work and the Contract Documents. Where applicable, shop drawings will be certified for construction by the manufacturer. Owner review of any shop drawing shall not constitute a change to the Contract. Contract changes can be effected through Change Orders only.

Each submittal shall be accompanied by a transmittal letter in the form specified by the Engineer from the Contractor stating the name of the material or equipment items as shown on the Contract Documents, a

specification reference consisting of a section number, and any proposed deviations from the Contract Documents requested or shown on the submittal.

Review of shop drawings is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Review and approval of the Contractor's shop drawings shall not relieve Contractor of any of his responsibility for the successful completion of the work in conformity with the requirements of the Contract Documents. The Contractor is responsible for conformance with all requirements of the Contract Documents, including, but not limited to, dimensions which shall be conformed and correlated at the job site, fabrication processes and techniques of construction, coordination of work with that of all others, and satisfactory performance of all work. Review of shop drawings shall not waive any requirement of the Contract Documents and defective work may be rejected notwithstanding such review.

It is the Contractor's responsibility to submit shop drawings and other submittals so as to allow sufficient time for review and for possible revisions and resubmittal. Minimum review time by the Engineer/Architect shall be thirty (30) calendar days; complex submittals may require up to 45 days. The Contractor shall schedule his shop drawing submittals so that this anticipated shop drawing review time does not delay his work.

Owner will make its best efforts to review submittals within the time period scheduled by the Contractor, provided it is consistent with the minimum time period specified in the preceding paragraph, but the Owner's inability to do so shall not automatically entitle the Contractor to additional time to complete the Contract. If the Engineer/Architect fails to complete his review of shop drawing submittals within a reasonable time (not to be less than the time period specified in this section), and if the Contractor's controlling operation is delayed by reason of the delay in review, an extension of time commensurate with the delay in completion of the work thus caused will be granted pursuant to Section G8.11, but no additional compensation will be allowed for such delay.

Shop drawings reviewed by the Engineer/Architect will be returned to the Contractor. The Engineer/Architect's action on each submittal will consist of one of the following: "No Exceptions Taken," "Exceptions Taken as Noted," "Revise and Resubmit" or "Rejected." When shop drawings are required to be resubmitted, the revisions are to be clearly defined on the revised drawings. Resubmittals will be reviewed in accordance with the provisions applicable to initial submittals and the time period for the Engineer's review shall be equal to that for initial submittals.

Submittal and processing of shop drawings shall conform to the requirements of Section 01 33 00, "Submittals," of the Technical Specifications.

Full compensation for furnishing all shop drawings shall be considered as included in the prices paid for the Contract items of work to which such drawings relate and no additional compensation will be allowed therefor.

When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in strict accordance therewith. Any further changes will require a resubmittal of the drawings.

G5.04 CONFORMITY WITH CONTRACT DOCUMENTS

Work and materials shall conform to the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on the Contract Drawings or indicated in the Specifications. Although measurement, sampling and testing may be considered evidence as to such conformity, the Engineer/Architect shall be the sole judge as to whether the work or materials deviate from the Contract Drawings and Specifications, and his decision as to any allowable deviations shall be final.

G5.05 COORDINATION AND INTERPRETATION OF CONTRACT DOCUMENTS

The General Provisions, Technical Specifications, Contract Drawings, Contract Change Orders and all supplementary documents are essential parts of the Contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete work.

In the event of inconsistencies between requirements contained in different components of the Contract Documents, the order of precedence to govern interpretation is as follows: (1) Change Orders, (2) Addenda, (3) Contract, (4) Bid Forms (all documents submitted by the bidder), (5) General Provisions, (6) Information for Bidders, (7) Technical Specifications, (8) Contract Drawings, (9) Notice Inviting Sealed Bids. In case of differences between small and large scale drawings, the large scale drawings shall govern. Schedules on drawings shall take precedence over conflicting notations on drawings. In the event of discrepancy between any drawing and the figures written thereon, the figures, unless otherwise directed, will govern over scaled dimensions.

Should it appear that the work to be done or any of the related matters is not sufficiently detailed or explained in the Contract Documents, the Contractor shall request from the Engineer/Architect for such further written explanations as may be necessary and shall conform to them as part of the Contract. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, clarification shall be sought from the Engineer/Architect, whose decision shall be final.

G5.06 ORDER OF WORK

When required by the Technical Specifications or Contract Drawings, the Contractor shall follow the sequence of operations as set forth.

Full compensation for conforming with such requirements will be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed.

G5.07 SUPERINTENDENCE

The Contractor shall supervise and direct the work using his best skill and attention and shall keep at the project site competent supervisory personnel at all times while work is in progress. The Contractor shall designate, in writing, before starting work, a project superintendent who shall be an employee of Contractor and shall have complete authority to represent and act for the Contractor. The Contractor shall notify the Engineer in writing prior to any change in superintendent assignment.

The Contractor shall be solely responsible for and have control over construction means, methods, techniques and procedures for providing adequate safety precautions and coordinating all portions of the

work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

G5.08 LINES AND GRADES

Contractor shall set primary control lines, monuments and bench marks as he determines to be necessary to control establishment of the lines and grades required for the completion of the work. In general, these will consist of the primary horizontal and vertical control points shown on the Contract Drawings. The Contractor shall notify Engineer a minimum of five (5) working days after such stakes are set.

Monuments, stakes and marks set by the Contractor shall be care-fully preserved by the Contractor. If such monuments, stakes or marks are destroyed or damaged, they will be replaced at no cost by the Contractor.

The Contractor shall temporarily suspend work at such points and for such reasonable times as the Engineer may require for transferring or setting monuments, stakes or marks, and the Contractor shall not be entitled to any additional compensation or extension of time therefore.

All other stakes or marks required to establish the lines and grades required for the completion of the work shall also be the responsibility of the Contractor. Payment for all work related to setting stakes or marks shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

Contractor shall take field measurements and verify field conditions consistent with prudent construction industry standards and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents before commencing construction activities on the work site. Errors, inconsistencies or omissions in the Contract Documents discovered by Contractor shall be reported to the Engineer at once.

G5.09 OBSERVATION OF CONSTRUCTION

The Engineer/Architect, and all authorized representatives of the Owner, shall at all times have safe access to the work during its construction, and shall be furnished with every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements and intentions of the Contract Documents. All work done and all materials furnished shall be subject to the Engineer/Architect's on-site and off-site observation.

The observation of the construction or materials by the Engineer shall not relieve the Contractor of any obligations to fulfill his Contract as prescribed. Work and materials not meeting such requirements shall be corrected, and unsuitable work or material may be rejected, notwithstanding that such work or materials have been previously reviewed by the Engineer, or that payment for such work or materials has been included in a progress estimate.

Re-examination of questioned work may be ordered by the Engineer/Architect at any time before final acceptance. If so ordered, the work shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner will pay for the cost of uncovering; removal, recovering and replacing of the parts removed; but if such work so exposed or examined is not in accordance with the Contract Documents, the uncovering, removal, recovering and replacement shall be at the Contractor's expense. Work which has been covered prior to observation by the Engineer/Architect

does not qualify as re-examined work; the Owner may order it uncovered for observation without payment of costs.

The Contractor shall give due notice to the Engineer/Architect before backfilling so that the Owner's Geotechnical Inspector may observe the materials and installation.

Whenever the Contractor intends to perform work on Saturday, Sunday, or a legal holiday, he shall give notice to the Architect and Owner Engineer of such intention twenty-four (24) hours prior to performing such work, or such longer period as may be specified, so that the Owner's material testing lab may make necessary arrangements.

The observations performed by the Engineer shall not relieve the Contractor of his responsibility to conduct comprehensive inspections of the work and to furnish materials and perform work in conformance with the Contract Documents.

G5.10 DOCUMENTS ON JOB SITE

The Contractor shall keep one copy of all Contract Documents (including Change Orders), approved Shop Drawings and approved progress payments on the job site, in good order, available to the Engineer and all authorized representatives of the Owner.

G5.11 CORRECTION, REMOVAL OF REJECTED WORK

The Contractor shall promptly correct work rejected by the Engineer as failing to conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed, so that it does comply with the Contract Documents. The Contractor shall bear the costs of correcting such rejected work, including additional testing, inspections and compensation for the Engineer's services and expenses made necessary thereby.

The Contractor shall remove, at his cost, from the site portions of the work which are not in accordance with the Contract Documents or which are not corrected by the Contractor.

The Contractor shall correct, at his cost, damaged or destroyed construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractors' correction or removal of work which is not in accordance with the requirements of the Contract Documents.

Any work done beyond the lines shown on the Contract Drawings or established by the Engineer, and all extra work done without written authority, will be considered as unauthorized work. Upon order of the Engineer, unauthorized work shall be remedied, removed or replaced at the Contractor's cost.

If the Contractor fails to promptly correct non-conforming or rejected work, or to comply promptly with any order of the Engineer under this Section, the Owner may cause such work to be remedied, removed or replaced and the costs thereof will be deducted from any monies due or to become due the Contractor.

Failure on the part of the Engineer to reject non-conforming work shall not be construed to imply acceptance of such work.

G5.12 [Intentionally left blank]

G5.13 CHARACTER OF WORKERS

The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons nor persons unskilled in tasks assigned to them.

G5.14 FINAL INSPECTION

When the work has been completed, the Engineer will make the final inspection. The Contractor shall notify the Engineer/Architect in writing when it considers the work complete and shall request a final inspection.

G5.15 SUBMITTAL OF RECORD DATA

The Contractor shall maintain up-to-date a separate, neat and legible set of construction drawings showing as-built conditions. The intention is that a separate full-size set of the construction drawings will be neatly and accurately marked in colored ink to show any condition, dimension, installation or location that is different from that originally shown. Deviations from the drawings, utilities and services, mechanical and electrical lines, details, and other work shall be incorporated on this set. The locations of installed underground and hidden utilities will be shown and dimensioned to appropriate reference points. No work shall be permanently concealed until the required information has been recorded. The requirement is that these record construction drawings and the "as-built" material and equipment drawing submittals provided will reflect the complete as-built condition of the project.

Where the contract drawings are not of sufficient size, scale, or detail, the Contractor shall furnish his own drawings for incorporation of details and dimensions. In such cases, the Contractor shall provide a reproducible set of his drawings, suitably cross-referenced to the contract drawings.

The record drawings will be maintained up to date on a "day by day" basis. That is, information will be recorded as it is known. Prior to any progress payments, the Engineer/Architect will review the status of the record construction drawings. The Engineer/Architect may withhold approval of progress payments until such time as the record drawings are brought up to date.

Prior to the completion of the contract, the Contractor shall furnish a satisfactory set of record drawings and certify on each drawing that conditions shown are as-built. Submittal of the record drawings is made a condition for acceptance of the project and final payment under the contract.

G5.16 EMERGENCIES

In an emergency affecting the safety of life, the work, or adjoining property, the Contractor, without special instructions or authorization from the Engineer/Architect, shall act at his discretion to prevent such threatened loss or injury. In such an emergency, the Contractor shall perform such additional work as is required. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with the provisions of Section 9.

G5.17 RIGHTS-OF-WAY

The Owner will provide the rights-of-way over private lands or the site for permanent works or installations, and right-of-way for access, unless otherwise indicated. The Contractor will be permitted to use such land for construction purposes, but any additional right-of-way or land desired by the Contractor for construction purposes shall be provided by the Contractor without expense to the Owner

SECTION 6 CONTROL OF MATERIALS

G6.01 SOURCE OF SUPPLY AND QUALITY OF MATERIALS

The Contractor shall provide all materials required to complete the work, except materials that are designated in the Specifications to be furnished by the Owner and materials furnished by the Owner in accordance with force account work as described in Section G9.03. As used in this Section, the term “materials” shall mean materials and equipment furnished for incorporation in the work.

Notwithstanding any prior inspection, only materials conforming to the requirements of the Contract Documents shall be incorporated in the work.

The materials furnished and used shall be new, except as may specifically be provided elsewhere in the Contract Documents. The materials shall be manufactured, handled, and used in a workmanlike manner to ensure completed work in accordance with the Contract Documents.

The Contractor shall submit to the Engineer/Architect a list of his sources of materials and the locations at which such materials will be available for inspection. The list shall be submitted in sufficient time to permit proper inspection and testing of materials to be furnished from such listed sources in advance of their use. The Contractor shall assure that the Engineer/Architect or his authorized representative has free access at all times to the material to be inspected, sampled or tested. The Engineer/Architect may inspect, sample or test materials at the source of supply or other locations. It is understood that such inspections and tests in no way shall be considered as a guaranty of continued acceptance of material presumed to be similar to that upon which inspections and tests have been made, and that inspection and testing performed by the Owner shall not relieve the Contractor or his suppliers of responsibility for quality control.

Manufacturers’ warranties, guaranties, instruction sheets and parts lists, which are furnished with certain materials incorporated in the work, shall be delivered to the Engineer/Architect before final acceptance of the Contract.

Reports and records of inspections made and tests performed, when available at the site of the work, may be examined by the Contractor and the Engineer.

G6.02 STORAGE OF MATERIALS

Materials shall be stored by the Contractor in such a manner as to ensure the preservation of their quality and fitness for the work and to facilitate inspection.

G6.03 DEFECTIVE MATERIALS

All Contractor-furnished materials not conforming to the requirements of the Contract Documents may be rejected, whether in place or not. They shall be removed immediately from the site of the work unless otherwise permitted by the Engineer/Architect. No rejected material, the defects of which have been subsequently corrected, shall be used in the work unless approval in writing has been given by the Engineer/Architect. Upon failure of the Contractor to comply promptly with any order of the Engineer/Architect made under the provisions of this Section, the Engineer/Architect may cause the

removal and replacement of rejected material and deduct the cost from any monies due or to become due the Contractor.

G6.04 TRADE NAMES AND ALTERNATIVES

For convenience in designation in the Contract Documents, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of a manufacturer and his catalog information. Except in those instances where the product is designated to match others in use in a particular improvement, either completed or in the course of completion, the use of an alternative article or material which is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

1. The Contractor shall submit his Proposal for an alternative in writing. Such request shall be made in ample time to permit review and approval without delaying the work.
2. No such Proposal will be considered unless accompanied by complete information and descriptive data necessary to determine the equality of the offered materials, articles, or equipment. Samples shall be provided when requested by the Engineer. The Contractor shall satisfy the Engineer as to the comparative quality, suitability and performance of the offered materials, articles or equipment. In the event that the Engineer/Architect rejects the use of such alternative materials, articles or equipment, then one of the particular products designated by brand name will be furnished.
3. The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and he shall furnish all information necessary as required by the Engineer/Architect. The Engineer/Architect shall be the sole judge as to the quality and suitability of alternative articles or materials and his decisions shall be final. Where use of an alternative material involves redesign of, or changes to, other parts of the work, the cost and the time required to effect such redesign or changes will be considered in evaluating the suitability of the alternative material. Cost of redesign by the Engineer/Architect will be borne by the Contractor.
4. Whenever classification, rating or other certification by a body such as UL or NEMA is a part of the specification for any material, proposal for use of alternative materials shall be accompanied by reports from the listed or equivalent independent testing laboratory indicating compliance with specification requirements. The cost of all testing required to prove equality of the material proposed shall be borne by the Contractor. Approval of an alternative material shall be only for the characteristics or use named in such approval, and shall not be used to change or modify any Contract requirement.

G6.05 PLANT INSPECTION

The Engineer/Architect may inspect the production of material, or the manufacture of products, at the source of supply. Plant inspection, however, will not be undertaken until the Engineer/Architect is assured of the cooperation and assistance of both the Contractor and the material producer. The Engineer/Architect or his authorized representative shall have free entry at all times to such parts of the plant as concern the manufacture or production of the materials. Adequate facilities shall be furnished free of charge to make the necessary inspection. The Engineer/Architect assumes no obligation to inspect

materials at the source of supply. The responsibility of incorporating satisfactory materials in the work rests entirely with the Contractor, notwithstanding any prior inspections or tests.

G6.06 PRODUCT AND REFERENCE STANDARDS

When descriptive catalog designations, including manufacturer's name, product brand name or model number are referred to in the Contract Documents, such designations shall be considered as being those found in industry publications in effect on the day the Notice to Contractors for the work is dated.

G6.07 SAMPLES

After the award of the Contract, the Contractor shall furnish to the Owner samples indicated in the Specifications or requested by the Engineer/Architect. Samples shall be submitted without charge, with shipping charges prepaid. Materials for which samples are required shall not be used in the work until approved in writing by the Engineer/Architect.

Each sample shall be submitted in duplicate unless otherwise directed, and shall be labeled with the following data: name of project; name of Contractor; material represented and location in the project including specification reference; and producer information including brand, model, place of origin, and other pertinent information.

The Contractor shall forward a transmittal letter to the Architect with each shipment of samples containing the information required in the previous paragraph. Approval of a sample shall be only for the characteristics and use named in the submittal and approval shall not be construed to change or modify any Contract requirement. Before submitting samples, the Contractor shall assure himself that the materials or equipment will be available in the quantities required in the project, as no change or substitution will be permitted after a sample has been approved unless approved by the Architect in writing.

Samples of material from local sources shall be taken by or in the presence of the Engineer/Architect if so required by the Engineer/Architect; otherwise the samples will not be considered for testing.

Approved samples not damaged in testing may be incorporated in the finished work if marked for identification and approved by the Engineer/Architect. Materials incorporated in the work shall match the approved samples.

Failure of any material to pass the specified tests will be sufficient cause for refusal to consider under this Contract any further samples of the same brand, make or source of that material. The Engineer/Architect reserves the right to reject the use of any material which has previously proven unsatisfactory in service.

Samples of material delivered to the site or in place may be taken by the Owner for testing. Failure of samples to meet Contract requirements will annul previous approvals of the item tested.

G6.08 TESTING OF MATERIALS OR WORK

Materials to be used in the work will be subject to inspection and tests by the Owner or designated representative. The Contractor shall furnish, without charge, such samples as may be required.

Materials and work shall be tested in accordance with the methods in use by the State of California, Department of Transportation, or by nationally recognized testing organizations or as specified in the Contract Documents. The Engineer/Architect will make or approve all testing. Unless otherwise noted in the Technical Specifications, testing will be made at the expense of the Contractor. In the event that any materials and work fail to pass tests, the cost of subsequent testing of similar materials and work as may be required by the Engineer/Architect shall be borne by the Contractor.

Whenever a reference is made in the Specifications to a test method by Calif. number, it shall mean the test method in effect on the date of the Notice for Proposals for the work. Whenever a reference is made in the Specifications to a specification or test designation of the American Society for Testing and Materials, the American Association of State Highway Officials, Underwriters' Laboratories, Inc., or any other recognized national organization, and the number accompanying the test designation representing the year of adoption of the test has been omitted, the reference shall mean the test method in effect on the date of the Notice for Proposals for the work.

Whenever the Contract Documents provide an option between two or more test methods, the Engineer/Architect will determine the test method to be used.

Whenever a specification, manual or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of such reports, identified as to the lot of material, shall be furnished to the Engineer/Architect. The manufacturer's test report shall supplement the inspection, sampling and testing provisions of this Section and shall not constitute a waiver of the Owner's right to inspect. When material which cannot be identified with specific test reports is proposed for use, the Owner may, at its discretion, select random samples from the lot for testing. Testing specimens from the random samples, including those required for retest, shall be prepared in accordance with the referenced specification and furnished by the Contractor at his expense. The number of such samples and test specimens shall be entirely at the discretion of the Engineer/Architect.

G6.09 CERTIFICATE OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which the Specifications require that such Certificate be furnished. In addition, the Engineer/Architect may permit the use of certain materials prior to sampling and testing if accompanied by a Certificate of Compliance stating that the materials involved comply in all respects with the requirements of the Specifications. The Certificate shall be signed by the manufacturer of the material. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lots so certified shall be clearly identified in the Certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the Contract Documents, and any such material not conforming to such requirements will be subject to rejection whether in place or not.

The Engineer/Architect reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as shown in the Special Provisions.

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITIES

G7.01 LAWS TO BE OBSERVED

The Contractor shall keep himself fully informed concerning all requirements of law, including but not limited to all State and Federal laws and county and municipal ordinances and regulations which in any manner affect those engaged or employed in the work, the materials used in the work, or which in any way affect the conduct of the work, and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe, and shall cause all his agents and employees to observe, all such requirements of laws and shall protect, indemnify and hold harmless the Owner and the Engineer/Architect, and all of their respective officers, agents and employees against all claims and liabilities arising from or based on the violation of any such requirement of law whether by the Contractor or his employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the work in relation to any such requirements of laws, the Contractor shall immediately report the same to the Engineer/Architect in writing. The Contract Documents shall be governed by the laws of the State of California.

G7.02 LABOR CODE REQUIREMENTS

Attention is directed to the following requirements of the Labor Code:

- A. **Hours of Labor.** Eight hours labor constitutes a legal day's work. The Contractor shall forfeit, as penalty to the Owner, Twenty-Five Dollars (\$25) for each worker employed in the performance of the Contract by the Contractor or by any subcontractor under him for each calendar day during which such workman is required or permitted to work more than eight (8) hours in any one (1) day and forty (40) hours in any one calendar week in violation of the provisions of the California Labor Code and in particular, Sections 1810 to 1815 thereof, inclusive, except that work performed by employees of the Contractor in excess of eight (8) hours per day and forty (40) hours during any one (1) week shall be permitted upon compensation for all hours worked in excess of eight hours per day at not less than one and one-half (1-1/2) times the basic rate of pay, as provided in said Section 1815.
- B. **Labor Non-Discrimination.** Attention is directed to Section 1735 of the Labor Code which provides the Contractor shall not discriminate against any employee who is employed on the work because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex gender, gender identity, gender expressing age or sexual orientation of such persons, except as provided in Section 12940 of the Government Code.
- C. **Prevailing Wages.** The Contractor shall comply with California Labor Code Sections 1770 to 1780, inclusive. In accordance with said Section 1775, the Contractor shall forfeit as a penalty to an amount determined by the Labor Commissioner, not to exceed Two Hundred Dollars (\$200) for each calendar day or portion thereof for each worker paid less than stipulated prevailing wage rates for such work or craft in which such worker is employed for any work done under the Contract by him or by any subcontractor under him in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

Pursuant to the provisions of Section 1773 of the Labor Code, the Owner has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work applicable to the work to be done from the Director of the Department of Industrial Relations. Copies of the prevailing rates are on file at the Owner's Office and are available to any interested party on request. Such wage rates must be prominently posted at the construction site.

The Owner will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth in the Contract. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his bid, and will not under any circumstances be considered as the basis of a claim against the Owner on the Contract.

- D. **Payroll Records.** The Contractor's attention is directed to the following provisions of Labor Code Section 1776. The Contractor shall be responsible for the compliance with these provisions by his subcontractors.
- (a) Each contractor and 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.
 - (b) Contractor and subcontractors(s) will be obligated to submit all certified payroll records directly to the Department of Industrial Relations (DIR) in electronic format.
 - (c) The payroll records enumerated under subdivision (a) 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 such employee or his or her authorized representative on request.
 - (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to the Owner, 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 enumerated in subdivision (a) shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the Owner, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractor and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor.
 - (d) 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.
 - (e) Each contractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within ten (10) days after receipt of a written request.

- (f) Any copy of records made available for inspection as copies and furnished upon request to the public or the Owner, 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 shall not be marked or obliterated.
- (g) The Contractor shall inform the Owner of the location of records enumerated under subdivision (a), including the street address, city and county, and shall, within five (5) working days of the Owner's request, provide a notice of a change of location and address.
- (h) In the event of noncompliance with the requirements of this Section, the Contractor shall have ten (10) days in which to comply subsequent to receipt of written notice specifying in what respects such contractor must comply with this Section. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the State or the Owner, forfeit One Hundred Dollars (\$100) 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, such penalties shall be withheld from progress payments then due.

The penalties specified in subdivision (g) of Labor Code Section 1776 for noncompliance with the provisions of said Section 1776 may be deducted from any monies due or which may become due to the Contractor.

The Contractor and each subcontractor shall preserve their payroll records for a period of three (3) years from the date of completion of the Contract.

- E. **Apprentices.** The Contractor shall fully comply with the requirements of Sections 1777.5 and 1777.6 of the California Labor Code and the regulations of the California Apprenticeship Council. In accordance with Section 1777.5, the Contractor shall secure the necessary certificates and shall contribute to the apprenticeship fund or funds, as provided for therein. The Contractor shall require each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work to comply fully with Sections 1777.5 and 1777.6 of the Labor Code. Information relative to apprenticeship standards, wage schedules and other requirements may be obtained from the State Division of Apprenticeship Standards and its branch offices.
- F. **Workers' Compensation.** Pursuant to the requirements of Section 1860 of the California Labor Code, the Contractor will be required to secure the payment of workers' compensation to his employees in accordance with the provisions of Section 3700 of the Labor code.

Prior to commencement of work, the Contractor shall sign and file with the Owner, a certification in the following form:

"I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self--insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

Said certification is included in the Contract, and signature and return of the Contract as provided in Section G3.03, "Execution of Contract," of the General Provisions, shall constitute signing and filing of the said certificate.

G7.03 REMOVAL, RELOCATION OR PROTECTION OF UTILITIES

Pursuant to California Government Code Section 4215, the Owner shall identify and provide for the timely removal, relocation or protection of any existing main or trunkline utility facilities located on the site of the work to be completed with reasonable accuracy in the plans and specifications made part of the invitation for bids. If the Contractor discovers utility facilities not identified by the Owner while performing the work, the Contractor shall immediately notify the Owner and the owner of the utility in writing. For those main or trunk line utility facilities discovered by the Contractor, the Owner will compensate the Contractor for the costs of locating, removing or relocating such utility facilities; repairing damage not due to the failure of the Contractor to exercise reasonable care; and for equipment on the project necessarily idled during such work. The Contractor will not be assessed liquidated damages for delays in completion of the project due to the failure of the Owner or owner of the utility to provide for removal or relocation of such utility facilities.

G7.04 AIR POLLUTION CONTROL

The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the Contract, including any air pollution control rules, regulations, ordinances and statutes specified in Section 11017 of the Government Code.

Material to be disposed of shall not be burned, either inside or outside the work site.

G7.05 WATER POLLUTION CONTROL

The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays and coastal waters from pollution with fuels, oils, bitumens, calcium chloride and other harmful materials and shall conduct and schedule his operations so as to avoid or minimize muddying and silting of said streams, lakes, reservoirs, bays and coastal waters. The Contractor shall comply with all laws, regulations, ordinances and rules regarding water pollution. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.

Water pollution control work is intended to provide prevention, control, and abatement of water pollution to streams, waterways and other bodies of water, and shall consist of constructing those facilities which may be shown on the plans, specified in the General Provisions or in the Technical Specifications Section 01530, or directed by the Engineer/Architect.

G7.06 SOUND CONTROL REQUIREMENTS

The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the Contract.

Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

G7.07 USE OF PESTICIDES

The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies which govern the use of pesticides required in the performance of the work on the Contract.

Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilants, and repellents.

Any substance or mixture of substances intended for preventing, repelling, mitigating or destroying weeds, insects, diseases, rodents or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered as pesticide.

G7.08 WEIGHT LIMITATIONS

Unless expressly permitted in the Technical Specifications, the Contractor shall not operate construction equipment or vehicles of any kind which, laden or unladen, exceed the maximum weight limits set forth in Division 15 of the Vehicle Code, over completed or existing base, surfacing, pavement or structures.

G7.09 PAYMENT OF TAXES

The Contract prices paid for the work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of any tax will be furnished to the Contractor by the Owner, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the Contract.

The Contractor shall withhold and pay any and all sales and use taxes, withholding taxes, whether State or Federal, Social Security taxes, State Unemployment Insurance charges and all other taxes which are now or hereafter may be required to be paid or withheld under any laws.

G7.10 PERMITS AND LICENSES

The Contractor shall procure all permits and licenses (except those procured or to be procured by the Owner which are listed in the Technical Specifications or Specifications), pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work.

The Environmental Quality Act (Public Resources Code, Section 21000 to 21176) may be applicable to permits, licenses and other authorizations which the Contractor must obtain from State or local agencies in connection with performing the work of the Contract. The Contractor shall comply with the provisions of that Act in obtaining such permits, licenses and other authorizations and they shall be obtained in sufficient time to prevent delays to the work.

The Contractor shall comply with permits obtained by the Owner for the work which are listed in the Technical Specifications or Specifications.

G7.11 SUBSURFACE EXCAVATIONS, NOTIFICATION

Attention is directed to Government Code Sections 4216 to 4216.9, and in particular Section 4216.2 which provides, in part:

Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two (2) working days, but no more than fourteen (14) calendar days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation.

The Contractor shall contact the regional notification center, "Underground Service Alert," and schedule the work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities.

The following provisions, drawn from Section 7104 of the Public Contracts Code, shall apply to any work which involves digging trenches or other excavations which extend deeper than four feet below the surface:

- (a) The Contractor shall promptly, and before the following conditions are disturbed, notify the District, in writing, of any:
 - (1) 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.
 - (2) Subsurface or latent physical conditions at the site differing from those indicated.
 - (3) 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.
- (b) The District shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work shall issue a change order under the procedures described in the Contract.
- (c) In the event that a dispute arises between the Owner and the Contractor as to whether the conditions materially so differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or the 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.

G7.12 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices or processes, used on or incorporated in the work and shall indemnify, save harmless and defend the Owner, the Engineer/Architect, and their duly authorized representatives from all suits at law, or actions of every nature for, or on account of, the use of patented materials, equipment, devices or processes. In case such materials, equipment, devices or processes are held to constitute an infringement and their use enjoined, the Contractor, at his expense, shall: (a) secure for the Owner the right to continue using said materials, equipment, devices or processes by suspension of the injunction or by procuring a license or licenses, or (b) replace such materials, equipment, devices or processes, or (c) modify them so that they become noninfringing or remove the enjoined materials, equipment, devices or processes and refund the sums paid therefor without prejudice to any other rights of the Owner or the Engineer/Architect.

G7.13 SAFETY REQUIREMENTS

The Contractor shall promptly and fully comply with and carry out, and shall without separate charge to the Owner, enforce compliance with the safety and first aid requirements prescribed by applicable State and Federal laws and regulations, rules and orders and, including but not limited to US Department of Labor (OSHA) and the CA Occupational Safety and Health Act (Cal-OSHA), as may be necessary to the end that work shall be done in a safe manner and that the safety and health of the employees and the people of local communities is safeguarded. In the event of conflicting requirements, the most stringent requirement as it pertains to the Contractor's safety responsibility applies.

Compliance with the provisions of this Section by subcontractors shall be the responsibility of the Contractor. All installed material, equipment and structures, without separate charge to the Owner, shall fully conform with all applicable State and Federal safety laws, rules, regulations and orders and it shall be the Contractor's responsibility to furnish only such material, equipment and structures, notwithstanding any omission in the Contract Documents thereof or that a particular material, equipment or structure was indicated.

Upon the failure of the Contractor to comply with any of the requirements of this Section, the Owner, Engineer or Architect shall have the authority, but not the duty, to stop any operations of the Contractor affected by such failure until such failure is remedied. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for increased costs or damages by the Contractor.

Contractor at all times shall conduct all operations under the Contract in a manner to avoid the risk of bodily harm to persons or risk of damage to any property. The Contractor shall continuously inspect all work, materials and equipment to ensure safe working conditions are maintained and damage to persons and property is avoided. During the performance of the work, the Contractor shall institute controls and procedures for the control and safety of persons visiting the job site.

The Contractor shall maintain an accurate record of, and shall report to the Owner in writing, exposure data and all accidents resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies or equipment incident to work performed under the Contract. If death or serious injuries or serious damages are caused, the accident shall be reported to the Owner immediately by telephone or messenger. In addition, the Contractor shall furnish the Owner with a copy of the Employer's Report of Injury immediately following any incident requiring the filing of said report during the

prosecution of the Work. The Contractor also shall furnish the District with a copy of the Employer's Report of Injury involving any subcontractors on the project. The Contractor shall make all reports as are, or may be, required by any authority having jurisdiction, and permit all safety inspections of the Work being performed under the Contract.

The Contractor may not submit a claim for extension of time or for extra costs or for any damages as a result of any stop work order for items related to this section that is issued by a proper authority, including the Owner.

No provisions of this Contract will act to make the Owner and Engineer/Architect, its consultants, or any other party other than the Contractor responsible for safety. The Contractor will indemnify, defend, and hold harmless the District, its officers, employees, and agents from and against any and all actions, damages, fines, and losses arising from the Contractor's failure to meet all the safety requirements or provide a safe work site.

G7.14 TRENCH EXCAVATION SAFETY PLAN

Attention is directed to California Labor Code Section 6705. At least five (5) days in advance of excavation of any trench five feet or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design of shoring, bracing, sloping and 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 State Construction Safety Orders, the plan shall be prepared and signed by a registered civil or structural engineer employed or hired by the Contractor. Nothing in this Section shall be deemed to allow the use of a shoring, sloping or protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety. Nothing in this Section shall be construed to impose liability on the Owner, the Engineer/Architect or any of their employees.

Acceptance by Owner or Engineer/Architect constitutes acknowledgement of the submission, and does not constitute review or approval of the designs, design assumptions or criteria, completeness of submission, applicability to areas of intended use or implementation of the plan, all of which are solely the responsibility of the Contractor.

G7.15 SANITARY PROVISIONS

The Contractor shall conform to the rules and regulations pertaining to sanitary provisions established by the State, and to County, Town and municipal laws and ordinances as may be applicable. Toilets for use of employees on the work shall be furnished where needed and shall be maintained by the Contractor. Their use shall be strictly enforced.

G7.16 PUBLIC SAFETY AND CONVENIENCE

The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to the public and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

The Contractor shall adequately warn and give notice to the general public of the construction and protect the general public from any and all dangerous conditions resulting from the work by means such as signs, lights, fences, barriers, guards and flaggers. Additional means may be specified in the Special Conditions.

The Contractor shall furnish, maintain throughout, and remove at the end of the construction period all construction signs, warning lights, lights for illumination, traffic strapping, delineators, barricades and flaggers which may be required or deemed necessary for public safety, including the safe and orderly movement of vehicular and pedestrian traffic. All traffic devices shall be as specified in the Manual of Traffic Controls for Construction and Maintenance Work Zones, issued by the California Department of Transportation (Caltrans). For work in a public right of way, the Contractor must comply with all the rules and regulations of the State, County, or local agency that owns the right of way.

The adequacy of the Contractor's means is subject to review by the Owner and other public agencies having jurisdiction and the Contractor shall promptly, at no additional cost to the Owner, comply with any order or direction regarding public safety and/or convenience.

All trucks coming to the site or leaving the site with materials or loose debris shall be loaded in a manner which will prevent dropping of material or debris on public streets. Spillage resulting from hauling operations along or across any public traveled way shall be removed immediately at the Contractor's expense.

Construction operations shall be conducted in such a manner as to cause as little inconvenience as possible to owners of abutting property. Convenient access to driveways, houses and buildings along the line of work shall be maintained, and temporary approaches to roads or highways shall be provided and kept in good condition. Roadway excavations shall be conducted in such a manner as to provide a reasonably smooth and even surface satisfactory for use by public traffic at all times.

For work in public right-of-way, the Contractor shall comply with the rules and regulations of the State, County or local agency that owns the right-of-way.

All costs of complying with public convenience requirements of all public agencies shall be included in the Contract price.

The Owner/Engineer/Architect shall have the authority, but not the duty, to stop the Contractor from beginning new work until the provisions of this Section have been met.

Liquidated damages for noncompliance with this section may be assessed at the amount per day, if any, specified in this Contract for failure to comply with this provision

G7.17 SAFETY PROGRAM

The Contractor shall establish, implement, monitor, supervise, and maintain a written injury and illness prevention program (IIPP) as required by Labor Code Section 6401.7. Before beginning the Work, the Contractor shall submit a copy of its IIPP plan to the Owner.

The Contractor's compliance with requirements for safety and the Owner's review of the Contractor's IIPP shall not relieve or decrease the liability of the Contractor for safety. The District's review of the Contractor's IIPP is only to determine if the above listed elements are included in the plan.

G7.18 PRESERVATION OF PROPERTY

Due care shall be exercised to avoid injury to existing improvements or facilities, utility facilities, adjacent property and trees, shrubs and other plants that are not to be removed.

Trees, shrubs and other plants that are not to be removed, and pole lines, fences, signs, survey markers and monuments, buildings and structures, conduits, pipe lines, sewer and water lines, highway facilities, and any other improvements or facilities, under or above ground, that are within or adjacent to the work limit line shall be protected from injury or damage, and the Contractor shall provide and install suitable safeguards to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the Specifications if any such objects are a part of the work being performed under the Contract. The Engineer/Architect may make or cause to be made such temporary repairs as are necessary to restore to service any damaged facility. The cost of such repairs shall be borne by the Contractor and may be deducted from any monies due or to become due to the Contractor under the Contract.

The fact that any underground facility is not shown on the Contract Plans shall not relieve the Contractor of his responsibility under Section G8.14, "Non-Owner Facilities," of the General Provisions. It shall be the Contractor's responsibility to ascertain the location of such underground improvements or facilities which may be subject to damage by reason of his operations.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in protecting or repairing property as specified in this Section, shall be considered as included in the prices paid for the various Contract items of work and no additional compensation will be allowed therefor.

G7.19 RESPONSIBILITY FOR DAMAGE

The Mid-Peninsula Water District, its directors, officers, employees and authorized agents thereof connected with the work, and the Engineer/Architect, shall not be answerable or accountable in any manner: for any loss or damage that may happen to the work or any part thereof; for any loss or damage to any of the materials or other things used or employed in performing the work; for injury to or death of any person (including but not limited to workers or the public) from any cause whatsoever; or damage to property from any cause whatsoever.

The Contractor shall be responsible for any liability imposed by law and injuries to or death of any person (including but not limited to workers and the public) or damage to property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before its completion and final acceptance.

To the maximum extent permitted by law, the Contractor shall indemnify and save harmless the **Mid-Peninsula Water District**, its directors, officers, employees and authorized agents thereof, and the Engineer/Architect, from all claims, suits or actions of every name, kind and description, brought for, or on account of, injuries to or death of any person (including but not limited to employees of Contractor, of subcontractors, or of any other person, firm or entity and the public) or damage to property arising from any cause whatsoever during the progress of the work or at any time before its final completion and

acceptance; or economic harm arising from any cause whatsoever during the progress of the work or at any time before its final completion and acceptance, excluding such injuries etc. caused by the sole negligence, willful misconduct, or active negligence of the Owner or its representatives. The duty of the Contractor to indemnify and save harmless includes the duties to defend (by legal counsel satisfactory to the indemnitees) as set forth in Section 2778 of the Civil Code and to pay attorney's fees and litigation costs required by such defense.

With respect to third party claims against Contractor, the Contractor waives any and all rights to any type of express or implied indemnity against the **Mid-Peninsula Water District**, its directors, officers, employees or authorized agents, or the Engineer/Architect. It is the intent of the parties that the Contractor shall indemnify and hold harmless the **Mid-Peninsula Water District**, its directors, officers, employees and authorized agents, and the Engineer, from any and all claims, suits, or actions arising from any cause whatsoever as set forth above regardless of the existence or degree of fault or negligence on the part of the **Mid-Peninsula Water District**, the Engineer/Architect, the Contractor, a subcontractor or employee of any of these, except that in no event shall Contractor be required to indemnify for the sole negligence, willful misconduct, or active negligence of the **Mid-Peninsula Water District** or its directors, officers, employees or authorized agents, or the Engineer.

Pursuant to Public Contract Code section 9201, District shall have full authority to compromise or otherwise settle any claim relating to the Contract at any time. The District shall provide for timely notification to the Contractor of the receipt of any third-party claim, relating to the contract. Notice shall be in writing and will be provided within thirty (30) days. The District shall be entitled to recover its reasonable costs incurred in providing the notification required herein.

G7.20 RESPONSIBILITY FOR WORK AND MATERIALS

Until the acceptance of the Contract, the Contractor shall have the charge and care of the work and of the materials to be used therein, including materials for which he has received partial payment, and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the work. Relief from maintenance and responsibility for a portion of the total work will not be granted by the Owner. The Contractor shall rebuild, repair or restore all injuries, losses or damages to any portion of the work and materials occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary, the Contractor shall, at his expense, provide suitable drainage and erect such temporary structures as are necessary to protect the work and materials from damage. The suspension of the work from any cause whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified. The Contractor shall properly store materials which have been partially paid for by the Owner. Such storage by the Contractor shall be on behalf of the Owner and the Owner shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored except on written authorization from the Engineer.

G7.21 CONTRACTOR'S LIABILITY INSURANCE

- A. Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in California (and acceptable to the Owner) policies of insurance as will protect the Contractor and the Owner from claims set forth below which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable,

whether such operations be by the Contractor or by a subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- (1) claims under workers' compensation, disability benefits and any other similar employee benefit acts, which are applicable to the work;
 - (2) claims for damage because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
 - (3) claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
 - (4) claims for damages insured by comprehensive personal injury liability coverage which are sustained by (1) a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;
 - (5) claims for damages, other than to the work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
 - (6) claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle; and
 - (7) claims involving contractual liability insurance applicable to the Contractor's indemnity obligations under Section G7.18.
- B. The general and commercial liability insurance required by paragraph A shall include all major divisions of coverage and be on a comprehensive basis including:
- (1) Premises Operations (including X, C & U coverages)
 - (2) Independent Contractors' Protection
 - (3) Products and Completed Operations
 - (4) Personal Injury Liability with Employment Exclusion deleted
 - (5) Broad Form Blanket Contractual, including specified provision for Contractor's obligation under Section G7.18
 - (6) Owned, Non-Owned and hired motor vehicles
 - (7) Broad Form Property Damage, including Completed Operations.
- C. The general and commercial liability insurance required by and described in paragraph A and paragraph B above shall be written for not less than Three Million Dollars (\$3,000,000) per occurrence. Coverages shall be written on an occurrence basis and shall be maintained without interruption from the date of commencement of work until the date of acceptance and final payment, and thereafter as may be required in the Technical Specifications.

- D. The Contractor shall procure and maintain at all times during this Contract Workers' Compensation Insurance in conformance with the laws of the State of California. Employer's Liability Insurance shall be One Million Dollars (\$1,000,000) per accident or disease. Within fifteen (15) days of Notice of Contract award, the Contractor shall file with the Owner a Certificate of Insurance, which shall stipulate that thirty (30) days advance written notice of cancellation, nonrenewal or reduction in limits shall be given in writing to the Owner.
- E. In the event any work is subcontracted, the Contractor shall require the subcontractors to provide statutory workers' compensation insurance and employer's liability insurance for all of the subcontractors' employees engaged in such work. In addition, the Contractor shall be responsible for any liability directly or indirectly arising out of the work performed by a subcontractor, to the extent such liability is not covered by the subcontractor's insurance. Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.
- F. Within fifteen (15) days from receipt of the Notice of Award, Contractor shall furnish to the District original certificates and amendatory endorsements of each policy of insurance required under this Contract. The endorsements are to be on forms that conform to the requirements stated herein and that are acceptable to the District. All documents are to be received and approved by the District before work commences. The District reserves the right to require complete, certified copies of all required insurance policies and/or endorsements effecting coverage required by these specifications at any time. Upon Owner's requirement, copies of each such policy of insurance and all endorsements shall also be promptly delivered to Owner. The policies of insurance required hereunder shall include the stipulations set forth below which also shall be reflected on the certificates of insurance.
- (1) Each insurance policy required under this Contract shall be endorsed to state that coverage shall not be suspended, voided, cancelled, reduced in coverage or in limits or otherwise materially altered except after thirty (30) days prior written notice by certified mail, return receipt requested has been given to the **Mid-Peninsula Water District**.
 - (2) The **Mid-Peninsula Water District**, its directors, officers, employees, authorized agents and the Engineer/Architect shall be named as additional insureds on the policies.
 - (3) The **City of Belmont**, its directors, officers, employees, authorized agents and the Engineer/Architect shall be named as additional insureds on the policies.
 - (4) The policy shall provide primary insurance coverage and the company providing such policy shall be liable thereunder for the full amount of any claim or loss up to and including the total limits of liability, without right of contribution from any other insurance maintained by the District/County/Town or the other additional insureds.
 - (5) The policy shall provide that inclusion of the District/County/Town, its officers, directors, employees and agents as additional insureds shall not affect the District's/County's/Town's rights as respects any claim, demand, suit or judgment brought or recovered against the Contractor. Said policy shall protect Contractor and District/County/Town in the same manner as though a separate policy had been issued to each, but nothing in said policy shall operate to increase the company's liability as set forth in this policy beyond the amount shown or to

which the company would have been liable if only one interest had been named as an insured. 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.

- G. Insurance is to be placed with an insurance carrier with a current A.M. Best and Company rating of no less than A:-VII or with a carrier acceptable to the District. The Contractor shall comply with all requirements of the insurers issuing policies. The carrying of insurance shall not be interpreted as relieving Contractor from any obligation under the Contract Documents. If any claim is made by any third person against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the insurance carrier and the Owner. Any failure to comply with reporting or other provisions of the policies shall not effect coverage provided to the **Mid-Peninsula Water District**, its officers, directors or employees.
- H. If Contractor fails to procure and maintain any insurance required under this Section, the Owner may take out and maintain, at the Contractor's expense, such insurance as the Owner may deem proper and deduct the cost thereof from any monies due the Contractor.
- I. For projects located within public right of way, additional insurance requirements may be imposed by the owner of the right of way as a condition of issuing an encroachment or street opening permit to the Contractor. The Contractor shall provide such insurance at his sole cost and expense.

G7.22 PROPERTY INSURANCE

Unless otherwise provided in the Technical Specifications, the Contractor will purchase and maintain, in a company or companies lawfully authorized to do business in California, and acceptable to the Owner, property insurance upon the entire work, in the amount of the Contract price on a replacement cost basis. Such property insurance shall be maintained until final payment has been made.

Property insurance shall be on an all-risk policy form (commonly known as "Builder's Risk-All Risk"), excluding coverage for earthquake and tsunami. The insurance shall cover reasonable compensation for Engineer's services and expenses required as a result of such insured loss. This insurance shall insure the interests of the Owner, the Contractor, and subcontractors in the work.

The property insurance may contain deductibles not to exceed the amounts. If no amounts are specified in the Special Provisions, the insurance shall be written without deductibles. The Contractor shall pay costs not covered because of such deductibles.

Complete copies of each policy of insurance and certificates of each policy, in form and substance satisfactory to Owner, shall be filed with Owner within fifteen (15) days after Contractor receives notice of award. The policies and certificates shall provide:

- (1) that **Mid-Peninsula Water District** is included as a named insured;
- (2) that losses shall be payable to Contractor and District as their interests appear; and
- (3) the policy will not be cancelled, nor coverage materially altered, without thirty (30) days prior written notice to District."

G7.23 DISPOSAL OF MATERIAL OUTSIDE THE WORK SITE

Unless otherwise specified in the Specifications, the Contractor shall make his own arrangements for disposing of materials outside the work site and he shall pay all costs involved.

When any material is to be disposed of outside the work site, the Contractor shall first obtain a written permit from the property owner on whose property the disposal is to be made. The Contractor shall file with the Engineer/Architect this permit or a certified copy, together with a written release from the property owner absolving the Owner from any and all responsibility in connection with the disposal of material on the property. Before any material is disposed of on said property, the Contractor shall obtain written permission from the Engineer/Architect to dispose of the material at the location designated in said permit.

When material is disposed of as above provided and the disposal location is visible from a highway, the Contractor shall dispose of the material in a neat and uniform manner to the satisfaction of the Owner's geotechnical consultant.

G7.24 COOPERATION

Should construction be under way by other forces or by other contractors within or adjacent to the limits of the work specified, or should work of any other nature be under way by other forces within or adjacent to these limits, the Contractor shall cooperate with all such other contractors or other forces to the end that any delay or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site at any time, by the use of other forces.

When two or more contractors are employed on related or adjacent Owner work, each shall conduct his operations in such a manner as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for all damage to work, to persons or property caused to the other by his operations, and for loss caused the other due to his unnecessary delays or failure to finish the work within the time specified for completion.

G7.25 OCCUPANCY PRIOR TO ACCEPTANCE

The Owner reserves the right to occupy all or any part of the project prior to completion of the entire Contract, upon written order therefor. In such event, the Contractor will be relieved of responsibility for any injury or damage to such part as results from such occupancy and use by the Owner.

If the Contractor carries insurance against damage to such premises or against liability to third persons covering the premises so used and occupied by the Owner, and if such occupancy results in increased premiums for such insurance, the Owner will pay to the Contractor the added cost for such insurance during the period of occupancy.

Such occupancy does not constitute acceptance by the Owner either of the complete work or of any portion, nor will it relieve the Contractor of full responsibility for correcting defective work or materials found at any time before the formal written acceptance of the entire Contract by the Owner or during the full guarantee period after such acceptance.

G7.26 ACCEPTANCE OF THE WORK

When the Engineer/Architect has made the final inspection as provided in Section G5.14 and determines that the work has been completed in all respects in accordance with the Contract Documents, he will recommend that the Owner formally accept the work. Immediately upon and after such formal written acceptance by the Owner, the Contractor will be relieved of the duty of maintaining the work as a whole, and he will not be required to perform any further work thereon except as provided in Sections G4.15, "GUARANTY OF WORK" and G4.16, "CORRECTION OF WORK DURING WARRANTY PERIOD."

G7.27 PROPERTY RIGHTS IN MATERIALS

Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or soil or after partial payment has been made for material delivered on the ground or stored subject to or under the control of the Owner and unused. All such material shall become the property of the Owner upon being so attached or affixed or upon payment for materials delivered on the ground or stored subject to or under the control of the Owner and unused, as provided in Section 9.

G7.28 RIGHTS IN LAND AND IMPROVEMENTS

The Contractor shall make no arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the work, for any purpose whatsoever, either with or without compensation, in conflict with any agreement between the Owner and any owner, former owner or tenant of such land, structure or buildings. The Contractor shall not occupy Owner-owned property outside the limit of the work as shown on the Contract Drawings unless he obtains prior approval.

G7.29 ANTITRUST CLAIMS

The Contractor's attention is directed to the following provision of Public Contract Code Section 7103.5(b) which shall be applicable to the Contractor and his subcontractors:

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

G7.30 ACCESS TO THE WORK

The Contractor shall satisfy himself that the jurisdictions through which his operations and haul routes pass will permit such operations with respect to type of vehicle, laden weights, frequency and dimensions of loads, hours of operation and required traffic control. All necessary permits, licenses or bonds shall be obtained and paid for by the Contractor.

G7.31 PERSONAL LIABILITY

Owner's Directors, General Manager, Secretary, Officers, Agents, Representatives and Employees and Engineer's Principals and Employees shall not be personally responsible for any liability arising under or by virtue of this Contract.

G7.32 THIRD PARTY RIGHTS

Nothing in the Contract is intended to create the public or any member thereof a third party beneficiary hereunder.

G7.33 INDEPENDENT CONTRACTOR STATUS

The Contractor shall independently perform all work under this Contract and shall not be considered as an agent or employee of the Owner, nor shall the Contractor's subcontractors or employees be considered as subagents of the Owner.

G7.34 HAZARDOUS CHEMICALS AND WASTES

The Contractor shall bear full and exclusive responsibility for any release of hazardous or nonhazardous chemicals or substances during the course of the performance of this Contract. The Contractor shall immediately report any such release to the Engineer/Architect. The Contractor shall be solely responsible for all claims and expenses associated with the response to, removal and remediation of the release, including, without limit, payment of any fines or penalties levied against the Owner by any agency as a result of such release and shall hold harmless, indemnify and defend the Owner from any claims arising from such release. For purposes of this section only, the term "claims" shall include (i) all notices, orders, directives, administrative or judicial proceedings, fines, penalties, fees or charges imposed by any governmental agency with jurisdiction, and (ii) any claim, cause of action, or administrative or judicial proceeding brought against the Owner, its directors, officers, employees or agents, or for any loss, cost (including reasonably attorney's fees), damage, or liability, sustained or suffered by any person or entity, including the Owner.

If the performance of the work outlined by these contract specifications creates any hazardous wastes, the Contractor shall properly dispose of such wastes in full accordance with federal, state and local laws, at the expense of the Contractor. The Contractor shall dispose of the wastes under the District's EPA Generator number and shall provide the District with written proof of the Contractor's or its subcontractor's registration as a hazardous waste transporter.

The Contractor shall notify the Engineer/Architect of any hazardous wastes generated and disposed of in connection with this Project and the District reserves the right to a copy of any tests concluded on the wastes and, at the District's cost, to perform additional tests or examine those wastes prior to disposition. The Contractor shall hold harmless, indemnify and defend the District from any claims in connection with the disposal of the hazardous wastes which arise from the negligent or willful misconduct of the Contractor or its subcontractor(s) in the disposal of said hazardous wastes.

SECTION 8 PROSECUTION AND PROGRESS

G8.01 SUBCONTRACTING

The Contractor shall give his personal attention to the fulfillment of the Contract and shall keep the work under his control.

No subcontractor will be recognized as such and nothing in the Contract Documents shall create any contractual relationship between the Owner and any subcontractor. The Contractor is as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.

Attention is directed to the requirements of the Subletting and Subcontracting Fair Practices Act (commencing with Section 4100 of the California Public Contract Code), which are applicable to this Contract. Each bidder shall list in his Bid the name and business address of each subcontractor to whom the bidder proposes to subcontract a portion of the work, and shall list each subcontractor, licensed by the State of California, proposed by the bidder to specially fabricate and install a portion of the work. The list shall include a description of the portion of the work which shall be done by each subcontractor. The bidder shall execute and submit with his Bid the "List of Subcontractors" on the form included in this book. Additional forms may be obtained from the Engineer/Architect. The Contractor shall not, without the consent of the Owner, either substitute any person as subcontractor in place of the subcontractor designated in the original List of Subcontractors, or sublet or subcontract any portion of the work in excess of one-half of one percent of the total amount of his Bid for which he did not originally designate a subcontractor. All subcontractors shall be registered with the Department of Industrial Relations.

When a portion of the work which has been subcontracted by the Contractor is not being prosecuted in a manner satisfactory to the Owner, the subcontractor shall be removed immediately on the request of the Owner, and shall not again be employed on the work.

The Contractor shall require, by written agreement, each subcontractor to be bound to the Contractor by terms of the Contract Documents and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by the Contract Documents, assumes toward the Owner, to the extent of the work to be performed by the subcontractor. Each subcontract agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the work to be performed by the subcontractor, so that subcontracting will not prejudice such rights.

G8.02 ASSIGNMENT

The performance of the Contract may not be assigned except upon the written consent of the Owner. Consent will not be given to any proposed assignment which would relieve the original Contractor or his surety of their responsibilities under the Contract nor will the Owner consent to any assignment of a part of the work under the Contract.

The Contractor may assign monies due or to become due him under the Contract and such assignment will be recognized by the Owner, if given proper notice, to the extent permitted by law. However, any assignment of monies shall be subject to all proper set-offs in favor of the Owner and to all deductions provided for in the Contract, and particularly all money withheld, whether assigned or not, shall be subject

to being used by the Owner for the completion of the work in the event that the Contractor should be in default therein.

G8.03 NOTICE TO PROCEED

As soon as practicable after the Owner receives acceptable insurance certificates, approves the Contract Bonds and other Contract Documents, executes the Contract and reviews all submittals required prior to the start of the Work, the Owner will issue a written Notice to Proceed, which will be mailed to the Contractor. The effective date of the Notice to Proceed will be the date stated as such in the Notice to Proceed, provided that the effective date will not be earlier than the day following the issuance of the Notice to Proceed.

G8.04 BEGINNING OF WORK

The Contractor is not authorized to perform any work until he has received a Notice to Proceed from the Owner. Within five (5) working days after the effective date of such Notice to Proceed, the Contractor shall commence work and shall diligently prosecute the same to completion within the time limit provided in the Technical Specifications.

The Contractor shall notify the Engineer/Architect, in writing, of his intent to begin work at least seventy-two (72) hours before work is begun and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.

Should the Contractor begin work in advance of receiving the Notice to Proceed and providing notice to the Engineer/Architect, any work performed by him in advance of such notice shall be considered as having been done by him at his own risk and as a volunteer without compensation.

G8.05 SCHEDULES AND PROGRESS REPORTS

The Contractor shall, within the time specified in the Technical Specifications after the effective date of the Notice to Proceed, submit to the Engineer/Architect the specified number of copies of a construction schedule covering his operations for the work. The construction schedule shall be in the form required by the Technical Specifications or Specifications. The schedule shall show the order in which the Contractor proposes to carry out the work and the dates on which he expects to start and finish each part or division of the work (including procurement of materials, plant and equipment). The construction schedule shall be consistent with the time and order of work requirements of the Contract Documents and shall provide for expeditious and practicable execution of the work; provided that it shall not show a completion date earlier than the date by which the Contract must be completed pursuant to Section G8.07 and the corresponding Special Provision unless this early completion date was submitted with the Contractor's Proposal and the Contractor agrees to sign a Change Order reducing the completion time to that proposed by his schedule. If the Contractor desires to revise his construction schedule, or if it becomes necessary to revise it due to major changes, he shall submit the specified number of copies of the revised schedule for review and comment by the Engineer.

Owner will not issue a Notice to Proceed until the District Engineer reviews and comments on the construction schedule and submittal materials. No construction work will begin until the Contractor submits five (5) copies of corrected final submittal materials.

The Contractor shall submit to the Engineer/Architect as a condition of payment, at the time of submittal of the invoice for work completed (See Section G9.08), a schedule summary report in a form and of sufficient detail and character as specified in the Technical Specifications. The schedule summary report shall include the updated current construction schedule and shall specify whether the project is on schedule and, if not, the reasons. The monthly schedule summary report shall also indicate the delivery status of major and critical items of purchased equipment and material, the status of shop drawings and field fabricated work and such other information as may be required and set out in the Technical Specifications.

G8.06 SITE MEETINGS

The Contractor shall schedule meetings with the Engineer/Architect and each active subcontractor at the work site weekly, or at such other frequency as specified in the Technical Specifications. Each subcontractor shall present a competent representative to report the conditions of his work and to discuss problems.

G8.07 TIME OF COMPLETION

The Contractor shall complete all or any designated portion of the work called for under the Contract in all parts and requirements within the time set forth in the Technical Specifications.

G8.08 ADDITIONAL SHIFT WORK

The time limits specified for the completion of the work contemplated may be insufficient to permit completion of the work by the Contractor working a normal number of hours per day or week on a single shift basis. Where additional shifts or premium time pay are necessary to ensure that the work will be completed within the time limits specified, any resulting additional costs will be considered to be included in the price paid for the various Contract items of work and no additional compensation will be allowed.

If the Contractor desires to carry on work at night or outside regular working hours, he shall give timely notice to the Engineer/Architect to allow satisfactory arrangements to be made for observing the work in progress.

G8.09 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct promptly work which is not in accordance with the requirements of the Contract Documents or persistently fails to carry out work in accordance with the Contract Documents, the Owner may, in writing, order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated. The Contractor shall immediately comply with a written order of the Owner to stop the work. The work stopped shall be resumed as and when ordered by the Owner.

G8.10 LIQUIDATED DAMAGES

It is agreed by the parties to the Contract that in case all the work called for under the Contract in all parts and requirements is not completed within the number of days as set forth in the Contract Documents, damage will be sustained by the Owner and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the Owner will sustain in the event of and by reason of such delay. It is therefore agreed that the Contractor shall pay to the Owner (as liquidated damages for

delay and not as a penalty) the sum set forth in the Contract Documents per day for each and every calendar day's delay in finishing the work in excess of the number of days prescribed. The Contractor agrees to pay these liquidated damages, and further agrees that the Owner may deduct this amount from any monies due or that may become due the Contractor under the Contract if the Contractor has not paid within seven (7) days any demand from the Owner for liquidated damages. If, based on the current approved progress schedule and rate of progress, it is determined by the Owner that completion will exceed the Contract time, as extended by any change orders, the Owner may prospectively assess and withhold liquidated damages from progress payments. If and at such time as progress improves to indicate timely completion, liquidated damages so withheld may be released at the next regular progress payment.

G8.11 DELAYS AND EXTENSIONS OF TIME

The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time set forth in the Technical Specifications caused by unforeseeable causes beyond the control and without the fault or negligence of the Contractor or subcontractor. Examples of such causes include acts of God or of the public enemy, fire, floods, storms, epidemics, quarantine restrictions, strikes and other work stoppages caused by a labor dispute, shortage of materials and freight embargoes, or acts or neglect of the Owner or Engineer/Architect not contemplated by the Contract Documents. In all cases, any extension of time is conditioned on the following: (1) that the cause is not due to the fault of the Contractor or subcontractor and the Contractor has taken reasonable precautions to prevent delays due to such cause; and (2) that the Contractor notifies the Engineer/Architect in writing within (ten) 10 days from the beginning of such delay specifying the nature of the delay, the number of days actually delayed and the measures taken to prevent or minimize the delay. Failure to submit written notice within this time shall constitute an absolute waiver of any claim for a time extension; failure to submit the required information will be sufficient cause for denial of the request for a time extension.

No extension of time will be granted for a delay caused by a shortage of materials, unless the Contractor furnishes to the Engineer/Architect documentary proof that he has diligently made every effort to obtain such materials from all known sources within reasonable reach of the work and further proof, in the form of schedule data as required in Section G8.05, that the inability to obtain such materials when originally planned did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. Only the physical shortage of material will be considered as a cause for extension of time, and no consideration will be given to any claim that material could not be obtained at a reasonable, practical or economical cost or price, unless it is shown to the satisfaction of the Engineer/Architect that such material could have been obtained only at exorbitant prices entirely out of line with current rates, taking into account the quantities involved and the usual practices in obtaining such quantities.

The term "shortage of materials," as used in this Section, shall apply only to materials, articles, parts or equipment which are standard items and shall not apply to materials, parts, articles or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract.

No extension of time will be granted for storms or adverse weather conditions which may reasonably be anticipated for the area in which the work is being performed, based on official records of monthly precipitation and other historical data.

No extensions of time will be granted for delays which have no measurable impact on the completion of the total work under the Contract. When extensions of time are granted, they will be limited to the period equivalent to the actual number of days lost on the critical path or controlling operation of construction, taking into account the extent to which that delay could be decreased by reasonable mitigation measures by the Contractor or its subcontractor. All requests for extensions of time must be supported with a critical path analysis showing the critical path and impacts to it.

Within a reasonable period of time after the Contractor submits the notice and information required by this Section, the Engineer will determine whether an extension of time is justified and, if so, the number of days for the extension. In the event that the Contractor disagrees with the Engineer's decision, the Contractor may submit a protest in compliance with G4.09.

G8.12 TERMINATION OF RIGHT TO PROCEED

If the Contractor should appear to the Engineer/Architect to be in default and the Contractor fails to remedy his default within five (5) working days after receipt from the Engineer/Architect of notice of such default, the Owner may terminate the Contractor's right to proceed with the work or that portion which the Engineer/Architect determines is most directly affected by the default.

The term "default" for purposes of this Section includes, but is not limited to, the performance of work in violation of the terms of the Contract; abandonment, assignment or subletting of the Contract without approval of the Owner; bankruptcy or appointment of a receiver for Contractor's property; refusal or failure properly to prosecute the work; use of materials, supplies, plant or equipment of improper quality or quantity; refusal or failure to use an adequate number of properly skilled workers; failure to provide proper workmanship; failure to take effective steps to end a prolonged labor dispute; and the performance of the Contract in bad faith.

Upon the Owner's termination of the Contractor's right to proceed with the work, or a portion of it, the Owner shall have the right to complete the work, or the portion involved, by whatever means and methods it deems expedient, including the hiring of others on such terms as the Owner deems advisable. The Owner shall have the right to take possession of the Contractor's materials, plant, tools, equipment and property of any kind provided by or on behalf of the Contractor for the purpose of the work, or a portion of them, without being responsible to the Contractor for fair wear and tear. The Contractor shall have no rights in such property during its use by the Owner. The Owner shall not be required to obtain the lowest prices for completing the work or a portion of it but shall make such expenditures as, in the Owner's sole judgment, best accomplish such completion.

The expense of completing such work or portion thereof, together with a reasonable charge for engineering, managerial and administrative services, as certified by the Owner, shall be charged to the Contractor, and the expense so charged shall be deducted by the Owner out of such monies as may be due or as may at any time afterwards become due to the Contractor. In case such expense is more than the sum which otherwise would have been payable to the Contractor under the Contract, then the Contractor or his surety or sureties shall promptly pay the amount of such excess so due. The Owner may, in its sole discretion, withhold all or any part of any progress payments otherwise due the Contractor until completion and final settlement of the work covered by such notice of default.

G8.13 TERMINATION OF CONTRACT

A. **Termination for Cause.** The Owner may terminate the Contract if the Contractor:

- (1) persistently or repeatedly fails or refuses to supply enough properly skilled workers or proper materials;
- (2) fails to make payment to subcontractors for materials or labor in accordance with the respective agreements between the Contractor and subcontractor;
- (3) persistently disregards laws, ordinances or rules, regulations or orders of a public authority having jurisdiction; or
- (4) otherwise is guilty of a substantial breach of a provision of the Contract Documents. A "default" as defined in Section G8.12 shall constitute a substantial breach of the Contract Documents.

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner under this Contract or otherwise, upon ten (10) days written notice, terminate the Contract and may:

- (1) take possession of the site and of all materials, equipment, tools and construction equipment and machinery thereon owned by the Contractor;
- (2) finish the work by whatever means the Owner deems expedient.

When the Owner terminates the Contract under this Section, the Contractor shall not be entitled to receive any further payments until the work is completed and accepted by the Owner.

The provisions of the last two paragraphs of Section G8.12 shall apply if the Owner terminates the Contract.

The Owner will issue the Contractor a written notice specifying that the Contract is to be terminated. Upon receipt of said written notice and, except as otherwise directed in writing by the Engineer, the Contractor shall:

- (1) stop all work under the Contract except that specifically directed to be completed prior to acceptance;
- (2) perform work the Engineer/Architect deems necessary to secure the project for termination;
- (3) remove equipment from the site of work;
- (4) take such action as is necessary to protect materials from damage;
- (5) notify all subcontractors and suppliers that the Contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer;

- (6) provide the Engineer/Architect with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the work and not yet used in the work, including its storage location, and such other information as the Engineer may request;
- (7) dispose of materials not used in the work as directed by the Engineer/Architect. It shall be the Contractor's responsibility to provide the Owner with good title to all materials purchased by the Owner, including materials for which partial payment has been made as provided in Section G9.10, "Partial Payments," of these General Provisions and with bills of sale or other documents of title for such materials;
- (8) subject to the prior written approval of the Engineer/Architect, settle all outstanding liabilities and all claims arising out of terminated subcontracts or orders for materials. To the extent directed by the Engineer, the Contractor shall assign to the Owner all the right, title and interest of the Contractor under subcontracts or orders for materials terminated hereunder;
- (9) furnish the Engineer/Architect with the documentation required to be furnished by the Contractor under the provisions of the Contract including, on projects as to which federal funds are involved, all documentation required under the federal requirements included in the Contract;
- (10) take such other actions as the Engineer/Architect may direct.

B. Termination for Convenience. The Owner may terminate this contract in whole, or from time to time in part, at any time and for any reason, whenever the Owner shall determine that such termination is in the best interests of the Owner. Any termination which is not based on the circumstances set forth in Subsection A above, shall be effected by delivery to the Contractor of a notice of termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective. In such event, Contractor shall be paid for all actual substantiated direct costs of materials furnished and work performed up to the date of termination and such additional compensation as the Owner deems proper and reasonable to effect termination.

Upon Contractor's receipt of a written notice of termination for convenience, the Contractor shall cease work as to those portions of the project so terminated and shall undertake the steps outlined in Subsection A above.

In the event that the Owner terminates this Contract under Subsection A above and it is determined for any reason that there was not sufficient cause to do so, the Owner's termination automatically will convert to a termination for convenience under this Subsection B and the terms and conditions outlined in this Subsection automatically will be applied to effectuate the Contract termination.

G8.14 NON-OWNER FACILITIES

The Contractor shall protect from damage those utilities and other non-Owner facilities that are to remain in place, be installed, relocated or otherwise arranged.

Attention is directed to the possible existence of facilities not shown, and of facilities in a location different from that which is indicated. The Contractor shall take steps to ascertain the exact location of all facilities prior to doing work which may damage such facilities or interfere with their service. Where the location of a facility is not indicated or is in doubt, the Contractor shall make such excavations and explorations as

are necessary to ascertain the correct location. The cost of such excavations and explorations will be considered as a part of the cost of other items of work and no additional payment will be made. Such excavations and exploratory work shall not entitle the Contractor to an extension of time.

Where it is determined by the Engineer/Architect that the rearrangement of an underground facility, the existence of which is not shown on the drawings, is essential in order to accommodate the work, the Engineer/Architect will provide for the rearrangement of such facility by other forces or, when so ordered by change order, such rearrangement shall be performed by the Contractor and will be paid for as provided under a change order.

The Contractor shall maintain all utility facilities placed by him in temporary locations, and all utilities within the construction area not required to be relocated but which are required to be shored or supported during the construction period. The cost of such maintenance shall be borne by the Contractor and no other compensation shall be due the Contractor for this work.

The cost of providing and maintaining all necessary or required temporary structures, of making any necessary repairs, replacements, or similar operations, or furnishing indemnity or other bonds, if required, and all costs required by this Section shall be paid by the Contractor and shall be included in the prices bid in the schedule for other items of work.

G8.15 TEMPORARY UTILITIES

The Contractor shall make his own arrangements with utility companies for any services he may require in performance of the work of this Contract and shall pay all costs of these services directly to these utility organizations.

SECTION 9 MEASUREMENT AND PAYMENT

G9.01 MEASUREMENT OF QUANTITIES

All work to be paid for at a Contract price per unit of measurement will be measured by the Engineer/Architect in accordance with United States Standard Measures.

G9.02 SCOPE OF PAYMENT

The Contractor shall accept the compensation provided in the Contract as full payment for furnishing all labor, materials, tools, equipment and incidentals necessary to the completed work and for performing all work contemplated and embraced under the Contract; also for loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the Owner; and for all risks of every description connected with the prosecution of the work, also for all expense incurred in consequence of the suspension or discontinuance of the work as herein specified; and for completing the work according to the Contract Documents. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or materials.

No compensation will be made in any case for loss of anticipated profits; profit in excess of that provided in the Contract Documents; home office overhead; consequential damage (including loss of bonding capacity, loss of bidding opportunities and insolvency); indirect costs or expenses of any nature; or attorneys' fees, claim preparation expenses or costs of litigation.

Except as specifically provided otherwise, no separate payment will be made for work covered in any of these General Provisions nor in the Division 1 Sections (01000 series), if used, of the Technical Specifications, and the cost thereof will be considered as included in the prices paid for the various Contract items included in the Bid.

If the "payment" clause in the Contract Documents relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured nor paid for under any other pay item which may appear elsewhere in the Contract Documents.

G9.03 FORCE ACCOUNT PAYMENT

When extra work or other work done pursuant to a Change Order is to be paid for on a force account basis, materials and equipment used in the performance of such work shall be subject to the approval of the Engineer/Architect and compensation will be determined as set forth below in this Section.

- A. Work Performed by Contractor. The Contractor will be paid the direct costs for labor, materials and equipment used in performing the work determined as hereafter provided.

To the total of the direct costs computed as provided in Sections 9.03.A(1), "Labor," 9.03.A(2), "Materials" and 9.03.A(3), "Equipment Rental," there will be added a markup of twenty-four percent (24%) to the cost of labor, fifteen percent (15%) to the cost of materials and subcontractors, fifteen percent (15%) to the cost of Contractor-owned equipment, and five percent (5%) to rented equipment.

The above markups shall constitute full compensation, covering the cost of general supervision, overhead, profit and any other general expense not specifically designated as cost or equipment rental in Sections 9.03.A(1), (2) and (3). The total payment made as provided above (i.e., direct cost plus applicable markups) shall be deemed to be the actual cost of such work and shall constitute full compensation therefor.

When work paid for on a force account basis is performed by forces other than the Contractor's organization, the Contractor shall reach agreement with such other forces as to the distribution of the payment made by the Owner for such work. No additional payment will be made by the Owner by reason of the performance of the work by a subcontractor or other forces.

1. **Labor.** The Contractor will be paid the cost of labor for the workers (including foremen when authorized by the Engineer/Architect, used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, subcontractor or other forces, will be the sum of the following:
 - (1a) Actual Wages. The actual wages paid shall include any employer payments to or on behalf of the workers for health and welfare, pension, vacation and similar purposes.
 - (1b) Labor Surcharge. To the actual wages, as defined in Section 9.03A(1a), will be added a labor surcharge set forth in the California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract. This labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workers, other than actual wages as defined in Section 9.03A(1a).
 - (1c) The Contractor must submit documentary evidence satisfactory to the District Engineer to support any claims for compensation for all labor costs incurred. Such evidence may include certified payroll records or other documentary evidence showing hours worked per individual worker for the relevant time period.
2. **Materials.** The Owner reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no claims for costs and markup on such materials.

Only materials furnished by the Contractor and necessarily used in the performance of the work will be paid for. The cost of such materials will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier, except as the following are applicable:

- (2a) If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the Owner notwithstanding the fact that such discount may not have been taken.
- (2b) If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials shall be deemed to be the price paid to the actual supplier as determined by the Engineer/Architect plus the actual costs, if any, incurred in the handling of such materials.

- (2c) If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of such materials shall not exceed the price paid by the purchaser for similar materials furnished from said source on Contract items or the current wholesale price for such materials delivered to the job site, less any discounts as provided in Section 9.03A(2a).
- (2d) If the cost of such materials is, in the opinion of the Engineer/Architect, excessive, then the cost of such material shall be deemed to be the lowest current wholesale price at which such materials were available in the quantities concerned delivered to the job site, less any discounts as provided in Section 9.03A(2a).
- (2e) If the Contractor does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof within sixty (60) days after the date of delivery of the materials or within fifteen (15) days after acceptance of the Contract, whichever occurs first, the Owner reserves the right to establish the cost of such materials at the lowest current wholesale prices at which such materials were available in the quantities concerned delivered to the location of the work, less any discounts as provided in Section 9.03A(2a).

3. **Equipment Rental.** The Contractor will be paid for the use of equipment at the rental rates listed for such equipment in the California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the Contract, regardless of ownership and any rental or other agreement, if such may exist, for the use of such equipment entered into by the Contractor. If it is deemed necessary by the Engineer/Architect to use equipment not listed in said publication, a suitable rental rate for such equipment will be established by the Engineer/Architect. The Contractor must furnish cost data to support the Engineer/Architect in the establishment of such rental rate.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

Operators of rented equipment will be paid for as provided in Section 9.03A(l), "Labor."

All equipment shall, in the opinion of the Engineer/Architect, be in good working condition and suitable for the purpose for which the equipment is to be used.

Individual pieces of equipment or tools not listed in said publication and having a replacement value of \$200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

4. **Equipment Not on the Job.** For the use of equipment moved in on the Job and used exclusively for extra work paid for on a force account basis, the Contractor will be paid the rental rates in effect or determined to the location of the work and its return to its original location, all in accordance with the following provisions:

- (4a) The original location of the equipment to be hauled to the location of the work will be agreed to by the Engineer/Architect in advance.
- (4b) The Owner will pay the costs of loading and unloading such equipment.
- (4c) The cost of transporting equipment in low bed trailers shall not exceed the hourly rates charged by established haulers.
- (4d) The cost of transporting equipment shall not exceed the applicable minimum established rates of the Public Utilities Commission.
- (4e) The rental period shall begin at the time the equipment is unloaded at the site of the extra work, shall include each day that the equipment is at the site of the extra work, excluding Saturdays, Sundays, and legal holidays unless the equipment is used to perform the extra work on such days, and shall terminate at the end of the day on which the Engineer directs the Contractor to discontinue the use of such equipment. The rental time to be paid per day will be in accordance with the following:

<u>Hours Equipment is in Operation</u>	<u>Hours To be Paid</u>
0	4
0.5	4.25
1	4.5
1.5	4.75
2	5
2.5	5.25
3.	5.5
3.5	5.75
4	6
4.5	6.25
5	6.5
5.5	6.75
6	7
6.5	7.25
7	7.5
7.75	7.75
8	8
Over 8	actual hours in operation

The hours to be paid for equipment which is operated less than eight (8) hours due to breakdown shall not exceed eight (8) less than the number of hours the equipment is inoperative due to breakdowns.

When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.

The Contractor must submit documentary evidence satisfactory to the District Engineer showing hours of rental equipment usage to support any claims for compensation.

When daily rates are listed, payment for one-half (1/2) day will be made for one (1) day.

The minimum rental time to be paid for the entire rental period on an hourly basis shall not be less than eight (8) hours or if on a daily basis, shall not be less than one (1) day.

- (4f) Should the Contractor desire the return of the equipment to a location other than its original location, the Owner will pay the cost of transportation in accordance with the above provisions; provided such payment shall not exceed the cost of moving the equipment to the work.
 - (4g) Payment for transporting, and loading and unloading equipment, as above provided, will not be made if the equipment is used on the work in any other way than upon extra work paid for on a force account basis.
- B. Work Performed by Special Forces or Other Special Services. When the Engineer/Architect and the Contractor, by agreement, determine that a special service or an item of extra work cannot be performed by the forces of the Contractor or those of any of his subcontractors, such service or extra work item may be performed by a specialist. Invoices for such service or item of extra work on the basis of the current market price may be accepted without complete itemization of labor, materials and equipment rental costs when it is impracticable and not in accordance with the established practice of the special service industry to provide such complete itemization.

In those instances when a contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from the job site, the charges for that portion of the extra work performed in such facility may, by agreement, be accepted as a specialist billing.

To the specialist invoice price, less a credit to the Owner for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added fifteen percent (15%) in lieu of the percentages provided in Section 9.03A, "Work Performed by Contractor."

G9.04 RECORDS

The Contractor shall maintain his records in such a manner as to provide a clear distinction between the direct costs of work paid for on a force account basis and the costs of other operations.

From the above records, the Contractor shall furnish the Engineer/Architect completed daily reports, on forms furnished by or acceptable to the Owner, for each day's work to be paid for on a force account basis. The daily reports shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Contractor, subcontractor, or other forces, except for charges described in Section G9.03.B, "Work Performed by Special Forces or Other Special Services," of the General Provisions. The daily reports shall provide names or identifications and classifications of workers, the hourly rate of pay and hours worked, and also the size, type and identification number of equipment, and hours operated. Before presenting the daily reports to the Engineer/Architect for payment, the Contractor shall compile the cost of the work to be paid for on a force account basis. The report number shall be left blank for completion by the Engineer/Architect.

Material charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily reports, or if not available, they shall be submitted with subsequent daily reports. Should vendor's invoices not be submitted within sixty (60) days after the date of delivery of the materials or within fifteen (15) days after the acceptance of the Contract, whichever occurs first, the Owner reserves the right to establish the cost of such materials at the lowest current wholesale prices at which said materials are available in the quantities concerned delivered to the location of the work, less any discounts provided in Section G9.03.A.

The daily reports shall be signed by the Contractor or his authorized representative. The daily reports shall be turned in to the Engineer/Architect by the close of business on the day following the day of the report. Failure to turn in reports on this schedule will be the basis for denying payment or use of the Engineer's records only as the final and indisputable basis for payment. Reports must be complete as noted above.

The Engineer/Architect will compare his records with the completed daily reports furnished by the Contractor and make any necessary adjustments.

When the daily reports are agreed upon and signed by both parties, except for delinquent reports as noted above, the reports shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on the later audit by the Owner.

Pursuant to Government Code section 8546.7, Contractor shall retain all project-related records for a period of 3 years after final payment on this contract, which shall be subject to audit or inspection by the District or the State Auditor during this period.

Separate and apart from the obligations under Section 8546.7, the District shall have the right to audit project records at District discretion under the following circumstances: (a) submission of a Public Records Act request regarding the project; (b) inability to resolve a disputed contract change order; or (c) submission of a construction claim.

G9.05 STOP NOTICES

The Owner may, at its option and at any time, retain out of any amounts due the Contractor sums sufficient to cover claims filed pursuant to Section 9350 et seq. of the California Civil Code.

G9.06 PAYMENT SCHEDULES

The Contractor shall submit a Schedule of Anticipated Contract Payments and a Schedule of Pay Items for review and approval by the Engineer/Architect prior to the initial partial payment to the Contractor. The Schedule of Pay Items shall be prepared by the Contractor in a format approved by the Engineer/Architect and shall include such detail as directed by the Engineer/Architect. The Schedule shall be sufficiently clear and detailed so as to facilitate an accurate and realistic appraisal of monthly progress for the purpose of making partial payments. The value for each bid item shall total the bid amount. The cost breakdown shall include only actual work items. No amounts will be allowed for mobilization and other overhead costs such as bonds and insurance. Costs of these items shall be spread uniformly over the actual items of work. The values in the Schedule will be used only for determining partial payments.

The Schedule of Anticipated Contract Payments shall be coordinated with the Contractor's construction schedule submitted pursuant to Section G8.05 and shall show the anticipated monthly Contract payments for each of the pay items covered in the Schedule for Pay Items, the total of monthly payments and

cumulative total of payments for each month. If the construction schedule is revised, the Schedule of Anticipated Contract Payments shall also be revised and resubmitted for the Engineer/Architect's review and approval. No partial payment will be made until the Engineer/Architect has approved the Schedules required by this Section.

G9.07 PROGRESS ESTIMATES AND INVOICES FOR WORK COMPLETED

Once each month, at a time, place and location mutually agreeable, the Contractor and Engineer/Architect shall meet to discuss the amount of work completed satisfactorily during the work period since the last invoice for partial payment was prepared. The first such estimate will be of the value of the work done after the Contractor commenced the performance of the contract, and every subsequent estimate, except the final estimate, will be of the value of the work done after that included in the last preceding estimate. Such estimates need not be based on strict measurements, but may be approximate only, and will be in due proportion to the whole amount of money, including payments previously made, that will have become due according to the contract when all work required under the contract shall have been completed. A draft invoice for work completed shall be prepared; the Engineer/Architect's judgment will be final if disputes occur regarding the amount of work completed or its value. Following the meeting, the Contractor shall formally submit the invoice for work completed in a form acceptable to the Engineer/Architect. The invoice will certify, and be supported by evidence if required by the Engineer/Architect, that the work invoiced has been done and that the materials listed have been incorporated into the work. The invoice may include the amount and value of such acceptable material as has been furnished and incorporated into the work.

G9.08 RETENTION

In addition to amounts, if any, withheld pursuant to any other provision of these General Provisions, including the Owner's right to withhold for the estimated or actual costs of correcting defective work and amounts claimed by the Owner as liquidated damages or other offsets, the Owner will retain an amount equal to 5 percent of the estimated value of the work done as part security for the fulfillment of the Contract by the Contractor.

In addition, when the Engineer/Architect determines that the contract is ninety-five percent (95%) complete, the Owner may reduce the amount withheld from payment to such lesser amount as the Owner determines is adequate security for the fulfillment of the balance of the work and other requirements of the contract, but in no event will said amount be reduced to less than one hundred twenty-five percent (125%) of the estimated value of the work yet to be completed as determined by the Engineer/Architect. In agreeing to any of the above referenced revised method(s) of progress payments, the Owner reserves the right to return to the original method of progress payments in the amount of ninety five percent (95%) of work completed, if at any time, the Engineer/Architect finds that either the Contractor is not making satisfactory progress or there is a specific cause for greater withholding.

G9.09 PARTIAL PAYMENTS

Pursuant to Public Contract Code Section 20104.50, if the Owner fails to make a progress payment in a timely manner, it shall pay interest to the Contractor at the legal rate set forth in the Code of Civil Procedure Section 685.010(a). No such progress payment will be made when, in the judgment of the Engineer/Architect, (a) the work is not proceeding in accordance with the provisions of the Contract; (b)

the Contractor is not complying with the requirements of the Contract; or (c) when the total value of the work done as shown on the invoice does not exceed Three Hundred Dollars (\$300.00).

No such invoice or payment will be construed to be an acceptance of any work or materials. Before any progress payment or the final payment is made, the Contractor may be required to submit satisfactory evidence that he is not delinquent in payments to his employees, subcontractors, suppliers or other creditors for labor and materials incorporated into the work.

G9.10 PAYMENT OF WITHHELD FUNDS

Pursuant to Public Contract Code Section 22300, the Contractor may request to deposit securities in escrow equivalent to the amount of funds withheld from progress payments by the Owner as described in Section G9.09, with the Owner or a bank acceptable to the Owner as a substitution for funds withheld by the Owner. Alternatively, the Contractor may request to have the District make payment of the funds withheld from progress payments as described in Section G9.09 directly to an escrow agent and direct the investment of such funds into securities. The Contractor shall be the beneficial owner of any securities and shall receive interest thereon. Upon satisfactory completion of the contract, the Contractor shall receive all securities, interest and payments. The Contractor may make this request only upon the following conditions:

- (a) the request to substitute securities or to have payments made directly to an escrow agent shall be at the sole expense of the Contractor;
- (b) securities eligible for investment shall include securities pursuant to California Government Code Section 16430, bank or savings and loan certificates of deposit, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed upon by the Owner and Contractor;
- (c) the Contractor shall enter into an escrow agreement which shall be substantially similar to the agreement form provided in Public Contract Code Section 22300;
- (d) the Contractor shall obtain the written consent of the surety to such agreement; and
- (e) the Contractor who elects to receive interest on funds withheld by the Owner shall, at the request of any subcontractor performing more than five percent (5%) of the Contractor's total bid, make the option available to the subcontractor to receive interest on any funds withheld in retention by the Contractor from the subcontractor. The subcontractor shall receive interest in accordance with Public Contract Code Section 22300(d)(1). Alternatively, the Contractor who elects to substitute securities in lieu of retention by the Owner, shall by mutual consent between the Contractor and subcontractor, allow any subcontractor performing more than five percent (5%) of the Contractor's total bid to substitute securities in lieu of funds withheld by the Contractor.

G9.11 PROMPT PAYMENT TO CONTRACTOR

The District will make progress payments within 30 days after receipt of an undisputed and properly submitted progress payment invoice pursuant to Section 20104.50 of the Public Contract Code. No such payment will be made when, in the judgment of the Engineer, (a) the work is not proceeding in accordance with the provisions of the Contract; (b) the Contractor is not complying with the requirements of the Contract; or (c) when the total value of the work done as shown on the invoice does not exceed Three

Hundred Dollars (\$300.00). No such invoice or payment will be construed to be an acceptance of any work or materials. Before any progress payment or the final payment is made, the Contractor may be required to submit satisfactory evidence that he is not delinquent in payments to his employees, subcontractors, suppliers or other creditors for labor and materials incorporated into the work. Pursuant to Public Contract Code Section 20104.50, if the District fails to make a progress payment in a timely manner, it shall pay interest to the Contractor at the legal rate set forth in Section 685.010(a) of the California Code of Civil Procedure.

G9.12 PROMPT PAYMENT TO SUBCONTRACTORS

Pursuant to Public Contract Code Section 7107, the Contractor shall pay any subcontractors for work that has been satisfactorily performed no later than seven (7) days from the date of Contractor's receipt of payments by the District. The District may require Contractor to provide documentation satisfactory to the District of Contractor's compliance with this requirement as a condition of final payment and release of contract retention.

Within seven (7) days of receipt of retention by the original Contractor, Contractor shall release any applicable retention payments withheld to the subcontractor.

In the event Contractor does not make progress payments or release retention to the subcontractors in accordance with the time periods in this section, Contractor may be subject to a charge of two percent (2%) per month on the untimely or improperly withheld payment.

G9.13 FINAL PAYMENT AND CLAIMS

After the work has been accepted by the Owner, as provided in Section G7.26, "Acceptance of Work," payment will be made to the Contractor in accordance with the provisions of this Section. Upon acceptance, the Owner will record a Notice of Completion covering the project.

Within thirty-five (35) days after acceptance by the Owner, the Contractor shall prepare and submit a proposed final invoice in writing, prepared in a form acceptable to the Engineer/Architect. The proposed final invoice will show the proposed total amount of compensation payable to the Contractor, including an itemization of that amount segregated as to Contract item quantities, extra work and other bases for payment. The proposed final invoice will also show all deductions made or to be made for prior payments and amounts to be kept or retained under the Contract.

The Contractor shall also submit, at the same time as the proposed final invoice is submitted, a statement of all claims he has submitted in accordance with G9.15. No claim for which the requirements of 9.15 have been satisfied will be considered unless the Contractor has fully complied with the notice or protest requirements in said section.

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer/Architect to ascertain the basis and amount of the claims. The Engineer/Architect will consider and determine the Contractor's claims and it will be the responsibility of the Contractor to furnish within a reasonable time such further information and details as may be required by the Engineer/Architect to determine the facts or contentions involved in the claims. Failure to submit such information and details will be sufficient cause for denying the claims.

The Engineer/Architect will review the proposed final invoice and claims and will submit his recommendation to the Owner as to the final estimate of the amount due the Contractor and the disposition of all claims. All prior invoices and payments are subject to correction in connection with review of the proposed final invoice.

The Owner will submit any changes or corrections to the proposed final invoice to the Contractor for his consideration. Within ten (10) days thereafter, the Contractor shall submit a final invoice, in a form acceptable to the Engineer/Architect, incorporating any changes or corrections made by the Owner, together with any additional claims resulting therefrom. Upon approval by the Owner, this will become the approved final invoice. The Contractor shall submit with the final invoice, certificates of any insurance required to be maintained after acceptance of the work.

If the Contractor files no claims within thirty (30) days after acceptance of the work by the Owner, and agreement is reached on all questions regarding the final invoice, the Owner will pay the entire sum found due upon the final invoice, except that the Owner will withhold sums sufficient to pay all unsettled claims for which stop notices have been filed pursuant to Section 3179 et seq. of the California Civil Code, together with the costs of administering such claims.

If the Contractor does file claims within thirty (30) days after acceptance of the work by the Owner, then upon final determination of all the Contractor's claims, the Owner will pay the entire sum found due upon the final invoice, including the amount, if any, allowed on claims, except that the Owner will withhold sums sufficient to pay all unsettled claims for which stop notices have been filed pursuant to Section 3179 et seq. of the California Civil Code, together with the costs of administering such claims.

Before final payment can be made, the Contractor shall furnish the Engineer/Architect with the following:

- (a) All drawings, catalogues, instruction sheets and information as required by the Contract;
- (b) One signed copy of the Release as discussed below in this Section and on a form furnished by the Owner; and
- (c) Guarantee Bond, if not already incorporated in the Performance Bond.

Final payment will be made within thirty (30) days after receipt of an approved final invoice and other required submittals referenced above and determination of all Contractor's claims, or sixty (60) days after acceptance of the work by the Owner, whichever is later. However, if an approved final invoice has not been submitted within sixty (60) days after acceptance of the work by the Owner, the Owner may elect to make payment of sums not in dispute without prejudice to the right of either the Owner or the Contractor in connection with such disputed sums.

The acceptance by the Contractor of final payment shall constitute a waiver and release of all claims by the Contractor against the Owner related to the work, except for claims previously made in writing and identified as unsettled by the Contractor at the time of submission of the final invoice. The making of final payment, however, shall not operate to release the Contractor or his sureties from obligations arising under this Contract, the Contract bonds and warranties as provided. Specifically, the making of final payment shall not constitute a waiver and release of claims by the Owner arising from (a) unsettled or future liens, (b) failure of the work to comply with the requirements of the Contract Documents, (c) the terms of any warranties required by or contained in the Contract Documents, (d) the right to any insurance

proceeds or the right to make any insurance or bond claims, (e) any claims with respect to Contractor's obligation of indemnity provided for in the Contract Documents, or (f) any latent defects or fraud.

G9.14 CLAIMS PROCEDURES

The Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer/Architect (including the failure or refusal to issue a Change Order), or the happening of any event, thing or occurrence, unless he shall have given the Engineer/Architect due written notice of the claim as specified below. However, compliance with this Section shall not be a prerequisite as to matters within the scope of the Contract Change Order protest provisions in Section G4.08, "Protest Procedure," or the notice provisions in Section G8.11, "Delays and Extension of Time."

The written claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved and, insofar as possible, the amount of the claim.

The Contractor hereby agrees that he shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which a written claim as required was not timely filed.

Compliance with all change order procedures is a prerequisite to filing a Public Contract Code Claim pursuant to this Section. Claims must be submitted no later than (a) 30 days after the submission of a written protest under Section 4.09 or (b) 30 days after the occurrence of the event giving rise to the claim.

In accordance with the procedures set forth in Public Contract Code Sections 9204 and 20104-20104.6, a Contractor may submit a claim by registered or certified mail with return receipt requested, for one or more of the following: (a) a time extension, including, without limitation, for relief from damages or penalties for delay assessed by the District; (b) payment by the District of money or damages arising from work done by, or on behalf of, the Contractor pursuant to this contract and payment for which is not otherwise expressly provided or to which the Contractor is not otherwise entitled; or (c) payment of an amount that is disputed by the District.

The Contractor shall furnish reasonable documentation to support the claim, including but not limited to: 1) a clear, concise recital of the basis upon which the claim is asserted, including a designation of the provisions of the Contract upon which the claim is based, 2) a statement as to the amount of time and/or compensation sought pursuant to the claim; 3) whether the Contractor's claim arises from an ongoing occurrence, and if so a description of the specific Work activities affected by the claim, 4) a time impact analysis in the event that Contractor requests a time extension, 5) full and complete cost records supporting the amount of any claim for additional compensation, and 6) a notarized certification by the Contractor as follows: "Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et seq., the undersigned hereby certifies that the information contained herein is a true, accurate and complete statement of all features relating to the claim asserted." Failure by the Contractor to provide sufficient documentation will result in denial of the claim. The District reserves the right to request additional documentation, or clarification of the documentation provided.

Upon receipt of a claim, the District will conduct a reasonable review and provide a written statement to the Contractor identifying what portion of the claim is disputed and what portion is undisputed within

45 days of receipt of the claim. The District and Contractor may, by mutual agreement, extend the 45 day time period. For any undisputed portion of a claim, the District must make payment within 60 days of its issuance of the written statement.

If the Contractor disputes the District's written statement, or if the District fails to respond, the Contractor may demand an informal conference to meet and confer for settlement of the issues in dispute. The District will then schedule the meet and confer conference within 30 days of the demand. Within 10 business days following the meet and confer conference, the District will provide a written statement identifying the portion of the claim that remain in dispute. Any payment due on an undisputed portion of the claim will be made within 60 days of the meet and confer conference.

After the meet and confer conference, any disputed portion of the claim shall be submitted to non-binding mediation. Alternatively, upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable. If mediation is unsuccessful, the parts of the claim that remain in dispute shall be subject to applicable procedures set forth below.

Failure of a public entity to respond to a claim within the time periods described above shall result in the claim being deemed rejected in its entirety. Additionally, amounts not paid in a timely manner shall bear interest at 7 percent per year.

In the event that the mediation is unsuccessful, Contractor must file a government claim pursuant to Government Code Sections 910 et seq. in order to initiate a civil action.

In any civil action filed to resolve claims, the court shall submit the matter to nonbinding mediation within 60 days following the filing or responsive pleading, provided that the parties have not already participated in mediation of the claim as outlined above. If the matter remains in dispute after nonbinding mediation, the court shall submit the matter to judicial arbitration pursuant to Code of Civil Procedure Section 1141.10 et seq. If the matter remains in dispute after judicial arbitration, the District or the Contractor may request a trial de novo.

**TECHNICAL SPECIFICATIONS
FOR**

**SR101 CROSSING AT PALO ALTO MEDICAL
FOUNDATION (PAMF) WATER MAIN
IMPROVEMENTS PHASE 1**

SECTION 01010 – SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION OF THE WORK

- A. The work consists of furnishing all labor, materials and equipment for the Mid-Peninsula Water District's "SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements Phase 1".
- B. This project will install a new watermain to a future SR101 crossing location. The project consists of constructing approximately 700 LF of 12-inch DIP water main within the PAMF easement; anode test stations; associated tie-ins and appurtenances as shown on the plans. Work also includes roadway restoration including traffic striping and slurry seal.

1.02 LOCATION AND OWNER

- A. The project is located in San Mateo County, California in the City of San Carlos. The work will be done for the Mid-Peninsula Water District (i.e., the "District").

1.03 CONTRACT

- A. The work will be bid under one (1) contract.
- B. The District reserves the right to delete items from the Bid Schedule included in the Proposal, and to change quantities shown on the Bid Schedule, in order to meet project funding limitations, once the contract is awarded.

1.04 DRAWINGS

- A. The following drawings, found at the end of these specifications, shall be part of the Contract Documents:

SHEET NO.	TITLE
G.1	Title Sheet, Location Map, Vicinity Map, and Sheet Index
G.2	Legend, Abbreviations, and Detail Designation
G.3	Utility Contacts, Survey Notes, and Key Map
G.4	General Notes
C.1	Plan and Profile: STA 10+00 to 13+00
C.2	Plan and Profile: STA 13+00 to 16+00
C.3	Plan and Profile: STA 16+00 to 16+74
CP.1	Cathodic Protection Notes, Table, and Details 1
CP.2	Cathodic Protection Details 2
CP.3	Cathodic Protection Details 3
D.1	Civil Details 1
D.2	Civil Details 2

1.05 REFERENCES TO STANDARD SPECIFICATIONS

- A. Wherever reference is made to "Standard Specifications" it shall be interpreted to mean the current version of Standard Specifications, State of California Business and Transportation Agency, Department of Transportation, obtainable from Caltrans, 6002 Folsom Blvd., Sacramento, CA 95819, and the following shall apply:

1. In case of conflict between the Standard Specifications and these specifications, these specifications shall govern.
2. Where the term "Engineer" is used in the Standard Specifications, it shall be understood to mean "the person or persons designated by the District to act as its duly authorized agent or agents."
3. Where the term "Special Provisions" is used in the Standard Specifications, it shall be understood to mean these specifications.
4. Where the term "State" is used in the Standard Specifications, it shall be understood to mean "District".
5. Any provisions for measurement and payment specified in the Standard Specifications shall be disregarded and the provisions of these specifications shall govern.

1.06 INQUIRES DURING BID PERIOD

- A. Questions pertaining to the contract documents, which may arise during the bidding period, shall be directed to the Engineer:

West Yost Associates
2020 Research Park Drive, Suite 100
Davis, CA 95618
Attn: Lindsey Olson
530-792-3226, Fax 530-756-5991

1.07 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Time of Completion: Thirty (30) working days from Notice to Proceed.
- B. The Contractor(s) shall pay to the District the sum of \$1,750.00 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.
- C. Designated legal holidays are: January 1st, the third Monday in January, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, the Friday following Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be the designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.
- D. Attention is also directed to the provisions of Section 8 of the General Conditions.

1.08 WORK SCHEDULE AND REQUIREMENTS

- A. Construction activities shall be allowed only between 8:00 a.m. and 5:00 p.m. Monday through Friday, unless stated otherwise. No work shall be performed on weekends or holidays.
- B. Should temporary road closures be necessary during the construction, it shall follow the process required by City/County as the road's owner. Road closure and detour plans shall be submitted and approved by the District and/or City/County. Closures could be limited to 9:00 A.M. to 3:00 P.M. or night shift from 9:00 P.M. to 6:00 A.M. as directed by the District. Residents and businesses affected by the closure shall be given a 2-week advance notice of any temporary closures.
- C. All scheduling conditions included in permits issued by affected agencies shall be followed.

- D. The Contractor shall coordinate all work with the District at (650) 591-8941.
- E. The water system is to remain in service throughout the project. Interruptions to service shall be minimized and shall be coordinated with the District.

1.09 CONDITIONS OF USE

A. City of San Carlos

1. Prior to start of the work the District will obtain an encroachment permit from the City of San Carlos for all the work within the City's right of way. The Contractor shall add the City as additionally insured per Section G7.21 of the General Provisions and forward a copy of the insurance certificate along with the traffic control plan to the District and the City. A copy of the encroachment permit will be forwarded to the Contractor.
2. Contractor shall notify the City of San Carlos Police Department at (650) 802-4277, 48 hours prior to start of construction.
3. The Contractor shall notify the City of San Carlos Fire Department at (605) 802-4300, in advance of any road closures, water main shutdowns and fire hydrant removal/replacement work during the course of the work.
4. The Contractor shall provide written notification to property owners, adjacent to the project area, in accordance with the City's encroachment permit.

B. Mid-Peninsula Water District

1. The contractor shall hand carry written notification to property owners, adjacent to the project area per Section 01 52 00, Traffic Control Plan.
2. The District will require the following of the Contractor in addition to the requirements shown and described elsewhere in these documents:
 - 1) The Contractor shall not operate District valves at any time.
 - 2) The District shall be notified at least three (3) working days in advance of any scheduled tie-ins and shutdowns.
 - 3) No tie-ins, or shutdowns, will be allowed on Fridays or the day preceding a holiday.
 - 4) No shutdown shall exceed 6 hours in duration.
 - 5) No more than two shut downs per week will be allowed.
 - 6) The Contractor shall designate a person to contact, should trench maintenance or other problems arise during non-working hours or days. The District shall be given that person's name and phone number.

C. Other Utilities

1. Pacific Gas and Electric Company, Comcast, and AT&T have reviewed preliminary versions of the project drawings. Their comments regarding their facilities have been added to the final drawings. The Contractor shall call USA at least 48 hours before excavating to have all utilities located.

D. California Department of Forestry

1. The Contractor shall notify the California Department of Forestry, San Mateo County Fire Marshall at (650) 573-3846 in advance of any road closures, watermain shutdowns and fire hydrant removal/replacement work during the course of the work.

E. General

1. The Contractor shall assume full responsibility for the protection and safekeeping of products stored on premises. Any stored products that interfere with operations of the District shall be moved by the Contractor at his expense. The Contractor shall obtain and pay for use of any additional storage or work area for operations.

1.10 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall be responsible for supplying and maintaining all construction safety signs, lighted barricades, cones, trench plates and other related safety measure to assure site is safe for workers.

B. The Contractor shall notify the City of San Carlos Public Works Department, City of San Carlos Fire Department, County of San Mateo Fire Protection Services, County of San Mateo Public Works or/and County of San Mateo Sheriff's Office (if applicable) at least 72 hours in advance whenever lane closures are planned. Such notification shall include the details and location of such closure, its anticipated duration and traffic control and signing to be used during such closure.

C. Unless noted otherwise the Contractor shall provide and pay for:

1. Labor, materials and equipment.
2. Tools, construction equipment and machinery.
3. Jobsite safety per Section G-7.13 of the General Provisions.
4. Utilities required for construction (i.e., water may be obtained from the system at no charge to the Contractor to the extent that it is available and does not result in a shortage to customers). The District shall furnish water to the Contractor (1) for compaction of backfill, as required, (2) for flushing, filling and disinfecting mains and (3) for cleanup and road maintenance activities during construction, subject to availability and to the provisions of Section 01 50 00, Temporary Facilities and Controls, Subparagraph 1.03.1.a.
5. All other facilities and services necessary for proper execution and completion of work.

D. Pay all required sales, consumer and use taxes.

E. Conform to the requirements of all permits.

F. Secure and pay for, as necessary for proper execution and completion of the work, applicable permits and licenses.

1. Give required notices.
2. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities, which bear on performance of the work.
3. Promptly submit written notice to District's Representative of observed variance of Contract Documents from legal requirements.

1.11 TESTS

- A. All compaction testing will be done by the District, performed in accordance with the most recent version of ASTM D-1557. The Contractor shall cooperate with the District in making such tests.

1.12 LAYOUT OF THE WORK

- A. The District will stake, or otherwise mark, the alignment of the new watermain and the location of valves not at a bend or tie-in.
- B. The Contractor shall lay out the work by accurately measuring from these controls to set all additional controls he may require. All work improperly located due to Contractor's errors or omissions shall be corrected by him at no additional expense to the District.
- C. The Contractor shall preserve controls thus established. Controls originally set by the District that are destroyed by the Contractor will be replaced by the District, with the cost of replacement deducted from Contractor's final payment.
- D. Locations and elevations indicated on the drawings are subject to final field adjustment by the District prior to construction. The Contractor shall immediately notify the District of apparent errors discovered on the drawings or in the initial stakeout. If changes in stakeout are required, the Contractor shall cooperate with the District in prompt establishment of the field control for altered or adjusted work.
- E. All monumental benchmarks, land corners, and triangulation points, established by other surveys, existing within the construction area shall be preserved. If existing monuments interfere with the work, secure written permission before removing them.

*****END OF SECTION*****

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SECTION 01 20 10 – DEFINITION OF BID ITEMS

PART 1 GENERAL

1.01 GENERAL

Work to be performed under this Contract shall consist of the following items:

- A. This project will install a new watermain to a future SR101 crossing location. The project consists of constructing approximately 700 LF of 12-inch DIP water main within the PAMF easement; anode test stations; associated tie-ins and appurtenances as shown on the plans. Work also includes roadway restoration including traffic striping and slurry seal.
- B. Specific requirements shall include, but shall not be limited to the following provisions (i.e., although these requirements are not restated under each individual bid item, they shall be deemed included under each item as applicable):
 - 1. Provide traffic control on State, County and private streets and roads in accordance with the requirements included in Sections 01 10 00, Summary of Work and 01 52 00, Traffic Control Plan. No additional payment will be made for this work. Access must be maintained to the PAMF property at all times.
 - 2. All trench excavation, bedding and backfill shall be in accordance with Sections 01 10 00, Summary of Work and 31 80 00, Trench Excavation and Backfill, with the details shown on the drawings and with the specific requirements shown on applicable plan and profile sheets.
 - 3. Where DIP is specified, Class 350 ductile iron pipe shall be used. All DIP pipe, fittings, and valves shall be polyethylene-wrapped per Section 33 14 13, Water Main.
 - 4. Pipe joint restraints shall be provided at all joints. Thrust blocks are required in locations noted on the drawings. No additional payment will be made for this work.
 - 5. Utility locations and clearances are approximate. The Contractor shall pothole for utilities sufficiently in advance of construction to adjust the grade of the water main to maintain desired clearances. No additional payment will be made for grade adjustments of less than 24-inches unless extra materials are required, such as fittings or concrete encasement.
 - 6. Tie-ins are diagrammatic. The contractor shall not be entitled to extra payment if additional pipe, couplings, valves and/or fittings, or other appurtenances are required to complete a tie-in. Tie-ins shall be constructed entirely of restrained ductile iron pipe and fittings.
 - 7. Restore road, street, and other surfaces in accordance with Sections 01 10 00, Summary of Work and 32 10 00, Paving Restoration and with the specific requirements shown on applicable plan sheets. This work shall include any required temporary paving and plating of trenches and pits.
 - 8. First order of submittals: Project Schedule, Storm Water Prevention Pollution Plan (SWPPP)/Water Pollution Control Plan (WPCP), and Traffic Control Plan (TCP).
 - 9. Tie-ins are diagrammatic. The contractor shall not be entitled to extra payment if additional pipe, couplings, bends or other appurtenances are required to complete a tie-in. Additional valves used on a tie-in are paid for under the valve bid item.

10. If applicable, Contractor shall submit an ADA approved sidewalk detour plan and sidewalk closure signage for review as part of the traffic control plan. Contractor shall maintain detour signage during the course of the project.
11. All pipe in storage area, staging area, or left overnight prior to installation shall have the ends of the pipes covered with plastic (visqueen) and secured with tape to maintain the inside of pipe free of debris and dirt.
12. Contractor shall have all BMPs in place prior to flushing water main. Repair, replace, and secure BMPs if needed before proceeding with any flushing operations. A Water Pollution Control Plan (WPCP) must be approved prior to any flushing or draining of the new or abandoning water main, fire hydrants, or reconnects. Dechlorination tablets shall be on-site and used when discharging water to the storm drain system. No exception.
13. Stainless Steel 316 hardware shall apply as applicable per Section 33 14 13, Water Main.
14. Equipment with metal tracks will not be allowed to be used on this project.
15. Removal of Underground Service Alert (USA) markings shall be paid in the various bid items.
16. Contractor shall make all arrangements to obtain a staging or storage area for equipment, tools, and materials. No equipment and materials may be stored overnight within the public right-of-way without written approval of the City and District.
17. Contractor shall conduct his operations and schedule cleanup so as to cause the least possible obstruction and inconvenience to traffic, pedestrians, bicyclists, and adjacent owners. All work areas shall be swept clean and debris removed at the end of the day's work and at other times when directed by the District.
18. Contractor shall not block emergency access to fire hydrants.
19. Contractor shall be responsible for supplying and maintaining all construction safety signs, lighted barricades, cones, trench plates and other related safety measure to assure site is safe for workers.
20. Contractor shall notify the affected property owners of the construction work in accordance with these specifications.
21. Spillage during the course of the project from equipment along or across any public traveled way shall be removed immediately by the contractor at their expense.
22. Contractor shall maintain access to all driveways, except when actually doing construction within the driveway boundaries, at which time, partial access will be maintained unless alternate arrangements can be made with the property owners or tenants in advance. Contractor shall coordinate work to minimize disruption to the property owners during the course of the project.
23. The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property.
24. The Contractor shall provide 2-week look-ahead schedule to the District every Friday or as needed and requested.
25. Contractor shall provide the District haul routes for the project for review.

26. Contractor must off-haul excavated material on a daily basis. No exception. Demolition material may not be stored on public right-of-way unless written approval is obtained from the City and District.
27. Contractor shall provide a designated area to clean and wash concrete from equipment during any concrete work on this project if needed. Area shall be lined to prevent any run-off to the storm drain system. Concrete residual shall be disposed properly.
28. During the main disinfection, Contractor shall make sure BMPs are installed and in working condition.
29. After every rainfall, Contractor shall inspect and replace any damaged BMPs. Any replacement of BMPs shall be paid in various bid items. Work shall include cleaning and properly disposing debris from the inlet. Every inlet needs to be free from obstruction and sediment.
30. Contractor shall include coordinating with utility companies, garbage collection company, District and property owners, implementing safety equipment, materials, and measures to include but not limited to cut-back, lighted barricades, cones, caution tape, night-lights, project safety signs, and trench plates to keep the jobsite safe during demolition. General housekeeping at the end of each day, sweeping with a regenerated air street sweeper on haul routes, and adjacent streets as directed by the District shall be included at no additional cost and as directed by the District.
31. At all times during the operations, Contractor shall prevent the formation of an airborne dust nuisance by watering and/or treating the work site in such a manner that will confine dust particles to the immediate work area. Collection of dust shall be removed from site on a daily basis.
32. No compensation will be made for additional material needed to complete the backfilling of the trench, for depths not shown on the plans.

1.02 DEFINITION OF BID ITEMS

BID ITEM 1 – MOBILIZATION AND DEMOBILIZATION

- A. Bid Item 1 includes payment for all work, equipment, and materials, not included in other bid items, necessary to complete project.
- B. No measurement will be made. Payment will be "Lump Sum" and shall be full compensation for, but not limited to, the following:
 1. Executing the contract, and obtaining all bonds and required insurance.
 2. Preparing the construction schedule and attending the preconstruction conference.
 3. Apply for, obtain, and comply with permits, licenses, agreements, and certifications as required in the Special Provisions, including obtaining any necessary Encroachment Permits.
 4. Moving onto the site of all equipment, materials and staff including set up of Contractor's staging area/yard.
 5. Furnishing and erecting all needed construction facilities, fencing, project signage, and project security.

6. Written release for temporary staging/disposal areas.
 7. Restoration of all areas including temporary staging/disposal areas.
 8. Preparing and implementing the SWPPP in accordance with Section 01 57 23.
 9. Demobilization, site cleaning and maintenance.
 10. Submittal and approval of Record Drawings.
 11. Perform and submit pre-construction and post-construction videos in accordance with Section 01 32 33.
 12. All work as required for the proper performance and completion of the project, including photographs and video recording of surface features, progress schedules and reports, contract meetings, and record drawings.
- C. COVID-19 Safety. The Contractor must comply with all applicable laws and regulations, including, without limitation, federal, state and local executive orders, and county health officer orders, regarding public health conditions related to the COVID-19 health emergency ("COVID-19 Orders"), including, without limitation, all orders issued by the San Mateo County Health Officer. The Contractor shall include required Social Distancing Protocols, and Construction Project Safety Protocols in Contractor's Health and Safety Plan. Contractor must monitor the issuance of new applicable COVID-19 Orders, advise the District of the issuance of new applicable COVID-19 Orders, and promptly update its Health and Safety Plan to comply with all new applicable COVID-19 Orders.
- D. Bid Item 1 shall not exceed a total of 5 percent of the total bid price. Up to 3 percent is allowed for mobilization and up to 2 percent is allowed for demobilization.
- E. This item is available for partial payment based on the percentage of total linear footage of pipe installed. The lump sum price shall be the full compensation for the preparation and installation of these materials, and for all labor, equipment, tools, and incidentals to complete this item.

BID ITEM 2 – SHEETING, SHORING, AND BRACING

- A. Bid Item 2 includes payment to cover worker protection and sheeting, shoring, and bracing design including requirements of Section 31 80 00, installation of water main by open cut, installation of valves and other appurtenances.
- B. Includes all work, equipment, and materials necessary to provide sheeting shoring, and bracing using speed shores (trench jacks), speed shores in combination with plywood or steel plates, and trench boxes for shaft and open trench construction in conformance with Federal and California safety codes.
- C. No measurement will be made. Payment shall be "Lump Sum" and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Design by a licensed CA Engineer, installation and removal of sheeting, shoring, and bracing speed shores, plywood, steel plates, sheet piling, slide rail systems, trench boxes, and all other types of sheeting and shoring.

4. Designing, furnishing and placing H-20 traffic rated trench plates to cover trenches and signage.
 5. Abandonment of sheeting and shoring where required.
 6. Other excavation supports in place necessary to complete all work under the Contract in conformance with Federal and California Safety and Health Standards, Sections 6700-6708 of the Labor Code and these Specifications.
- D. This item is available for partial payment based on the percentage of total linear footage of pipe installed. The lump sum price shall be the full compensation for the preparation and installation of these materials, and for all labor, equipment, tools, and incidentals to complete this item.

BID ITEM 3 – TRAFFIC CONTROL

- A. Bid Item 3 includes payment for all work, equipment, and materials necessary to provide traffic control for completion of the entire project in accordance with Section 01 52 00.
- B. No measurement will be made. Payment shall be “Lump Sum” and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Furnishing detailed traffic control plans for approval by the District, PAMF, and City of San Carlos, as required.
 3. Coordination of all traffic control with PAMF.
 4. Barricades, flaggers as necessary, lighted arrow boards, portable and changeable message boards, construction area signs, portable changeable message boards, and detours.
 5. Lighting, pedestrian and traffic ramps.
 6. Temporary striping, permanent striping, k-rails, and pavement markers.
 7. Traffic plates.
 8. All incidentals necessary for worker, pedestrian, bicycle, and traffic protection.
- C. This item is available for partial payment based on the percentage of construction completed. The lump sum price shall be the full compensation for the preparation and installation of these materials, and for all labor, equipment, tools, and incidentals to complete this item.

BID ITEM 4 – CONSTRUCT 12-INCH DIAMETER DIP WATER MAIN BY OPEN CUT

- A. Bid Item 4 includes payment for all work, equipment, and materials necessary to install new DIP water main complete in place. All pipe shall be restrained joint DIP pipe.
- B. Measurement for payment shall be per horizontal “Linear Foot” of water main to be constructed. Payment shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Coordination and protection of existing utilities including potholing of utilities & excavating trenches. Issuance of USA Ticket and physical verification (potholing) of existing utilities that cross or are in close proximity to planned excavations.

4. Sawcutting, removal and legal disposal of concrete or asphalt concrete pavement including pavement containing reinforcing fabric.
 5. Excavation, testing, spoil handling and legal disposal.
 6. Furnishing and installing restrained joint ductile iron pipe of stated diameter and footage, restrained fittings, and appurtenances.
 7. Installing tracer wire and warning tape.
 8. All flushing, hydrostatic and disinfection testing.
 9. Furnishing and installing backfill, and aggregate base for pavement subgrade, temporary and permanent paving, pavement markers and striping.
 10. Compaction testing for any retests where the original test results do not meet the requirements.
 11. Protection and restoration of all surface improvements including sidewalks, medians, curbs, gutters, cross gutters, speed bumps, temporary and permanent striping, landscaping, irrigation systems, valve boxes, and other surface features disturbed by the work.
 12. Daily cleanup, dust control, record drawings and all incidentals required by these Specifications and Drawings.
- C. Up to 85 percent of this bid item amount will be available for payment for installation of the pipeline subgrade complete with temporary pavement in place. Full compensation will be made upon completion of all of the work indicated under this bid item.

BID ITEM 5 – CATHODIC PROTECTION

- A. Bid Item 5 includes payment to provide and install cathodic protection system complete and in place.
- B. No measurement will be made. Payment will be “Lump Sum” and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Bonding all fittings, valves, flanges, mechanical joints, and restrained mechanical joints.
 3. Installation of pre-packaged magnesium anodes.
 4. Exothermic Welding Equipment and Supplies.
 5. Polyethylene encasement (polywrap) and seal all fittings.
 6. Testing.
- C. This item is available for partial payment based on the percentage of total linear footage of pipe installed. The lump sum price shall be the full compensation for the preparation and installation of these materials, and for all labor, equipment, tools, and incidentals to complete this item.

BID ITEM 6 – 12-INCH TIE-IN TO EXISTING WATER MAIN

- A. Bid Item 6 includes payment for all work, equipment, and materials necessary to tie-in existing water main as shown on the Drawings complete in place.

- B. No measurement will be made. Payment shall be “Each” and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Removing paving or other surface material.
 4. Coordination and protection of existing utilities including potholing of utilities and excavating trench.
 5. Sawcutting, removal and legal disposal of concrete or asphalt concrete pavement including pavement containing reinforcing fabric.
 6. Excavation, testing, spoil handling and legal disposal.
 7. Coordination with District for main shut down.
 8. Controlling water in trench so it does not back up into mains.
 9. Furnishing, cleaning, and installing restrained pipe, restrained fittings, and appurtenances.
 10. Removal and legal disposal of existing pipe and fittings, blow offs, thrust blocks, and other appurtenances to connect to new pipe.
 11. All hydrostatic testing and disinfection.
 12. Furnishing and installing backfill, and aggregate base for pavement subgrade, temporary and permanent paving, and pavement markers and striping.
 13. Compaction testing.
 14. Protection and restoration of all surface improvements including sidewalks, medians, curbs, gutters, cross gutters, speed bumps, temporary and permanent striping, landscaping, irrigation systems, valve boxes, and other surface features disturbed by the work.
 15. Daily cleanup, dust control, record drawings and all incidentals required by these Specifications and Drawings.

BID ITEM 7 – INSTALL 12-INCH GATE VALVE AND BOX

- A. Bid Item 7 includes payment for all work, equipment, and materials necessary to construct isolation gate valves as shown on the Drawings complete in place.
- B. No measurement will be made. Payment shall be “Each” and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Excavation, trenching, backfill, and spoil handling.
 4. Sawcutting, removal and legal disposal of concrete or asphalt concrete pavement including pavement containing reinforcing fabric.
 5. Excavation, testing, spoil handling and legal disposal.

6. Dewatering within excavation using sumps, sump pumps, trash pumps, discharge piping, desilting and discharge using best management practices.
7. Furnishing and installing gate valves including block, riser, box, valve nut extension, and marker post.
8. Protection and restoration of all surface improvements including sidewalks, medians, curbs, gutters, cross gutters, speed bumps, temporary and permanent striping, landscaping, irrigation systems, valve boxes, survey monuments, and other surface features disturbed by the work.
9. Daily cleanup, dust control, record drawings and all incidentals required by these Specifications and Drawings.

BID ITEM 8 – INSTALL 1-INCH COMBINATION AIR VALVE ASSEMBLY

- A. Bid Item 8 includes payment for all work, equipment, and materials necessary to install a 1-inch combination air valve assembly as shown on the Drawings, complete in place.
- B. No measurement will be made. Payment shall be “Each” and shall be full compensation for, but not limited to, the following:
 1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Excavation, trenching, backfill, and spoil handling.
 4. Sawcutting, removal and legal disposal of concrete or asphalt concrete pavement including pavement containing reinforcing fabric.
 5. Excavation, testing, spoil handling and legal disposal.
 6. Furnishing and installing service saddle and tap, corporation stop, dielectric fitting and appurtenances as required, copper tubing between main line and air valve (regardless of length), fittings, combination air/vacuum air relief valve, air valve enclosure, valve box, backfill, blocking and bracing, air vent, and other appurtenances as specified in District Standards.
 7. All hydrostatic and disinfection testing.
 8. Furnishing and installing backfill, and aggregate base for pavement subgrade, temporary and permanent paving, pavement markers, and striping.
 9. Protection and restoration of all surface improvements including sidewalks, medians, curbs, gutters, cross gutters, speed bumps, temporary and permanent striping, landscaping, irrigation systems, valve boxes, and other surface features disturbed by the work.
 10. Daily cleanup, dust control, record drawings and all incidentals required by these Specifications and Drawings.

BID ITEM 9 – REMOVE TREES

- A. Bid Item 9 includes payment for all work, equipment, and materials necessary to remove existing trees as shown on the Drawings or as approved by the District prior to removal.

- B. No measurement will be made. Payment shall be “Each” and shall be full compensation for, but not limited to, the following:
1. Clearing excess vegetation and removal of tree where shown on the plans.
 2. Grinding or removal of rootball and roots to a minimum depth of 24 inches.
 3. Coordination and protection of existing utilities including potholing of utilities.
 4. Furnishing and installing temporary construction fencing for protection of environmental features.
 5. Stockpiling, protecting, and replacement of topsoil.
 6. Restoring landscape including furnishing and installation of ground cover.
 7. Repairing irrigation system and resetting valve boxes.
 8. Hydromulching.
 9. Emissions and dust control.
 10. Erosion control.

BID ITEM 10 - DEWATERING

- A. Bid Item 10 includes payment for all work, equipment, and materials necessary to provide dewatering for completion of the entire project (see Section 31 23 19).
- B. No measurement will be made. Payment shall be “Lump Sum” and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Obtaining all required permits and compliance with the Waste Discharge Requirements (see Appendices). This includes sampling, testing, monitoring, and reporting requirements.
 3. Design of dewatering system.
 4. Furnishing and installation of all equipment including sumps, wells, pumps, hoses, holding tanks, and discharge facilities.
 5. Decommissioning of any groundwater wells constructed when no longer in use.
 6. Legal discharge.
- C. This item is available for partial payment based on the percentage of construction completed. The lump sum price shall be the full compensation for the preparation and installation of these materials, and for all labor, equipment, tools, and incidentals to complete this item.

BID ITEM 11 –TYPE II SLURRY SEAL

- A. Bid Item 11 includes payment for all work, equipment, and materials necessary for installing slurry seal after restoring trenches.
- B. Measurement for payment shall be per "Square Foot" of pavement restoration. Payment shall be full compensation for, but not limited to, the following:
1. All submittals.

2. Removing or protecting existing striping where required.
3. Application of asphaltic emulsion, screening, and spreading the Type 2 slurry seal over a minimum width of 10 feet or full width of impacted lane, whichever is greater, where pavement is disturbed in accordance with Section 37 of the Caltrans Standard Specifications.
4. Testing.
5. Public notification and coordination with PAMF prior to slurry seal application.
6. Replacing thermoplastic pavement markers, markings, striping and testing.
7. Any work associated with this contract as specified and as indicated at the locations shown on the Plans.

BID ITEM 12 – INSTALL 6-INCH BLOW OFF ASSEMBLY

- A. Bid Item 12 includes payment for all work, equipment, and materials necessary to install a 6-inch blow off assembly as shown on the Drawings, complete in place.
- B. No measurement will be made. Payment shall be “Each” and shall be full compensation for, but not limited to, the following:
 1. All submittals.
 2. Surveying by a California-Licensed Land Surveyor.
 3. Excavation, trenching, backfill, and spoil handling.
 4. Coordination and protection of existing utilities including potholing.
 5. Sawcutting, removal and legal disposal of concrete or asphalt concrete pavement including pavement containing reinforcing fabric.
 6. Excavation, testing, spoil handling and legal disposal.
 7. Furnishing and installing cap with threaded tap opening, blow off/flushing hydrant, pipe, fittings, gate valve, drain rock, polyethylene encasement and tape, copper tracer wire, utility box, restraint, and other appurtenances as specified in District Standards.
 8. Compaction testing.
 9. Protection and restoration of all surface improvements including sidewalks, medians, curbs, gutters, cross gutters, speed bumps, temporary and permanent striping, landscaping, irrigation systems, valve boxes, and other surface features disturbed by the work.
 10. Daily cleanup, dust control, record drawings and all incidentals required by these Specifications and Drawings.

BID ITEM 13 – OVER EXCAVATE AND INSTALL CRUSHED DRAIN ROCK AS AUTHORIZED BY THE CONSTRUCTION MANAGER

- A. Bid Item 13 includes payment for all work, equipment, and materials necessary for removal of unsuitable pipe subgrade material and installation of crushed drain rock to a minimum depth of 12-inches as authorized by the Construction Manager.

- B. Measurement for payment shall be per horizontal "Linear Foot" and shall be full compensation for, but not limited to, the following:
1. All submittals.
 2. Overexcavating, hauling, and disposing of the unsuitable material and replacing with compacted crushed drain rock wrapped in filter fabric as specified.
 3. The quantities for Bid Item 13 may increase or decrease by any amount or be omitted entirely.

*****END OF SECTION*****

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SECTION 01 32 33 - CONSTRUCTION PHOTOGRAPHY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction photography or video required to document: pre-construction conditions, construction activities, and post-construction conditions. Photographs will be particularly useful in documenting the pre-construction conditions of yards, landscaping, streets, etc.

1.02 USE OF PHOTOGRAPHY

- A. Pre-Construction photography will be used in part to establish pre-construction conditions. Disputes with property owners will be settled through the use of construction photos that will document pre-construction conditions. In the event that the Contractor fails to adequately document pre-construction conditions, the Contractor will be obligated to restore disputed landscaping, yards improvements, etc. to the satisfaction of the property owner.

PART 2 PRODUCTS

2.01 FORMAT

- A. Format of the photography and video shall be as follows:
 - 1. Photographs shall be in digital format with date stamp, delivered to the District on CD-ROM or portable external hard drive.
 - 2. Photographs shall be color photos with a minimum resolution of 1760x1168 pixels. Image storage size shall not exceed 250 KB per image.
 - 3. Video shall be in digital format with date stamp on a CD-ROM or DVD. Video shall be broken into chapters or other searchable means.

2.02 DATABASE

- A. The photos shall be displayed in a table, (MS-Excel) that will be used for indexing digital photographs. The table shall have the following fields: address, pre-construction photographs (will be multiple records), construction photographs (will be multiple records), post-construction photographs (will be multiple records).
- B. Populate the table fields indicated with links to the digital photos that correspond to each residence affected by the project as well as public rights-of-way as necessary.

PART 3 EXECUTION

3.01 PRE-CONSTRUCTION DOCUMENTATION

- A. Prior to construction, the Contractor will document the conditions of all surface features of the affected areas. This documentation shall be in the form of both digital video and still digital photographs.
- B. The Contractor is obligated to document the Pre-Construction conditions sufficiently to avoid disputes with property owners regarding the quality of post-construction repairs.
- C. The photographer shall use signs in each photograph that clearly identify each photo by address.

- D. Pre-Construction video coverage shall include (at a minimum):
 - 1. The ground surface above all pipes to be installed.
 - 2. Landscaping at existing services and hydrant locations which may be disturbed.
 - 3. Driveways in the project vicinity on which construction equipment may access.
 - 4. Curb, gutter and sidewalk, and other surface features in the project vicinity that construction equipment might damage.
- E. Submit one pre-construction video to the District prior to beginning construction. Video shall be labeled with the title, "Pre-Construction Video", the name of the project, name of the Contractor, and date(s) of videotaping. The video photographer should include enough narrative to let a viewer know the time, date, and location of each separate area shown.
- F. Pre-Construction photographs shall include a minimum of two photos from all residential yards or businesses landscaping that will be excavated. Photos should focus on areas that will be disturbed by the work.
- G. Prior to the beginning of construction, the Contractor shall submit to the District CDs with the following information:
 - 1. Photography table with links to color photographs for each address. Only links to pre-construction photographs are required to be completed at this time.
 - 2. A CD label with project title, photographs included, and Contractor name.

3.02 CONSTRUCTION PHOTOGRAPHS

- A. Use construction photographs to document the progress of construction activities. The Contractor should use construction photographs to document unusual situations, repairs made to buried improvements, accidents, construction disputes, and any other conditions that may be useful in the future. The use of construction photographs should be for the Contractor's benefit to document work completed.
- B. Supply photographs each time a gas line, telecommunications line, or other buried utility line is exposed with location and details of the condition noted.

3.03 POST CONSTRUCTION DOCUMENTATION

- A. Provide Post-Construction photographs. Post-Construction photographs will include photos of the completed and repaired work areas. Photos will include enough detail to demonstrate that the Contractor has performed repair and clean-up work. At a minimum, each site that was photographed for a pre-construction photo shall be re-photographed for the post-construction documentation.
- B. Following completion of construction, the Contractor shall submit to the District CDs with the following information:
 - 1. Photography table with links to color photographs for each location. Links to pre-construction photographs, construction photographs, and post-construction photographs are all required to be completed at this time. This final CD is to replace all CDs previously submitted to the District.
 - 2. A CD label with project title, photographs included, and Contractor name.

3. If multiple CDs are required to hold the required information, each CD label shall include numbering to indicate the CD number and the total number of CDs in the set (i.e., 1 of 3).
- C. Post-Construction video shall be made that documents the post-construction conditions of the project sites. Again, the video should include footage of all areas shown in the pre-construction video. Also, the video should include any sensitive areas as indicated by property owner's feedback and concerns.
- D. Submit one copy of each post-construction video to the Engineer immediately following completion of the work and prior to the final payment. Video shall be labeled with title, "Post-Construction Video", the name of the project, name of the Contractor, and date(s) of videotaping. The video photographer should include enough narrative to let a viewer know the time, date and location of each separate area shown.

*****END OF SECTION*****

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SECTION 01 33 00 - SUBMITTALS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included in this section consists of furnishing various submittal items as listed herein, as required for the work.

1.02 SUBMITTAL PROCEDURE

- A. The Contractor shall deliver all applicable submittals listed in the schedule included in this section a minimum of 20 days before the anticipated start of construction. This time limit shall not apply to those items to be furnished during the course of the work or near or at the conclusion of the work such as test reports and record drawings. Electronic files in PDF format of all submittal materials shall be furnished. Prior to installation of materials, the Contractor shall submit electronic files in PDF format of corrected final submittal material. Installation shall not commence until submittal material has been reviewed by the District and final submittals have been delivered.
- B. The following procedure shall be used by the Contractor in submitting and processing submittals for review by the District and Engineer:
 - 1. Each submittal item shall be forwarded to the District and Engineer with an individual transmittal letter or form. The letter or form shall include the following items:
 - a. Project name.
 - b. Submittal number.
 - c. Description of submittal item.
 - d. Specification section and drawing references.
 - e. Certification by the Contractor's representative that the submittal is complete and correct.
 - f. When required in a specific specification section, a "Letter of Compliance" shall be furnished stating that material and/or equipment furnished complies with the specifications.
- C. The District reserves the right to require submittals in addition to those called for herein.

1.03 SHOP DRAWINGS

- A. The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, furnished by Contractor to explain in detail specific portions of the work required by the contract.
- B. The Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness and compliance with contract requirements and shall so indicate that such coordination and review has been done by signing the transmittal letters. Shop drawings submitted to the District without evidence of Contractor's review will be returned for resubmission.
- C. Review by the District shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this contract. If shop drawings show variations from contract requirements, Contractor shall describe

such variations in writing, separate from the drawings, at time of submission. All such variations must be approved by the District.

- D. In these Standard Specifications, whenever the trade name of a product or the name of a manufacturer appears, it shall be understood to specify the product so identified and no equivalent is allowed. If the District Standard Specifications allow for use of an equivalent data may be submitted by the Contractor for a period of fifteen (15) days from receipt of the Notice to Proceed to substantiate a request for substitution as an equivalent item.
- E. Wherever in these Standard Specifications, or in any orders that may be given by the District pursuant to or supplementing the specifications, it is provided that the Contractor shall furnish materials for which no detailed specifications are set forth, the materials shall conform to accepted quality standards for materials of the kind required, with due consideration for the use to which they are to be put.

1.04 SAMPLES AND TESTS

- A. The source supply of each material furnished shall be approved by the District, unless the District advises the Contractor to the contrary at least ten (10) calendar days prior to the time when delivery is started, of any of the material used in the work. Representative preliminary samples of the character and quality prescribed and the manufacturer's test certificates pertaining thereto shall be submitted by the Contractor for all materials to be used in the work, as required by these Standard Specifications or as requested by the District.
- B. All tests of materials will be made in accordance with commonly recognized standards of national organizations, and such special methods and tests as are prescribed in these project specifications. The approval of any material on the basis of sample tests and/or certificates will be considered as general approval only, and will not constitute a waiver of the District's right to demand full compliance with the Contract requirements. After delivery of materials to the job, the District will make such check tests as deemed necessary in each instance, and may reject materials, equipment, or accessories which fail to meet the check tests, even though such materials have previously been given general approval.
- C. Laboratory test reports shall cite the contract requirements, the test of analysis procedures used, the actual test results, and includes a statement that the item tested or analyzed conforms or fails to conform to specification requirements. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports.
- D. The cost of all testing will be borne by the District, except for the following situations: (1) The Contractor shall assume all costs of retesting materials which fails to meet Contract requirements; (2) The Contractor shall assume all costs of testing materials offered in substitution of those found to be deficient; (3) The Contractor shall assume all costs of testing materials offered in lieu of specified materials, to prove their quality equivalence.

1.05 CERTIFICATES

- A. For those items called for in individual sections of these Standard Specifications or shown on project drawings, furnish certificates from manufacturers, suppliers, or other certifying that materials or equipment being furnished under the contract comply with the requirements of these Standard Specifications.

1.06 PROGRESS SCHEDULES

- A. The Contractor shall submit a schedule at the preconstruction meeting for the project showing the estimated startup and completion date for each element of the work, in conformance with the requirements of the Standard Specifications.

1.07 TRAFFIC CONTROL PLAN

- A. Traffic Control Plan submittal shall be per Section 01 52 00, Traffic Control Plan, of these Standard Specifications.
- B. The Contractor shall notify the City of Belmont Public Works Department, the City of Belmont Fire Department, The City of Belmont Police Department, the City of San Carlos Public Works Department, City of San Carlos Fire Department, County of San Mateo Fire Protection Services, County of San Mateo Public Works or/and County of San Mateo Sheriff's Office (if applicable) at least 72 hours in advance whenever lane closures are planned. Such notification shall include the details and location of such closure, its anticipated duration and traffic control and signing to be used during such closure.

1.08 RECORD DRAWINGS

- A. Using colored ink, each Contractor shall make changes on a set of clean prints. Indicate all changes and revisions to the original design that affect the permanent structures and will exist in the completed work. Reference underground utilities to semi-permanent or permanent physical objects. Reference water, sewer, telephone, storm drain, gas, and electric lines to corners of buildings and survey markers.
- B. The record drawings shall be kept current. Project record drawings are the property of the District. The original hard copies of the record drawings shall be delivered to the District before project closeout.

1.09 SUBMITTAL SCHEDULE

- A. The list below is a general representation of materials to be used on the project. The Contractor is responsible for reviewing each individual specification section for specific requirements to ensure all material information is submitted and reviewed.

Section No.	Item
	Safety Plan per the General Standard Specifications
	Staging Plan
01 52 00	Traffic Control Plan
01 57 23	Storm Water Pollution Control Plan
01 70 00	Tests Certificates and Guarantees Record Drawings
13 47 13	Catalog Data on Anodes Test Boxes Shunts Thermite Welds Weld Coating

Section No.	Item
31 80 00	Subgrade Material Bedding Material Aggregate Base Written Shoring Safety Plan prepared by a registered Civil Engineer
32 10 00	Control Density Fill Aggregate Base Aggregate Surfacing Asphaltic Concrete Bonding Coat and Tack Seal Temporary Paving Type II Slurry Seal
33 14 13	Ductile Iron Pipe Thrust-Resistant Restraint for Ductile Iron Pipe Hardware Tubing and Fittings V-Bio Polyethylene Encasement and Tape Marker Tape for Buried Piping Tracer Wire Disinfection Plans Disposal of Chlorinated Water
33 14 20	Gate Valves Blow Off Combination Air Valve Valve Boxes

PART 2 MATERIALS - NONE

PART 3 EXECUTION - NONE

*****END OF SECTION*****

SECTION 01 45 00 - QUALITY CONTROL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of performing or conforming to quality control procedures and requirements as listed herein and in the various technical specification sections that comprise these Standard Specifications.

1.02 GENERAL QUALITY

- A. All material shall be new and of a quality equivalent to that specified.
- B. The work shall be executed in conformity with the best accepted standard practice of the trade so as to contribute to maximum efficiency of operation, accessibility and appearance, and minimum cost of maintenance and construction of future alterations and additions.

1.03 QUALITY IN ABSENCE OF DETAILED SPECIFICATIONS

- A. Whenever the Contractor shall furnish materials or manufactured articles or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be of the normal commercial grade in quality and workmanship obtained from firms normally furnishing such materials or equipment or, if not ordinarily carried in stock, shall conform to the usual standards for first-class materials or articles of the kind required with due consideration of the use to which they are to be put. In general, the work performed shall be in conformity with the intent to secure the normal commercial standard of construction and equipment of the work as a whole or in part.

1.04 DEFECTIVE MATERIALS

- A. All materials not conforming to these Standard Specifications shall be considered defective; and all such materials, whether in place or not will be rejected, and shall be immediately removed from the site of the work, unless otherwise permitted to remain by the District. Rejected materials, the defects of which have been subsequently corrected, shall not be used until approval in writing has been obtained from the District. Upon failure of the Contractor to comply with any order of the District made under the Standard Specifications of this article, the District shall have the authority to remove and replace defective materials and to deduct the cost of same from any monies due or to become due the Contractor.

1.05 GUARANTEE

- A. All materials, and workmanship shall be guaranteed by the Contractor for a period of two (2) years from the date of initial operation or the date of acceptance thereof, whichever is later, against all defects that might render the work unsatisfactory for the intended purpose. Defective materials and workmanship occurring during the guarantee period shall be replaced by the Contractor at his expense, together with the repair or replacement of any adjacent work which may be damaged or displaced in the process.
- B. In addition to the above guarantee, the Contractor shall assign to the District all material guarantees issued by manufacturers or subcontractors which guarantees extend beyond the two (2) year period stipulated.

PART 1 MATERIALS - NONE

PART 2 EXECUTION - NONE

*****END OF SECTION*****

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work required under this section consists of providing temporary facilities or conforming to control procedures and requirements as listed herein and in the various technical specification sections that comprise these Standard Specifications.

1.02 SUBMITTALS

- A. The Contractor shall submit a detailed staging plan and how he intends to comply with the requirements of this section.

1.03 TEMPORARY FACILITIES

- A. Construction Utilities/Facilities
 1. Water - The District will furnish water required for water main and tank disinfection/flushing purposes, subject to availability. All other water required for construction related items shall be provided by the Contractor. Water can be obtained from one of the existing hydrants near the job site. The District will provide a 2" hydrant meter to be installed on the hydrant. It shall be the Contractor's responsibility to provide certified backflow preventer hoses and/or piping to convey water to the construction site. In no case shall the Contractor use and obtain water from a hydrant without a backflow preventer and hydrant meter. Quantities and delivery schedules shall be subject to availability from the local system, as approved by the District. The District will not be responsible for transporting water to the job site for use by the Contractor.
 2. Sanitary Facilities - The Contractor shall provide adequate toilet facilities for all workers and representatives of the District employed on the job. Facilities shall be immediately adjacent to the work area and subject to the approval of the District as to location and type. The Contractor shall maintain them in sanitary condition from the beginning of the work until completion and shall then remove the facilities and disinfect the premises. All portions of the work shall be maintained at all times in a sanitary condition.
- B. Storage Facilities / Staging Area
 1. It is the Contractor's responsibility to find a staging area for equipment and material for the project duration. All materials and equipment shall be stored at the Contractor's staging area. Staging areas shall be fenced with at least a 6 ft high fence, screening, and security gate. Fencing materials and boundaries of staging areas shall be subject to approval of the District. All coordination with neighbors near the staging area is the Contractor's responsibility.
 2. The staging area shall have a construction entrance per Section 01 57 23 - Storm Water Pollution Control Plan/ Erosion Control, to prevent dirt and mud from leaving the area. In the event material is tracked onto pavement, it shall be swept and cleaned immediately.

1.04 TEMPORARY CONTROLS

A. Housekeeping

1. Keep the project neat, orderly, and in a safe condition at all times. Immediately remove all hazardous rubbish. Do not allow rubbish to accumulate. Provide on-site containers for collection of rubbish or dispose of it at frequent intervals during progress of work. Dry material and rubbish shall be wet-down to prevent blowing dust. Keep volatile wastes in covered containers.
2. The Contractor shall properly dispose of all litter, trash, garbage which may accumulate on the project site on a daily basis.

B. Environmental Protection Requirements

1. Provide environmental protective measures as required to control pollution that develops during normal construction practice, and as required to correct conditions that develop during the construction of permanent or temporary features associated with the project. Comply with all federal, state, and local regulations pertaining to water, air, and noise pollution. Prior to the commencement of the work, meet with the District to develop a mutual understanding relative to details of environmental protection, including measures for protecting natural resources and measures to be taken should the Contractor fail to provide adequate protection in an adequate and timely manner.
2. Water containment barriers must be on site for accidental discharge of chlorinated water.

C. Protection of Trees and Other Vegetation

1. Except in areas indicated to be cleared, do not remove, cut, deface, injure, or destroy trees, shrubs or other vegetation without authorization from the District. Do not fasten or attach ropes, cables, or guys to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is authorized, the Contractor shall be responsible for any resultant damage. Protect existing trees to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations.
2. Restore to their original condition landscape features scarred or damaged by the equipment or operations. Obtain approval of the restoration from the District prior to installation.

D. Air, Soil, and Water Pollution Control Measures

1. Take all necessary reasonable measures to reduce air, soil, and water pollution by any material or equipment used during construction.
2. No burning will be permitted.
3. Do not dispose of volatile wastes or oils or allow waste materials to be wash into storm or sanitary drains, nor allow such materials to reach watercourses.

E. Handling and Disposal of Waste Materials

1. Dispose of all waste materials legally.
2. Store chemical waste in corrosion resistant containers labeled to identify type of waste and date filled. Remove containers from the project site, and dispose of chemical waste in accordance with federal, state, and local regulations. For oil and hazardous material spills which may be large enough to violate federal, state, and local regulations, notify the District immediately.

3. Conduct fueling and lubricating of equipment and motor vehicles in a manner that affords the maximum protection against spills and evaporation. Dispose of lubricants to be discarded and excess oil in accordance with approved procedures meeting federal, state, and local regulations.
4. Take special measures to prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil, petroleum, or liquid chemical storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of content leakage or spillage. For oil and hazardous material spills which may be large enough to violate federal, state, and local regulations, notify the District immediately.

F. Erosion Protection

1. All earthwork brought to final grade shall be immediately finished as indicated or specified in the Standard Specifications or on the drawings. Immediately protect slopes upon completion of rough grading. Plan and conduct all earthwork in such a manner as to minimize the duration of exposure of unprotected soils.

G. Dust Control

1. Keep dust down at all times, including non-working hours, weekends, and holidays. Sprinkle or treat soil at the site, and other areas disturbed by operations, with a dust suppressor. No dry power brooming is permitted. Air blowing is permitted only for cleaning non-particulate debris, such as steel reinforcing bars. No sandblasting is permitted unless dust is confined. Only wet cutting of concrete and asphalt is permitted. No unnecessary shaking of bags is permitted where bagged cement, concrete mortar, and plaster is used.

H. Sound Control Requirements

1. The noise level from the Contractor's operations, between the hours of 8:00 a.m. and 5:00 p.m. shall not exceed 75dbA at a distance of 50 feet from the project site. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances relating to noise.
2. Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, or transient equipment that may or may not be owned by the Contractor. The use of load sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

I. Preservation and Cleaning

1. The Contractor shall keep roads free from mud and other debris. If mud or debris is tracked onto the road, it shall be immediately cleared. The Contractor shall clean the roadways at the end of each day.

J. Cleanup and Removal of Temporary Facilities

1. Obliterate all signs of temporary construction facilities including work areas, staging area, structures, stockpiles of excess or waste materials, and all other vestiges of construction. Temporary parking areas and similar temporary use areas shall be graded in conformance with surrounding areas.

2. Sweep paved surfaces; rake other surfaces or grounds. Remove all tools, equipment, surplus materials, trash, garbage, and rubbish. At the time of final inspection, the project shall be thoroughly clean and ready for use.

K. Mechanical/Vacuum Roadway Sweeper

1. During the course of construction, the Contractor shall sweep the project site on haul routes and as requested by the District with a regenerative air type street sweeper.

PART 2 MATERIALS - NONE

PART 3 EXECUTION - NONE

*****END OF SECTION****

SECTION 01 52 00 – TRAFFIC CONTROL PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work required under this section consists of furnishing all labor, materials, tools, and equipment incidentals to comply and provide traffic control plan. Traffic control is the sole responsibility of the Contractor.

1.02 SUBMITTALS

- A. The Contractor shall submit details on how they intend to comply with the requirements of this section.

PART 2 MATERIALS

2.01 GENREAL

- A. All materials used as part of the traffic control plan shall conform to the latest requirements of Caltrans Standard Specifications and the requirements of applicable encroachment permits.

PART 3 EXECUTION

3.01 TRAFFIC CONTROL PLAN

- A. The first order of work shall be for the Contractor to submit a traffic control plan prepared by a licensed traffic engineer. Delay in submittal of traffic control plan shall not be a basis for any time extensions. Work shall not begin until the District has reviewed the traffic control plan.
- B. The traffic control plan shall be in full compliance with the California Department of Transportation, the County of San Mateo, and/or the City of San Carlos encroachment permit requirements.
- C. Personal vehicles of the Contractor's employees shall not be parked on the traveled way or paved shoulder area, including any section closed to public traffic.
- D. The Contractor shall notify local authorities of the Contractor's 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 all arrangements relative to keeping the working area clear of parked vehicles.
- E. The full width of roadway used during construction shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays and the day preceding designated legal holidays, and when construction operations are not actively in progress.
- F. Ingress and egress for residents and businesses during construction must be provided during construction at all times.
- G. Minor deviations from the requirements of this section concerning hours of work which do not significantly change the cost of the work may be permitted upon the written request of the Contractor if, in the opinion of the District, public traffic will be better served and the work

expedited. These deviations shall not be adopted by the Contractor until the District has approved them in writing.

3.02 CONSTRUCTION AREA SIGNS AND SYSTEM

- A. Construction area signs shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12 - Construction Area Traffic Control Devices, of the Standard Specifications and these provisions.
- B. The Contractor shall notify in writing residence, District, the County of San Mateo, and/or the City of San Carlos and any other pertinent local agencies at least two (2) working days prior to commencing excavation for construction area signs posts.
- C. Excavation required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it determined there are no utility facilities in the area of the proposed post holes.
- D. Sign substrates for stationary mounted construction signs may be fabricated from fiberglass reinforced plastic as specified under "Pre-qualified and Tested Signing and Delineation Materials" of the Standard Specifications.
- E. The Contractor may be required to cover certain signs during the progress of the work. Signs that are no longer required or that convey inaccurate information to the public shall be immediately covered or removed or the information shall be corrected. Covers for construction signs shall be of sufficient size and density to completely block out the complete face of the signs. The retro-reflective face of the covered signs shall not be visible either during the day or at night. Covers shall be fastened securely so that the signs remain covered during inclement weather. Covers shall be replaced when they no longer cover the signs properly.
- F. The Contractor shall furnish and maintain two construction funding signs, 4'x4' in dimension, per Section 12 of the California Department of Transportation's Standard Specifications. The Contractor shall place signs in conjunction with the construction area signs at locations designated by the inspector. The exact language of the signs will be furnished to the Contractor by the District during the pre-construction meeting. At a minimum these signs shall contain the logo and address of the District and Contractor, project duration and funding information. These signs shall be maintained by the Contractor throughout the project constructions. Damaged construction funding signs shall be replaced by the Contractor at his/her expense.
- G. When using trench plates at the end of the day, the Contractor shall place customized "Trench Plates Ahead" and "Uneven Pavement" signs on a working, lighted, barricade at each direction of traffic. Contractor shall also place "Trench Plates Ahead" signs at areas where trench plates are temporarily placed in the right-of-way. Sand bags shall be used at each barricade to provide stability. The existing wind conditions and weather will determine the number of sand bags to be used.
- H. Letters of customized signs shall be black in color, 4-inch high, on orange background on non-running paint or color. Signs shall be maintained through the course of the project and shall be weather resistant. No paper signs are allowed.
- I. Payment of customized signs shall be paid for under various bid items requiring the signs.

3.03 MAINTAINING TRAFFIC

- A. Attention is directed to Sections 7-1.03, "Public Convenience," 7-1.04, "Public Safety," and 12, "Temporary Traffic Control," of the Standard Specifications and these special provisions.
- B. At least five (5) working days in advance is required prior the beginning of any operation which will impact properties, limit resident or business access to their driveways or potentially impact utility and sewer services, the Contractor must provide written notification to all the impacted residents. This Notice to Residents must clearly state the time, date, and duration of the Contractor's planned operation, the impacts to the residents, the purpose of the project and the prohibition of on-street parking. The Contractor shall submit the notice for review.
- C. All Notices to Residents and businesses shall include the District's phone number and the Contractor's day and emergency phone numbers. The Contractor shall obtain the District's approval of the Notice to Residents prior to distribution and the beginning of any operations. Each notice shall be hand delivered or securely attached to the door in the event that no one is home. A Friday that occurs prior to a Holiday (three day) weekend shall not be considered as a working day for the purpose of this section.
- D. If needed, 72 hours prior to the day which will require the Contractor to remove parked cars, the Contractor shall furnish and erect "No Parking" signs. These shall be attached to portable barricades placed 25 feet and shall state the dates and time that parking will be restricted. The exact date and time signs are posted shall also be noted on the signs.
- E. Emergency vehicles shall be permitted to pass through the work area without delay at all times.
- F. Noncompliance with the requirements of this section shall be cause for the Engineer to stop the work. Delays caused by failure to meet these requirements shall not be considered a valid basis for an extension of time for the purpose of calculating liquidating damages.
- G. Lane closures shall conform to the provisions in the section of these special provisions entitled "Traffic Control System for Lane Closures" of these special provisions.

3.04 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

- A. A traffic control system shall consist of closing traffic lanes in conformance with the provisions in Section 12, "Temporary Traffic Control," of the Standard Specifications, and "Construction Area Signs and System" and "Maintaining Traffic" of these provisions.
- B. The provisions in this section will not relieve the Contractor of responsibility for providing additional devices or taking measures as may be necessary to comply with the Standard Specifications and these provisions.

*****END OF SECTION*****

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SECTION 01 57 23 – STORM WATER POLLUTION CONTROL PLAN

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work required under this section consists of furnishing all labor, materials, tools, and equipment incidentals to provide and comply with a storm water pollution control plan.
- B. General Background
 - 1. The National Pollution Discharge Elimination System (NPDES) General Permit for Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Construction General Permit) issued and regulated by the State Water Resources Control Board (SWRCB) has been in effect for construction sites for many years now. The latest Construction General Permit requires owners or operators of construction sites, regardless of project size, to implement Best Management Practice (BMP) measures to prevent contamination of storm water runoff from leaving the construction site. In addition to this general requirement, owners and operators of construction sites, including underground and aboveground water main installation projects, that result in land disturbance of one acre or more shall obtain coverage under the Construction General Permit prior to starting construction. Coverage under the Construction General Permit requires:
 - a. Electronically file all Permit Registration Documents (PRDs) to the State Water Board's Storm Water Multi-Application and Report Tracking System (SMARTS) website, which includes a Notice of Intent (NOI) notifying the SWRCB of the project, Risk Assessment, Site Map, signed Certification Statement, Storm Water Pollution Prevention Plan (SWPPP), changes of information, annual reporting and other compliance documents, and Notice of Termination (NOT).
 - b. Preparation of site-specific Storm Water Pollution Prevention Plan (SWPPP) identifying the potential sources of storm water runoff contamination and BMP measures that will be implemented and maintained on the project site to minimize storm water pollution.
 - c. Mailing Annual Permit Fee to SWRCB.
 - d. Obtaining Waste Discharger Identification (WDID) number.
- C. For All Traditional and/or Linear Underground/Overhead Project Sites Greater Than One Acre
 - 1. The District in accordance with the County of San Mateo, the City of Belmont/San Mateo Grading Ordinance will require all project applicants obtain coverage under and comply with the Construction General Permit regulations. Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on construction sites without current PRDs, an approved and current SWPPP document prepared by a Qualified SWPPP Developer (QSD), site-specific BMP measures in place and functioning and monitored by a Qualified SWPPP Practitioner (QSP) throughout the duration of the project.
- D. For Traditional and/or Linear Underground/Overhead Project Sites less than One Acre and Part of a Larger Common Plan of Development or Sale of One or more Acres of Disturbed Land Surface
 - 1. The District in accordance with the County of San Mateo, City of Belmont/San Mateo Grading Ordinance will require all project applicants obtain coverage under and comply with the

Construction General Permit regulations, where these regulations specifically state that construction activities that results in land surface disturbance of less than one acre is subject to the regulations if the construction activity is part of a larger common plan of development or sale of one or more acres of disturbed land surface.

2. Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on sites without current PRDs, an approved and current SWPPP document prepared by a Qualified SWPPP Developer (QSD), site-specific BMP measures in place and functioning and monitored by a Qualified SWPPP Practitioner (QSP) throughout the duration of the project.
- E. For Traditional and/or Linear Underground/Overhead Project Sites less than One Acre
1. The District in accordance with the County of San Mateo, the City of Belmont/San Mateo Grading Ordinance will require all project applicants obtain approval of all improvement plans, including a project site-specific Storm Water Pollution Control Plan, from all lead agencies (County of San Mateo, City of Belmont/San Mateo, etc.), where projects disturb less than one acre of land surface and is not part of a larger common plan of development or sale of one or more acres of disturbed land surface. Per the current Construction General Permit these construction activities do not require filing of PRDs to obtain coverage under the permit. However, the District reserves the right to require a project site-specific Storm Water Pollution Control Plan prepared in accordance with the California Storm Water Quality Association (CASQA) Storm Water Program requirements and approved by the lead agency on a case by case basis. The project site-specific Storm Water Pollution Control Plan shall identify BMP measures necessary to protect the project site throughout all phases of construction during both the rainy-season (October 15th through April 15th) and dry-season. All project construction site BMP measures shall be in place, maintained and functioning before the wet-season (before September 15th).
 2. Since installing new services or mains on development sites typically involves land surface disturbance, the District will not provide work or inspection services on sites without an approved and current site-specific Storm Water Pollution Control Plan and BMP measures in place, functioning and monitored by the project applicant and/or project applicants contractor in accordance with industry standards.
- F. Related Documents:
1. State of California, Department of Transportation (Caltrans), Caltrans Standard Specifications, Section 13 – Water Pollution Control.
 2. State Water Resource Control Board (SWRCB) General Permit for Storm Water Discharges Associated with Construction Activity.
http://www.waterboards.ca.gov/water_issues/programs/storm_water/
 3. SWRCB General Permit for Storm Water Discharges Associated with Construction Activities from Small Linear Underground/Overhead Projects (State).
http://www.waterboards.ca.gov/water_issues/programs/storm_water/
 4. California Stormwater Quality Association (CASQA) Storm Water Program.
<https://www.casqa.org/>
 5. California Department of Transportation (Caltrans) Storm water Quality Program.
http://www.dot.ca.gov/hq/construc/storm_water/

6. Blueprint for a Clean Bay.
7. California Storm Water Best Management Practice Handbook.
8. Fish and Game Code.

1.02 SUBMITTALS

- A. The Contractor shall submit details on how he intends to comply with the requirements of this section.

PART 2 MATERIALS

2.01 GENERAL

- A. All materials used as part of the storm water pollution control plan shall conform to the requirements of the SWRCB Construction General Permit and latest edition of the California "Storm Water Best Management Practice Handbook: Construction" prepared by CASQA.

PART 3 EXECUTION

3.01 GENERAL

- A. Storm water pollution control work shall conform to the requirements in Section III "Discharge Prohibitions," Section IV "Standard Specifications," Section V "Effluent Standards," Section VI "Receiving Water Limitations," and Attachment A "Linear Underground/Overhead Requirements" of the Construction General Permit, and these Standard Specifications.
- B. Storm water pollution control work shall conform to the requirements in the SWRCB Construction General Permit and the "Storm Water Best Management Practice Handbook: Construction" prepared by CASQA, and addenda thereto issued up to and including the date of advertisement of the project, hereafter referred to as the "Handbooks."
- C. The Contractor shall become fully informed of, and comply with applicable Standard Specifications of the Handbook and Federal, State and local regulations that govern the Contractor's operations and storm water discharges from both the project site and areas of disturbance outside the project limits during construction.
- D. The Contractor shall incorporate appropriate Best Management Practices (BMPs) measures at all locations such as gutters, drainage inlets, etc., that may be affected by any operation, including saw cutting, grinding and paving, that may deposit pollutants in those facilities. Monitoring of the BMPs shall be done throughout the project and any upgrades or adjustments shall be made as directed by the project applicant's QSP. Any spillage into gutters or drainage inlets shall be cleaned immediately.
- E. The District and/or City/County may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this Section - Storm Water Pollution Control, as determined by the District. No extension of time and no delay charges shall result from such suspension by the District and/or City/County.
- F. If the District and/or City/County identify a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the District and/or City/County in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the District.

- G. Nothing in the terms of the Contract nor in the Standard Specifications in this Section shall relieve the Contractor of the responsibility for compliance with Section 5650 and 12015 of the Fish and Game Code, or other applicable statutes relating to prevention or abatement of water pollution.
- H. Contractor shall provide a designated area to clean and wash concrete from equipment during any concrete work on this project. Area shall be lined to prevent any run-off. Concrete residual shall be properly disposed.
- I. After every rainfall, Contractor shall inspect and replace any damaged BMPs. Any replacement of BMPs shall be paid in various bid items. Work shall include cleaning and properly disposing debris from the inlets. Every inlet needs to be free from obstruction and sediment.
- J. Conformance with the requirements of this section - Storm Water Pollution Control Plan/Erosion Control, shall not relieve the applicant and their Contractor from the responsibilities, as provided in Sections 5-1.36 - Property and Facility Preservation, 7-1.05 - Indemnification, and 7-1.06 - Insurance, of the Standard Specifications.

*****END OF SECTION*****

SECTION 01 70 00 - PROJECT CLOSEOUT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of conforming to the job completion-related requirements of other Standard Specification Sections and of furnishing various materials needed to complete the project.

1.02 SUBMITTALS

- A. Tests

Submit any test results done during the course of the work and not previously submitted in accordance with applicable sections of these Standard Specifications.
- B. Certificates and Guarantees

Furnish all certificates and/or guarantees as required by individual Standard Specification Sections and in accordance with applicable sections of these Standard Specifications.
- C. Record Drawings

Furnish record drawings.

1.03 INSPECTION

- A. Final Inspection
 - 1. Submit written certification that project, or designated portion of project, is substantially complete, and request, in writing, a final inspection. The District will make an inspection within ten (10) days of receipt of the request.
 - 2. Should the District determine that the work is substantially complete, the District will prepare a punch list of deficiencies that do not preclude operation and use of the facility; however, final payment will be withheld until all deficiencies are corrected and all close-out requirements of the encroachment permits are met.
 - 3. Prior to the District accepting the project, the Contractor shall perform a final sweep using a regenerating air type street sweeper along the project limits 14 days after the paving and striping operations. Work shall be coordinated with the District inspector.
 - 4. Until receipt of a letter of final acceptance, the Contractor shall be responsible for the work.
- B. Post-Construction Inspection
 - 1. Prior to expiration of the performance bond, and approximately 23 months from date of final acceptance, the District will inspect project to determine whether corrective work is needed. The Contractor will be notified in writing of any deficiencies. The Contractor must begin corrective work on the noted deficiencies within 10 days after receipt of notification.

PART 2 MATERIALS – NONE

PART 3 EXECUTION

3.01 CLEANING

- A. Cleanup and cleaning shall be done in accordance with applicable sections of these Standard Specifications.

*****END OF SECTION*****

SECTION 02 20 00 - SITE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Site preparation work, as follows:
 - 1. Locating existing facilities.
 - 2. Installing safety and protective barriers.
 - 3. Constructing temporary access roads, work areas and storage areas.
 - 4. Clearing, grubbing, stripping, and other initial work required for earthwork and trenching operations.

1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
 - 1. Section 01 33 00 – Submittals
 - 2. Section 31 80 00 – Trench Excavation, Bedding, and Backfill

1.03 DEFINITIONS

- A. Clearing: Consists of removal of natural obstructions and man-made objects and features including foundations, buildings, fences, lumber, stumps, debris, rubbish, brush, trees, boulders, and other items that interfere with construction operations or are specifically designated for removal.
- B. Stripping: Includes the removal and disposal of sod, grass, weeds, roots, and other organic material remaining after clearing has been completed.

1.04 SUBMITTALS

- A. Comply with Section 01 33 00.
- B. Submit:
 - 1. Materials used and layout of temporary fences
 - 2. Proposed staging and stockpile locations.

PART 2 PRODUCTS

2.01 TEMPORARY FENCES

- A. Type: Heavyweight, high visibility, flat laminar mesh design.
- B. Material: High-density polyethylene.
- C. Height: 48 inches.
- D. Posts: Wood or metal posts at 10-foot spacing. Secure fence to posts with plastic cable ties.

PART 3 EXECUTION

3.01 LOCATING EXISTING FACILITIES

- A. Review the design drawings, maps, and other sources of information and identify existing facilities at the site to determine and mark the approximate locations of underground facilities.
- B. Follow rules adopted by USA North 811 regarding locating and marking existing buried utilities and contact owners of existing underground utilities prior to beginning work in the vicinity of their utilities.
- C. Refer to Section 31 80 00. Locate all existing utilities by exploratory excavations after field marking by the utility agencies and prior to any excavations in the affected areas.

3.02 SAFETY AND PROTECTIVE BARRIERS

- A. Along Public Roadways:
 - 1. Install appropriate barriers such as temporary fencing, plastic drums, or concrete traffic barriers to protect public from construction areas and to protect workers and existing facilities from danger of passing vehicles.
- B. Temporary Fences:
 - 1. Prior to beginning excavation, erect temporary fences along boundaries of temporary easements indicated on the Drawings.
 - 2. Maintain work activities within the confines of the temporary fences.
 - 3. Remove temporary fences when work in the vicinity is substantially complete.
- C. Provide protective concrete slabs, steel plates or encasements for existing buried facilities that may be damaged by Contractor's equipment and vehicles.

3.03 PRIMARY SITE ACCESS, WORK AND STORAGE AREAS

- A. Develop primary access routes, work areas and storage areas as indicated on the Drawings.
- B. Clean up areas at the conclusion of the project and return the areas to their original or better condition.

3.04 CLEARING

- A. Clear construction areas of objectionable items and material, which, if left in place, would interfere with the proper performance of the work.
- B. Remove loose boulders within 10 feet from the tops of cut slopes. Incorporate boulders into landscaping or remove from the site.
- C. Dispose of material from clearing operations in an acceptable off-site location.

3.05 TREE REMOVAL

- A. Remove specific trees indicated on the Drawings for removal. Cut tree so they fall into the area being cleared. Cut stumps no higher than 4 inches above the ground surface if the tree is within an area that will otherwise be undisturbed. Remove felled tree from the site.

- B. Timber Salvage: Property owners have the rights to any tree with caliper of 6 inches and larger that are felled. The Contractor shall notify property owners at least 48 hours prior to tree removal. If property owners elect to keep felled trees, they will be granted 7 calendar days after the tree is felled to remove the timber. If timber is not removed after 7 calendar days, the ownership of the timber shall revert back to Contractor.

3.06 TREE TRIMMING

- A. Permits are required to prune, cut, break, or damage roots of street trees. Contractor maybe subject to fines if trees are removed prior to obtaining a permit and may also be required to remove, replace, and mitigate for the loss of a damaged tree. The Contractor is required to coordinate with the Owner and the Cities for tree trimming services required for this project.
- B. Timely Contractor communication with the Owner and the Cities is required regarding activities that will require tree trimming:
 - 1. At least two weeks before beginning work that requires tree trimming, attend a walk-through of the project area with the Owner, Engineer, and the City Forester. Identify trimming necessary to complete the Work. Notify the Engineer of additional tree trimming work that may be needed during the project.
 - 2. Following Project completion, attend a final walk-through of the project area and identify any needed post-construction tree-related work.

3.07 REMOVAL OF EROSION CONTROL DEVICES

- A. Remove erosion control devices when bare soils are sufficiently revegetated to prevent on-site or off-site soil erosion.
- B. Straw wattles containing plastic netting, including plastic specified as phot-degradable, may not remain on site. Remove entire wattle or remove and dispose of plastic netting and spread straw from wattle across vegetated areas of site.

*****END OF SECTION*****

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SECTION 13 47 13 – GALVANIC ANODE CATHODIC PROTECTION SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of furnishing and constructing a galvanic anode cathodic protection system for steel or ductile iron metallic pipe fittings. The anodes and appurtenances are to be installed as shown on the standard drawings and as specified herein.

1.02 SUBMITTALS

- A. Submit catalog data on anodes, test boxes, shunts, exothermic welds, and weld coating.

PART 2 MATERIALS

2.01 ZINC ANODES

- A. Zinc anodes shall weigh 15 lb, 30 lb or/and 60 lb as directed by the District. All zinc anodes to be packaged inside a cotton cloth bag with special backfill as shown in Standard Drawings. A #12 AWG, THHN, solid copper lead wire shall be silver soldered to the galvanized steel anode core and the connection sealed by the supplier. The lead wire shall be of sufficient length to reach the test station without splicing.
- B. Anode alloy and special backfill shall conform to the following chemical compositions:

<u>Anode Composition</u>	<u>Special Backfill</u>
Lead 0.006% Max.	Ground Hydrated Gypsum 75%
Iron 0.0030% Max.	Powdered Wyoming Bentonite 20%
Cadmium 0.025 - 0.07%	Anhydrous Sodium Sulfate 5%
Copper 0.005% max.	
Aluminum 0.1 – 0.55%	
Zinc Remainder	

2.02 ANODE BOXES

- A. Anode boxes shall be precast concrete with cast iron locking cover marked "ANODE" and shall be a Christy Concrete G05T box with G05CT cover.

2.03 TEST BOARDS

- A. Test boards shall be COTT Manufacturing "Big Fink". Hardware shall be nickel plated brass. Solderless lugs shall be nickel plated copper or red brass of the smallest size suitable for the wire sizes. Identify each lead wire with a wire marker and coat with a clear heat shrink sleeve as shown in drawing.

2.04 WIRE

- A. Anode wires are specified under Zinc Anodes. Other wiring to be of the size and color shown on Standard Drawing and shall have THHN insulation.

- B. For connecting wiring from anodes and fittings into test stations, the District will only allow the use of a single anode and single test station for fittings / tees / valves which are located within 20 feet or less of each other. These fittings / tees / valves shall be connected to a separate terminal with a wire labelled for identification, unless directed by the District otherwise.
- C. Any fittings / tees / valves located 20 feet or more of each other shall have their own anode and test station unless directed by District otherwise.
- D. Long bond wires shall be taped to the pipe every five (5) feet.

2.05 SHUNTS

- A. Current measuring shunts shall be 0.01 ohm, with 5 ampere current capacity, Holloway type RS, Cott Manufacturing Company, or equivalent.

2.06 EXOTHERMIC WELDS

- A. Exothermic welds shall be "Cadweld" by Erico Products, or "Thermoweld" by Continental Industries Inc. Mold shall be the type recommended by the manufacturer for the wire size, metal shape, and orientation. Weld alloy shall be formulated for use on steel or iron pipe as appropriate and shall be of the weight recommended by the manufacturer for the size cable and mold being used. Welds to be buried or submerged shall be primed with an elastomer resin based primer then be covered with a 100% solids mastic filled plastic cap. Primer and cap shall be Roybond Primer 747 and Handy Cap manufactured by Royston Laboratories.

2.07 INSULATED JOINTS

- A. Insulate flange joints to electrically isolate tanks from below piping will be a full face dielectric gasket and double washer bolt insulation on each bolt and restraining rod passing through or around the dielectric gasket. Dielectric gasket shall be 1/8-inch thick, full face phenolic with a nitrile or neoprene sealing element in a groove in the gasket designed for 250 PSI pressure in a waterline. Bolt insulation shall be phenolic washers and polyethylene or mylar sleeves or shall be one piece Minlon sleeve and washer. Insulating materials shall be manufactured by Central Plastics Company, or PSI.

PART 3 EXECUTION

3.01 PIPE-TO-SOIL POTENTIALS

- A. Measure native pipe-to-soil and open anode potentials at each wire at each test station to portable reference cells. Repair or replace any wires, test stations, or anodes that are not operating properly. Remeasure potentials at least one hour after all anodes have been connected and measure anode shunts. Type data in clear tabular form and submit to the District.

3.02 ANODES

- A. Anodes shall be installed as shown on the drawings. Anodes may be installed vertically or horizontally. Center anode in package by massaging package as necessary. The anode packages shall be soaked with ten gallons of water after backfilling to a point 12" above the top of the anode. Anode wires shall be carefully run and protected against damage during installation and backfilling operations. The anode lead wire shall not be used for lowering or handling the anode.

3.03 EXOTHERMIC WELDS

- A. Clean pipe to bright metal. Weld according to manufacturer's instructions. Test completed weld by striking weld with a hammer and pulling on wire. If weld comes off, repeat pipe cleaning and welding, and retest. Remove flux and coat as specified above.

3.04 SPLICE

- A. Splices shall be made only where shown or approved by District as a repair. Splices shall be made using split bolt connectors or crimp connectors of the smallest size compatible with the cables being used. Connections shall be insulated with two half lapped layers of rubber tape and at least one half lapped layer of plastic tape, by encasing in resin (3M Scotchcast), heat shrink sleeve (Raychem ASE).

3.05 BACKFILL

- A. All backfill material and compaction shall be per Section 31 80 00, Trench Excavation, Bedding, and Backfill.

*****END OF SECTION*****

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SECTION 13 47 14 – GALVANIC ANODE CATHODIC PROTECTION OF DUCTILE IRON PIPELINE

PART 1 GENERAL

1.01 INTENTION

- A. This specifications section is intended to supplement the Mid-Peninsula Water District (MPWD) Specifications Section 13 47 13, Galvanic Anode Cathodic Protection System for Underground Metallic Fittings as is appropriate for the corrosion control requirements of the underground metallic pipelines involved in this project.
- B. Only items not addressed or only partially addressed by the Specifications Section are enumerated.
- C. The items already that are fully addressed by the Specifications Section 13 47 13 are herein referred to by Specification Section and paragraph number.

1.02 REQUIREMENTS

- A. The Contractor shall furnish all materials, install all equipment and provide all labor necessary to complete the work shown on the drawings and or/listed below and all other work and miscellaneous items not specifically mentioned but reasonably inferred, including all accessories and appurtenances required for a complete system. The intent of this specification is to provide a complete, functional cathodic protection system for the ductile iron fittings on the 12-inch Water Main, and copper pipe of combination air release valves in the Mid-Peninsula Water District, SR101 Crossing at PAMF project.
- B. The work may include any or all of the following:
 - 1. Cathodic protection of a polyethylene encased ductile iron pipeline by means of prepackaged magnesium anodes at test stations.
 - 2. Cathodic protection of polyethylene encased copper tubing and associated brass fittings by means of prepackaged zinc anodes directly attached to the copper tubing/pipe.
 - 3. Joint bonding of ductile iron pipe, valves, fittings and appurtenances.
 - 4. Installation of polyethylene sleeving on copper piping of combination air valves.
 - 5. Trenching, drilling and other excavation including cleanup and restoration of surfaces.
 - 6. Backfill and compaction of backfill.
 - 7. Provide shop drawings, reports, permits, and obtain Engineer's approval where required.
 - 8. Correction of all deficiencies.
 - 9. The work shall include the provision of all materials, equipment, and apparatus not specifically mentioned herein or noted on the plans, but which are necessary to complete the work specified.

1.03 RELATED WORK IN OTHER SECTIONS

<u>Section</u>	<u>Title</u>
01 33 00	Submittals
01 45 00	Quality Control

01 57 23	Storm Water Pollution Control Plan
31 80 00	Trench Excavation, Bedding, and Backfill
32 10 00	Paving, Restoration, and Resurfacing Work
33 14 13	Water Main
33 14 20	Valve and Appurtenances

1.04 APPLICABLE CODE & STANDARDS:

- A. All material and construction work shall be carried out in conformity with the various applicable local, company, state, national or international standards, including but limited to the following:
1. National Association of Corrosion Engineers (NACE):
 - a. SP-01-69 – Recommended Practice, Control of External Corrosion of Underground and Submerged Metallic Piping Systems
 2. American Society for Testing and Materials (ASTM):
 - a. D-1248 – Polyethylene Plastics, Molding and Extrusion Materials
 - b. D-1557 – Moisture Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb. Rammer and 18-in. Drop
 - c. C-94 – Ready-mixed Concrete
 3. National Electrical Manufacturers Association (NEMA):
 - a. 1-10 – Type 3R and 4X Enclosures
 - b. TC-2 – Electrical Plastic Tubing (EPT) and Conduit (EPC 40 and EPC 80)
 4. Military Specification (Mil. Spec.):
 - a. MIL-C-18480B – Coating Compound, Bituminous Solvent, Coal Tar Base
 5. American National Standards Institute (ANSI):
 - a. C80.1 – Specifications for Rigid Steel Conduit, Zinc-Coated
 6. Underwriter's Laboratories, Inc. (U.L.):
 - a. 6 – Rigid Metallic Conduit
 - b. 83 – Thermoplastic Insulated Wire
 - c. 486A – Wire Connectors And Soldering Lugs For Use With Copper Conductors
 - d. 489 – Molded Case Circuit Breakers and Circuit Breaker Enclosures
 - e. 510 – Insulating Tape
 - f. 514A – Outlet Boxes and Fittings
 7. IEEE – Regulation for electrical installation.
 8. NFPA 70 – National Fire Protection Code
 9. NEC – National Electrical Code

1.05 QUALITY ASSURANCE

- A. General
1. All work shall be performed to the satisfaction of the ENGINEER.

2. The Contractor shall not substitute for the specified materials unless approved in writing by the ENGINEER.
3. Regarding Compaction of backfill and trenches see MPWD Specifications Section 31 80 00, Trench Excavation, Bedding, and Backfill.
4. Qualification of Workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of the portion of the work involved and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

1.06 PRODUCT QUALITY

- A. The material and equipment furnished under these specifications shall be standard products from manufacturers regularly engaged in the manufacture of such products and shall be the manufacturer's latest standard design that complies with the specification requirements.

1.07 SUBMITTALS

- A. Submit the following in compliance with Section 01 33 00.
- B. Submit a complete list of equipment and material, including name and manufacturer, catalog number, size, finish and any other pertinent data necessary for proper identification and to determine conformance with specifications for the following:
 1. Magnesium anodes
 2. Zinc anodes
 3. PVC conduit
 4. Cables
 5. Exothermic weld equipment
 6. Weld coating
 7. Test stations
 8. Terminal boxes
 9. Cable warning tape
 10. Identification tags
 11. Bitumastic coating
 12. Polyethylene encasement

PART 2 PRODUCTS

2.01 GENERAL

- A. All materials shall conform to the requirements set forth herein or as designated on the drawings, unless otherwise specified. All materials must be new, free from defects, and shall be of the best commercial quality for the purpose specified. The Contractor shall furnish all necessary items and accessories not shown on the drawings or specified herein, but which are required to fully carry out the specified intent of the work, without additional cost to the Owner.

2.02 PREPACKAGED MAGNESIUM ANODES

A. Magnesium anodes for the ductile iron pipeline/fittings and steel casings shall be H -1 Alloy Grade C (low potential), Magnesium Alloy. The anodes shall be of the size indicated on the drawings. Each anode shall be cast with a steel core, and the core shall protrude from one end and shall be of sufficient length to permit attachment of a lead wire.

B. Each anode shall conform to the following chemical composition:

Anode Composition	Special Backfill
Aluminum 5.0 – 7.0%	Ground Hydrated Gypsum 75%
Manganese 0.15% Min	Powdered Wyoming Bentonite 20%
Zinc 2.0 – 4.0%	Anhydrous Sodium Sulfate 5%
Silicon 0.30% Max	
Iron 0.003% Max.	
Nickel 0.003% Max.	
Copper 0.10% Max.	
Total Other Impurities 0.3 % Max Total	
Magnesium Balance	

C. Each anode ingot shall conform to the following dimensions:

Nominal Wt. Bare (lbs)	Height (inches)	Width (inches)	Length (inches)
32	6	5.75	21

D. Each anode shall be furnished with a lead wire attached to one end of the steel core, and the wire shall be of sufficient length to attach to the test station as shown on the drawings. The wire shall be connected to the steel core by silver soldering, and the connection shall be mechanically secured before soldering. The entire connection shall be insulated with an electrical potting compound. The cable attached to the anode shall be No. 10 AWG, Type THHN stranded, single conductor copper.

E. The anode shall be prepackaged in a permeable cloth bag filled with a mixture of 75% ground hydrated gypsum, 20% powdered bentonite, and 5% anhydrous sodium sulfate. Backfill shall have a grain size so that 100% is capable of passing through a 100-mesh screen. The mixture shall be firmly packed around the anode within the cloth bag by means of adequate vibration so that the magnesium ingot is completely surrounded with a minimum 1 inch of backfill material.

F. Subject to Compliance with the Contract Documents the following Manufacturers are acceptable:

1. Farwest Corrosion Control
2. Corrpro Companies
3. Or approved equal

2.03 PREPACKAGED ZINC ANODES

A. See MPWD Specifications Section 13 47 13, paragraph 2.01, ZINC ANODES.

B. The cable attached to the anode shall be No. 10 AWG, Type THHN stranded, single conductor copper.

2.04 CABLES

- A. Cables used for joint bonding shall be single conductor, stranded copper, Type CP, insulated for 600 volts with High Molecular Weight Polyethylene (HMWPE) in accordance with the requirements of ASTM D 1248, Type 1, Class C, Grade 5.
- B. All cables for test stations and anodes shall be Type THHN or THWN, stranded, copper, sized as shown on the drawings, conforming to Federal Specification J-C-30.
- C. Cable Insulation Color for Anodes and Test Stations.
 - 1. Project Pipe: White
 - 2. Anode or Anode Header Cable: Black

2.05 CABLE-TO-PIPE CONNECTIONS

- A. Ductile Iron Pipe and Steel Pipe: See MPWD Specifications Section 13 47 13, paragraph 2.06, EXOTHERMIC WELDS
- B. Copper Pipe
 - 1. All cable connections to the copper service risers shall be accomplished utilizing bronze or brass ground clamps.

2.06 CABLE-TO-PIPE COATING MATERIAL

- A. Epoxy or Royston Handy Caps may at the discretion of the Contractor be used for sealing the cable to pipe connections.
- B. Epoxy Option:
 - 1. ProPoxy® 20, manufactured by Hercules
 - 2. Durcon-164, by Duriron Company
 - 3. Scotchcast Resin No. 4, by 3-M Company
 - 4. CC-1 Potting Compound, by OSI Products
 - 5. Or approved equal
- C. Handy Caps Option: See MPWD Specifications Section 13 47 13, paragraph 2.06, EXOTHERMIC WELDS.

2.07 FLUSH MOUNTED TEST STATIONS

- A. Anode Boxes: See MPWD Specifications Section 13 47 13, paragraph 2.02, ANODE BOXES.
- B. Test Station shall be complete with terminal box and test leads to the pipe. The actual configuration of the terminal box and test leads shall be as shown on the drawings.
- C. Subject to Compliance with the Contract Documents the following Manufacturers are acceptable:
 - 1. Christy G-5
 - 2. Or approved equal

2.08 TERMINAL BOXES

- A. Terminal boxes shall be locking type, constructed of high-impact, and molded Lexan plastic. The test box shall be provided with sufficient hardware and binding post terminals for each cable as shown on the drawings. All test station hardware, including nuts, bolts, shunts and shorting straps shall be nickel plated brass, and shall be from the same manufacturer as the terminal box.
- B. Cable Terminations
 - 1. If terminal posts with washers and nuts are utilized, all cables that terminate in the terminal boxes shall have ring type connectors that are sized appropriately for the terminal bolts. The ring connectors shall be either a soldered ring type connection or a heavy duty, compression type crimp connection.
 - 2. If binding post terminals are utilized, ring connectors are not required.
- C. Subject to Compliance with the Contract Documents the following Manufacturers are acceptable:
 - 1. Tinker & Rasor Company, Model: T-3
 - 2. Cott Manufacturing Company, Model Big Fink: See MPWD Specifications Section 13 47 13, paragraph 2.03, TEST BOARDS.
 - 3. Or approved equal

2.09 METERING SHUNTS

- A. Anode metering shunts shall be 0.01 ohm, 6 ampere capacity, with 1% accuracy.
- B. Subject to Compliance with the Contract Documents the following Manufacturers are acceptable:
 - 1. Tinker & Rasor Company
 - 2. Cott Manufacturing Company
 - 3. Or approved equal.

2.10 CABLE WARNING TAPE

- A. All buried cables shall have plastic warning tape installed a minimum of 12 inches above the top of the cables for the entire buried length of the cables. The warning tape shall be 6 inches wide and shall be red in color with black lettering with the legend "CAUTION, CATHODIC PROTECTION CABLES BURIED BELOW" in 4 inch high lettering printed at a minimum of seven foot intervals along the entire buried length of the cable.

2.11 CABLE IDENTIFICATION TAGS

- A. All cables in the terminal boxes shall be identified. The identification tag shall be typed on a heat shrinkable tube applied to each end of the wire:
- B. Heat shrinkable tube shall be shall be a permanent, non-smearing, solvent resistant type, similar to Brady, Raychem TMS, or approved equal.

2.12 BITUMASTIC COATING

- A. Coating for all buried rods, bolts, nuts and metallic washers of the ductile iron pipe and fittings, and the copper insulating corporation stops shall be Bitumastic 300M coal tar mastic coating.

- B. Subject to Compliance with the Contract Documents the following Manufacturers are acceptable:
 - 1. Carboline Coatings
 - 2. Or approved equal

2.13 POLYETHYLENE ENCASEMENT

- A. The polyethylene sheets used for encasement of the ductile iron pipe and fittings shall be minimum 8-mils thick in accordance with AWWA C-105.
- B. The polyethylene sleeves used for encasement of the copper pipe shall be minimum 6-mils thick.

2.14 RIGID PVC CONDUIT AND FITTINGS

- A. Rigid polyvinylchloride (PVC) conduit and fittings shall be Schedule 40, manufactured to NEMA TC-2 and WC-1094 specifications and shall be U.L. approved.

2.15 SPLICE TO ANODE HEADER CABLE

- A. Anode to header cable splices shall be with a proper sized Burndy Crimpit or Thomas & Betts C tap crimp connector or two Burndy copper split bolts.
- B. Scotch® linerless rubber splicing tape 130C.
- C. Scotch® premium vinyl electrical tape Super 33+.

PART 3 EXECUTION

3.01 MATERIAL DELIVERY, STORAGE AND PROTECTION

- A. All materials and equipment to be used in construction shall be stored in such a manner to be protected from detrimental effects from the elements. If warehouse storage cannot be provided, materials and equipment shall be stacked well above ground level and protected from the elements with plastic sheeting or other method as appropriate.

3.02 GENERAL

- A. All materials, workmanship and installation shall conform to all requirements of the legally constituted authority having jurisdiction. These authorities include, but are not limited to, the latest revision of the State of California, Department of Industrial Relations, Division of Industrial Safety, Electrical Orders; The National Electric Code, General Construction Safety Orders of the Industrial Accident Commission; and all other applicable Federal, State, County, or City codes and regulations. Nothing in the drawings or specifications is to be construed to permit work not conforming to these regulations and codes. Where larger size or better grade materials than required by these regulations and codes are specified, the specifications and drawings shall have precedence.

3.03 GALVANIC ANODES

- A. Anodes shall be installed in excavated holes in native soil after excavation to proper depth, as shown on the drawings. Excavate a hole to a minimum of 3 inches larger than the package sacrificial anode diameter. The anodes shall be installed at a minimum distance of 5 feet from the edge of the pipe. Spacing between anodes shall be as shown on the drawings. Prior to placing anodes in the trench or hole, paper or plastic bags shall be removed, but the cloth bag shall remain

around the anode. Care shall be exercised during installation to prevent damage to the cloth bag and loss of backfill material. After placing anodes in the trench, native soil, free of rocks and other foreign objects shall be placed around the anode to a minimum cover of one foot above the anode. When backfill level is even with the top of the anode, a minimum of 5 gallons of fresh water shall be added to each anode. After the water is added, a minimum of 6 inches of native soil shall be placed on the anode and compacted to eliminate voids. Remainder of the trench shall then be backfilled with native soil. During installation, anodes shall not be supported or handled by use of attached wires.

- B. Excavate the lead wire trench to a minimum depth of 30 inches.
- C. The number of anodes to be installed at each test station is designated on the drawings.

3.04 CABLES

- A. Cables buried in the ground shall be direct buried and shall be laid straight, without kinks. The cable shall have a minimum cover of 30 inches. Each cable run shall be continuous in length and free of joints or splices. Cable splices to extend existing cables shall be limited to those specifically indicated on the drawings. Care shall be exercised during installation to avoid punctures, cuts, and similar damage to insulation. Any damage to insulation during construction shall require replacement of the entire cable length at no additional cost to the Owner. Backfill surrounding the cables shall be native soil free of foreign materials. Cable warning tape shall be installed 12 inches above the entire buried length of the cable.

3.05 CABLE-TO-PIPE CONNECTIONS

- A. Cable-to-pipe connections shall be installed in the manner and at the locations shown on the drawings. Coating materials shall be removed from the pipe surface over an area just sufficient to make the connections. The surface shall be cleaned to white metal by grinding or filing prior to welding the conductor. Grinding with resin impregnated wheels shall not be allowed. The conductor shall be welded to the pipe by the exothermic process with a copper sleeve fitted over the conductor, and only sufficient insulation shall be removed from the conductor to allow placing in welding mold. After the weld has cooled, all slag shall be removed and the weld shall be tested with a sharp blow from a 12 to 16 ounce ball peen hammer to assure proper metallurgical bond. All defective welds shall be removed and replaced.
- B. All exposed surfaces of copper wire and ductile iron pipe shall be cleaned of contaminants and first covered with a minimum thickness of ¼ inch of epoxy as shown on the drawings or coated with Royston Roybond 747 primer. After the Roybond primer has dried, the Royston Handy Cap shall be applied.

3.06 TEST STATIONS

- A. Test stations shall be installed at locations designated on the drawings and at all anode installation locations. Exact locations of test stations shall be determined by the ENGINEER in the field. The terminal end of each cable shall be identified with the structure identification using the permanent cable identification tags.
- B. Provide a concrete collar where anode test stations are to be installed in native soil. Set collar level flush with top of curb or finish grade in paved areas and two (2) inches above grade in landscaped and unimproved areas. Provide a minimum of 18 inches of slack for each cable in

each test station. Sufficient slack shall be provided to allow removal of the terminal box from the test station without disconnecting any of the cables.

- C. No excavations shall be left overnight without proper trench plate covers.

3.07 JOINT BONDING

- A. Ductile Iron Pipe: All non-welded rubber gasket joints, mechanical joints, flange joints and threaded joints (except insulating joints) shall be bonded with a HMWPE stranded copper cable sizes as shown on the drawings. The overall length of the conductor shall permit maximum movement of the pipe joint without transferring any tensile stress to the cable, per pipe manufacturer's recommendations. The bonded pipe sections shall be tested for continuity, prior to backfilling.

3.08 FIELD COATING OF BURIED FLANGE AND COUPLING HARDWARE

- A. All buried nuts, washer, bolts and rods of ductile iron flanges and couplings shall be coated with Bitumastic prior to polyethylene encasement. After flange or coupling hardware is installed use wire brush, power brush or an abrasive cleaning pad to remove all loose material, dirt and grime from substrate to a minimum cleanliness of SSPC SP2. Apply Bitumastic coating liberally with a medium bristle brush to the extent that all surfaces are completely covered with no bare spots visually evident. Coat exposed surfaces of rods, bolts, washers and nuts, giving special attention to the bottom-side surfaces. Follow the manufacturer's recommendations for drying times required before polyethylene encasement and backfill.
- B. Coat all bronze service clamps and corporation stops with Bitumastic.

3.09 POLYETHYLENE ENCASEMENT OF DUCTILE IRON PIPE AND FITTINGS

- A. Encase the buried ductile iron pipes and fittings in minimum 8-mil polyethylene in accordance with AWWA C-105.
- B. The buried copper piping shall be encased in 6-mil polyethylene sleeves.

3.10 SPLICES

- A. The splices of the anode lead wires to the anode header wire shall be made as shown in the drawings.
- B. For restrictions on all other kinds of splices see MPWD Specifications Section 13 47 13, paragraph 3.04 SPLICE.

3.11 SYSTEM COMMISSIONING

- A. After installation of the corrosion monitoring facilities, the system shall be tested, and adjusted by the PROJECT CORROSION ENGINEER, or his designated representative, to assure conformance with the specifications. Testing shall include a determination of proper installation of each component, adequacy of test stations, electrical continuity of bonded test stations and pipe fittings. Upon completion of tests, a detailed report shall be submitted describing any deficiencies detected. Any and all deficiencies shall be corrected by the Contractor and site conditions restored prior to final acceptance. All retesting shall be at the Contractor's expense. See MPWD Specifications Section 13 47 13, paragraph 3.01, PIPE-TO-SOIL POTENTIALS.

- B. The Contractor shall notify the PROJECT CORROSION ENGINEER 48 hours prior to installation of any cathodic protection components so that inspections can be scheduled. Phone messages left with others will not be considered adequate notification. The Contractor shall not backfill any cathodic protection components prior to inspection and approval by the PROJECT CORROSION ENGINEER.

3.12 INTERFERENCE AND EXACT LOCATIONS

- A. General
1. The CONTRACTOR shall coordinate and properly relate this work to the site and to the work of all trades. The general locations of the facilities are shown on the drawings. However, the CONTRACTOR shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, verify existing conditions in the field, determine the exact locations of existing pipelines and structures and advise the ENGINEER of any discrepancy that may prevent or hinder the specified work from being completed. The CONTRACTOR shall be solely responsible for location and marking underground structures so as to avoid damage during construction.

3.13 GPS COORDINATES

- A. The “as-built” GPS coordinates of all components such as test stations, rectifiers, anode beds, etc. shall be mapped by the CONTRACTOR and provided in tabular form and as an electronic file.

*****END OF SECTION*****

SECTION 31 23 19 - CONTROL OF WATER

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control of surface water and excavation drainage.
- B. Protection of the work against surface runoff, and exfiltration from existing pipes and structures.
- C. Collection, treatment, and disposal of removed water.

1.02 DEFINITIONS

- A. Excavation drainage includes keeping excavations free of surface water, seepage water, and exfiltration from existing pipes and structures.
- B. Surface drainage includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines as required to protect the work from any source of surface water.
- C. Construction Water: surface or groundwater that is subject to removal by the Contractor as necessary to complete the work.

1.03 PERMITS

- A. Obtain and comply with all permits for the control and disposal of surface and groundwater
- B. Pay all associated fees.
- C. Obtain coverage under the San Francisco Bay Regional Water Quality Control Board General Order No. R2-2012-0012 General Waste Discharge Requirements for Discharge or Reuse of Extracted and Treated Groundwater Resulting from the Cleanup of Groundwater Polluted by Volatile Organic Compounds (VOC), Fuel Leaks and Other Related Wastes, if appropriate, for any dewatering activity, including removal and discharge of groundwater, accumulated rainwater and removal of water from cofferdams or diversions.
- D. Comply with the conditions of the General Permit for Dewatering Activities and Caltrans BMP# NS-2 Dewatering Operations.

PART 2 PRODUCTS

2.01 FACILITIES AND EQUIPMENT

- A. Provide necessary facilities and equipment for controlling surface water and excavation drainage as necessary to complete the Work.

PART 3 EXECUTION

3.01 SURFACE AND EXCAVATION DRAINAGE WATER CONTROL

- A. Perform surface and excavation drainage water control in conformance with regulatory requirements as modified herein.
- B. Have available, on hand at all times during excavation activities,

1. Sufficient pumping equipment and labor necessary to keep excavations clear of water as necessary to complete Work as specified
 2. Adequate standby equipment as may be necessary to keep the control of water operation in full effect due to equipment or power failure.
- C. Commence control of water at an appropriate time during excavation and continue until facilities and structures are installed and backfilled and are sufficiently protected from the effects of hydrostatic uplift or floatation.
- D. Intercept surface and excavation water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. The requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations
- E. Excavations extending below groundwater levels or encountering perched groundwater.
1. Where possible, direct inflow to a sump where water can be removed by a pump within narrow trench excavations that penetrate less than a few feet below the groundwater level and do not encounter loose or cohesionless soils.
 2. Provide well points, perimeter trench drains, or deep sumps as necessary to control of water within wider, deeper, and/or more extensive excavations.
 3. To maintain bottom stability of wider, deeper, or more extensive excavations, draw down groundwater levels a minimum of 5 feet below the lowest portion of the excavation.
- F. Control water in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and protect temporary excavation slope stability during construction.
1. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with drain rock on geotextile fabric at no additional cost to the Owner.
- G. Implement ground settlement monitoring, prior to the commencement of the dewatering operation:
1. Survey existing structures in the vicinity of the proposed dewatering operation,
 2. Monitor the existing structures for settlement, both total and differential, throughout the dewatering operation.
 3. Prepare a daily report for each structure and provided to the Engineer identifying the original baseline elevation; the elevation measured each day, and corresponding total and differential settlement.
 4. Modifications to the dewatering program may be necessary, as determined by the Engineer, should dewatering induced settlements be detected.

3.02 DISPOSAL OF WATER

- A. Construction water may be disposed into existing drainage courses, subject to applicable permitting requirements.

- B. Design and control the dewatering operations such that disposal of water does not cause erosion or other damage and such that water to be disposed of is free from silt and other objectionable materials.
- C. Use settling basins and/or other means to control groundwater quality prior to discharge as necessary.
- D. Follow the applicable construction activity Best Management Practices (BMP) for the project.
- E. Refer to "Caltrans Storm Quality Handbooks, Construction Site Best Management Procedures Manual", May 2017 or latest edition.

3.03 TERMINATION OF DEWATERING

- A. Terminate control of dewatering operations in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines, and sewers.
- B. If damage occurs due to improper termination of dewatering, repair the damage to the satisfaction of the Engineer and at no additional cost to the District.
- C. Remove control of water devices following completion of the Work requiring control of water.

*****END OF SECTION*****

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SECTION 31 23 23 .33 - CONTROLLED DENSITY FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for controlled density fill (CDF) as backfill material in specific locations.

1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section:

- 1. Section 01 33 00 – Submittals

1.03 DEFINITION

- A. Controlled Density Fill (CDF): A highly flowable, lean concrete mix consisting of a mixture of cement, fly ash, densely graded mineral aggregates, water and admixtures. Characteristics include:

- 1. Capable of freely flowing to fill excavations and voids without compaction or other additional effort.
- 2. Used in trenches and for backfill adjacent to structures where clearance is limited, and in other areas specifically identified on the Drawings or specified.
- 3. Low permeability to prevent migration of adjacent fines into the set mix.
- 4. Easily excavated after curing with minimum risk of damage to buried utility.

1.04 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittals.
- B. Mix Design: Identify name and/or number of the mix design. Provide the proportions and gradations of materials proposed for CDF.
- C. Certified test results for compressive strength.

1.05 QUALITY ASSURANCE

- A. Demonstrate that the CDF mix meets the specified requirements, including compressive strength.
- B. Enlist the services of a testing laboratory to prepare test cylinders and to transport cylinders to the laboratory for testing.
- C. Testing expenses shall be borne by the Contractor.
- D. Test Cylinders
 - 1. Procedure: Make 6-inch diameter by 12-inch high test cylinders in accordance with ASTM D4832.
 - 2. Required Number: Not less than 3 cylinders for each 200 cubic yards of CDF placed, with a minimum of 3 cylinders for each location where CDF is used.
 - 3. Test two cylinders at 28 days, third cylinder is spare.

- E. Field Testing:
1. Test flow consistency per ASTM D6103.
 2. Test flow consistency once every 200 cubic yards of CDF placed.

PART 2 PRODUCTS

2.01 GENERAL

- A. CDF Mix: A mixture of Portland cement, fly ash, aggregate, water, and admixtures that produce a material of controlled density and of low compressive strength capable of filling all spaces between the pipe, the bedding and the trench walls.

2.02 MATERIALS

- A. Cement: Conforming to ASTM C150, Type II or III with total alkali content not more than 0.8 percent.
- B. Water: Clean, potable water.
- C. Fly Ash
1. Mix Designs used for Pipe Bedding and Trench Backfill: Class F in conformance with ASTM C618.
 2. Mix Designs used for Backfill of Excavations: Class F in conformance with ASTM C618.
- D. Aggregate Materials
1. Densely graded rock conforming to the following gradation:

Sieve Size	Percentage Passing
1"	100
No. 8	50-100
No. 200	0-5

2.03 DESIGN REQUIREMENTS

- A. Water-cement Ratio: Not to exceed 3.5.
- B. Minimum Cement Content: 50 pounds per cubic yard.
- C. Use fly ash to improve flow-ability of the fresh CDF and to regulate the strength. Do not use more than 300 pounds per cubic yard.
- D. Unit Weight Requirements
1. Density of CDF when used as backfill of excavations: dry unit weight of 100 pounds per cubic foot or less as determined by ASTM D6023.
- E. Compressive Strength Requirements
1. Mix Designs used for Pipe Bedding and Trench Backfill: Compressive strength at 28 days between 100 psi and 150 psi as determined in accordance with ASTM D4832.

2. Mix Designs used for Backfill of Excavations: Compressive strength at 28 days between 150 and 300 psi as determined in accordance with ASTM C4832.
3. Mix Designs used for Excavation Support and Protection: Compressive strength at 28 days 1,500 psi or greater.

2.04 CONSISTENCY AND MIXING

- A. Consistency: Similar to that of a thick liquid so that it flows readily and fills spaces and voids around pipes and structures.
- B. Slump: Between 6 inches and 8 inches when tested in accordance with ASTM C143.
- C. Uniform consistency and appearance.
- D. Mixing Method and Time: As required to produce a uniform mixture of cement, fly ash, aggregate, admixtures, and water.

2.05 MEASUREMENT OF MATERIALS

- A. Use weighing equipment to determine the amount of cement, fly ash, and aggregate entering into each batch. Where batches are proportioned to contain an integral number of conventional sacks of cement, and the cement is delivered at the mixer in the original unbroken sacks, the weight of the cement contained in each sack may be taken without weighing as 94 lbs.
- B. Use a suitable water meter or other acceptable method of measuring the quantity of water entering the mixer.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Thoroughly settle and consolidate CDF as the material is placed in excavations. Fill the entire depth of the layer that is being consolidated, into a dense, homogeneous mass, filling all spaces and voids and bringing only a slight excess of water to the exposed surface. Place and consolidate CDF by means that will not cause segregation of the mix.
- B. Do not place CDF under the following conditions:
 1. When the air temperature is below 40 degrees Fahrenheit.
 2. When the excavation contains water or when the bottom or walls of the excavation are frozen or contain frozen material.
- C. Prevent flotation of pipes by placing CDF in two or more lifts, with each lift reaching an initial set before the succeeding lift is placed. Correct any flotation and displacement of pipelines.
- D. Placement of CDF in Excavations: Limit lift thickness to 10 feet, place subsequent lifts after CDF has achieved the minimum specified compressive strength.

3.02 PROTECTION OF CDF

- A. Protect CDF from equipment, traffic and backfilling operations until the surface has achieved an initial set and has hardened enough to develop a minimum penetration number of 650 when tested in accordance with ASTM C403.

- B. If the trench backfill is not to be placed over the CDF within eight hours after CDF placement, place a 6-inch layer of moist backfill over the CDF.

*****END OF SECTION*****

SECTION 31 80 00 - TRENCH EXCAVATION, BEDDING, AND BACKFILL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of furnishing all necessary labor, materials, tools, equipment, and services in connection with and reasonably incidental to clearing, sawcutting pavement, excavating, installing bedding and backfill material, and disposing of excess excavated materials required for the construction of water mains and storm drains. Work required shall also include the furnishing of all materials and equipment necessary for the construction and installation of all temporary shoring, sheeting and bracing and other facilities which may be necessary to perform the excavations and to place and compact the bedding and backfill, and the subsequent removal of such sheeting, bracing and other facilities.
- B. Excavation and backfill shall be in accordance with the Standard Drawings and these Standard Specifications.

PART 2 MATERIALS

2.01 QUARRY FINES

- A. Bedding material shall be "Quarry Fines," produced by Steven Creek Quarry, Cupertino, CA, free of organic material and clay.

2.02 AGGREGATE BASE (CLASS 2)

- A. Aggregate base shall conform to the requirements of Section 26 – Aggregate Bases of Caltrans Standard Specifications. Grading and Quality Characteristics requirements shall meet 3/4" maximum, Class 2 material.

2.03 CONTROLLED DENSITY FILL

- A. Controlled density fill shall conform to the requirements of Section 31 23 23.33.

2.04 DRAIN ROCK

- A. Drain rock shall be 3/4" crushed rock.

2.05 PAVEMENT

- A. Pavement shall conform to the requirements in Section 32 10 00, Paving, Restoration, and Resurfacing Work of these Standard Specifications.

PART 3 EXECUTION

3.01 CONSTRUCTION ACROSS IMPROVED AREAS

- A. Asphalt concrete pavement or driveways removed or damaged in connection with construction shall be rebuilt to these Standard Specifications and have the same quality as the portion removed. Where pavement or driveways must be removed, they shall be saw-cut prior to excavation.

- B. The Contractor may, when approved by the District, tunnel under driveways. Where existing driveways are removed or damaged by the Contractor, the Contractor shall replace after completion of the installation of the water main or utilities with the same type and quality of material as that which was removed or damaged.

3.02 UNDERGROUND OBSTRUCTIONS

- A. The Contractor shall notify North USA at (811) a minimum of 2 working days before proceeding with the work. Work may not begin until utilities marked.
- B. The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages by the Contractor's failure to exactly locate and preserve any and all underground utilities.
- C. Excavation and other work under or adjacent to existing water mains, conduits, or structures of any kind, shall be executed in such a manner as not to interfere with the safe operation and use of such installations. Should any damage occur to these facilities during the operations of the Contractor, they shall immediately notify the District and the facility owner(s) or authorities, and shall arrange for the immediate repair of the facilities at his own expense. If any conflicts are encountered during construction, the District shall be notified immediately.

3.03 TRENCH EXCAVATION

- A. Trench Width
 - 1. In all cases, trenches must be of sufficient width to permit the proper jointing of the pipe. However, trenches wider than the maximums specified herein will result in a greater earth load on the pipe than it was designed for; consequently, if the maximum trench widths specified are exceeded by the Contractor without the written permission of the District, the Contractor will be required, at their own expense for both labor and material, to provide a higher class of pipe or to embed the pipe in a concrete cradle as directed by the District.
 - 2. Permissible trench widths are as follows: For all pipes up to and including 18" diameter, and in all types of soil, maximum trench width of 24" greater than the outside diameter of the pipe will be permitted. This shall be interpreted to permit a maximum of no more than 12" on each side of the pipe. This clearance shall be measured from the outside of the barrel of the pipe to the sides of the trench and shall include any sheeting used. The minimum width of un-shored trenches shall be 12" plus the outside diameter of the pipe (a minimum of 6" on each side of the pipe). Where shoring is required the Contractor shall allow sufficient width to comply with codes and regulatory safety requirements.
- B. "T" Cut
 - 1. A second saw-cut operation is required prior to final paving to achieve the "T"-cut section as shown on the standard drawings. Saw-cutting a wider trench during initial trench excavation to achieve a "T" cut section will not be allowed.
- C. Shoring
 - 1. The Contractor shall furnish, place and maintain shoring and bracing as may be required to support the sides of excavations for the protection of workers, to facilitate the work; to prevent damage to manholes, structures, and water mains being constructed; to protect adjacent embankments, structures or facilities from damage; and as required by applicable local, State and Federal safety codes.

2. Shoring shall be removed by the Contractor unless field conditions make the removal of sheeting impractical. In such case, the District may permit portions of the sheeting to be cut off to a specified depth and to remain in the trench. Backfill shall be brought to one foot above the top of the pipe before sheeting may be removed.
3. When trenching or excavation over five (5) feet in depth, under the Labor Code Section 6705, Contractor shall provide the following:
 - a. Written and detailed plan covering trench and excavation safety procedures that meets CalOSHA requirements under the Construction Safety Orders Sections 1539-1543.
 - b. Submit a written safety plan reviewed and approved by a registered civil or structure engineer for review and approval prior to the start at work.
 - c. Assign a competent person to supervise trenching and excavation operations when work is being performed.
 - d. The Contractor shall obtain and provide the District a copy of a CalOSHA permit for all trench and excavation operations.
4. The Contractor must provide ladders or a safe access within 25 feet of a work area in trenches 4 feet or deeper.

D. Dewatering

1. During water main excavation and backfill operations, the Contractor shall provide temporary drains, diversion ditches, pumps, cofferdams, or other devices as may be necessary to remove surface water or groundwater from the work area. Unless otherwise specifically permitted by the District, water, either of surface or subsurface origin, will not be permitted in the trenches or in new or existing water mains at any time during construction and until backfilling over the top of the pipe has been completed; nor will the groundwater level in the trench be permitted to rise above an elevation 4" below the invert of the pipe. If trench has been flooded prior to placement of bedding material, the bottom of the native trench shall be compacted to the satisfaction of the District. Special care shall be taken during dewatering to ensure compliance with (Section 01 57 23 - Storm Water Pollution Control Plan).
2. All excavations shall be kept free from water during the time when concrete is being placed and until such time as water will not be detrimental to the finished work. Dewatering trenches, when required, may be accomplished in any manner the Contractor desires, provided the method is acceptable to the District. Any damage resulting from the failure of the chosen method to operate properly shall be the responsibility of the Contractor and shall be repaired in a manner satisfactory to the District, at the Contractor's expense.

E. Structural Clearances

1. Excavation near structures such as catch basins, manholes, and drain inlets shall be sufficient to leave at least 12" between the outer surfaces of the structure and the sides of the excavation.

F. Care of Excavated Material

1. All material excavated from trenches and piled adjacent to the trench, or in a roadway or public thoroughfare, must be piled and maintained in such a manner that the toe of the slope of the excavated material is at least a lateral distance equal to the height of the excavation from the edge of the trench. It shall also be piled so that as little inconvenience as possible is

caused to public travel. Free access shall be provided to all fire hydrants, water valves, and meters, and all other conduits shall be kept clean to allow free flow of storm water.

G. Open Trench

1. Unless otherwise directed by the District or stated otherwise on the project drawings, no trench shall be excavated more than 200 feet, nor left unfilled past construction working hours or non-working hours.
2. All trenches in roads, whether located on the project roads or in an easement, shall either be backfilled or plated during non-working hours.

H. Excavation Below Grade

1. Except where unsatisfactory native subgrade material exists, no excavation below the bottom of the water main bedding will be permitted. If, for any reason other than unsatisfactory subgrade, excess material is excavated beyond the limits specified for bedding, such excavation below grade shall be replaced beneath the pipe zone with thoroughly compacted subgrade material at the expense of the Contractor. Unsatisfactory subgrade material shall be removed and replaced as directed by the District.

I. Tree Roots

1. Trees not identified to be removed with roots two inches or more in diameter at adjacent trees shall not be cut without prior approval of a licensed arborist or the District. Material shall be removed from around root system to avoid damage thereto. Roots shall be protected with burlap wrapping while exposed.

J. Excavation

1. All excavation is unclassified. Work shall consist of performing all excavation operations regardless of the character of subsurface conditions. The Contractor shall make their own evaluation of the type of materials which may be encountered.

K. Excavated Trench Material Disposal

1. Any excess material resulting from trench excavation shall be disposed of offsite by the Contractor own expense in a manner satisfactory to the District. Such excess material may be deposited on private property if so requested by the property owner and their approval, proper permits shall be obtained for the pertinent local agencies by the property owner and the Contractor. It is recommended that disposed of materials be recycled wherever possible.

L. Trench Plates

1. When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring shall be required to preserve unobstructed traffic flow. Smooth surface plates are not allowed. No more than two (2) trench plates in length will be allowed unless directed by the District.
2. Trench plates shall be A-36 grade steel, non-skid, a minimum of 1-inch thick, and rated for H/20 loading or greater.
3. Tack weld plates together when using multiple plates.
4. Trench plate signage shall be per Section 01 52 00, Traffic Control Plan.

5. The Contractor shall maintain trench plates at all time and respond to and correct shifting trench plates regardless of the time of day. If the Contractor fails to correct sinking backfill material or shifting trench plates in a timely manner, the District reserves the right to correct the problem at the expense of the Contractor.
6. In the event pending inclement weather or other conditions as determined by the District may adversely affect the use of trench plates, they shall be removed, the excavation backfilled, and the surface secured with temporary asphalt.

3.04 TRENCH BACKFILL

A. General

1. No backfilling shall commence until the pipe has been inspected and approved by the District, until concrete in masonry structures such as thrust blocks or encasement has attained a proper strength, and until required fittings are installed and inspected.
2. In backfilling the trench, the Contractor shall take all necessary precautions to prevent damage or shifting of the pipe. Backfilling from the sides of the trench will be permitted after sufficient material has first been carefully placed over the pipe to such a depth as is acceptable to the District.
3. Any backfill which becomes displaced or depressed during construction or during the warranty period, shall be refilled, shaped, and restored to proper grade as frequently as is necessary until the surface is unyielding, at the Contractor's expense.
4. Placement and compaction operation shall be done in 8" maximum loose lifts unless otherwise specified on the project drawings or by the District. Lifts shall be compacted by the use of mechanical means approved by the District. Compaction equipment or methods that produce horizontal or vertical earth pressures, which may cause excessive displacement or may damage the water main or structure, shall not be used. Ponding or jetting of backfill materials will not be permitted. The trench excavation and adjacent areas shall be backfilled to the grades existing prior to construction.

B. Pipe Embedment Zone Definitions

1. Quarry Fine Bedding shall be defined as the area between the bottom of the pipe and 4" below the bottom of the pipe. Pipe Bedding shall consist of leveling the bottom of the trench and furnishing, placing, and compacting quarry fines or other specified material as shown on the project drawings and as specified herein.
2. Quarry Fine Backfill shall be defined as the area between the pipe, the sides of the trench, and 6" above the pipe. Pipe Backfill shall consist of furnishing, placing and compacting quarry fines above the pipe or other specified material as shown on the project drawings and as specified herein.
3. Bedding and backfill material shall be compacted to 90% relative compaction and placed in three lifts. Quarry fines shall be placed in no more than 6" lifts or as specified here in. Vibratory plate will not be allowed to compact the pipe backfill.

C. Pipe Embedment Zone Lifts

1. **Lift One** – The first lift shall consist of placing 4" of compacted quarry fines or other specified material as shown on the project drawings to the satisfaction of the District prior to the placement of the pipe. The pipe shall be placed prior to the second lift.

2. **Lift Two** – The second lift shall consist of placing quarry fines or other specified material as shown on the project drawings around the pipe to the top of the pipe to the satisfaction of the District. The top of the pipe shall be visible prior to the start of compaction for the second lift. Compaction of the backfill around the pipe shall be performed by a pneumatic means such as a “Powder Puff.” No other means of compaction tool shall be allowed without prior approval by the District. Contractor shall use extreme care to avoid hitting the pipe and V-Bio polyethylene wrapping while compacting.
3. **Lift Three** – The third lift shall consist of placing and compacting 6” of quarry fines or other specified material as shown on the project drawings.

D. Pipe Upper Level Zone

1. Paved Surfaces

- a. Shall be defined as filling the trench with controlled density fill within 6” minimum of the surface. Temporary pavement of 2” minimum thickness shall be placed and maintained to the satisfaction of the District. Compact temporary pavement per Section 32 10 00, Paving, Restoration, and Resurfacing. The existing paved surface shall then be replaced with a minimum 6” thickness of asphalt concrete within 30 days of placing temporary pavement.

2. Unpaved Areas

- a. Shall be defined as compacting in max 12” lifts native material removed from the trench in uniform layers to a relative density of 90%. Material removed from the trench shall be deposited at a suitable site acquired by the Contractor or on abutting property if requested by the property owner, in writing.

3. Wet Trench (Drain Rock at Bottom)

- a. Shall be defined as placing 3/4” drain rock, as defined in Section 31 80 00, wrapped in filter fabric at 12” thickness layer at the bottom of the trench within 4” minimum of water main.

E. Subgrade

1. If the bottom of the trench contains stones or other hard objects which would interfere with the proper placement of bedding material or is unsatisfactory for supporting the pipe, it shall be removed to a depth to be determined by the District and backfilled with bedding material as directed by the District.
2. If water is encountered in the trench or the District inspector determines the subgrade below the pipe embedment zone is unstable the Contractor shall excavate and additional 12” and install crashed drain rock. Drain Rock at Bottom shall be defined as placing 3/4” drain rock, as defined in Section 31 80 00, wrapped in filter fabric at 12” thickness layer at the bottom of the trench within 4” minimum of water main.

F. Compaction Tests

1. The Contractor is responsible achieving the compaction requirements of these specifications. At its discretion the District may perform compaction tests on its own to determine the adequacy of the trench bedding and. Retesting for compaction required by a failing test shall be paid for by the Contractor.

A. Concrete Compressive Strength Tests

1. Concrete will be tested and inspected as work progresses. One compressive strength test shall be made for each pour and as described in the Standard Specifications. One complete test shall consist of making three (3) cylinders in accordance with ASTM C31, storing the cylinders for 24 hours at the pour site, delivering the cylinders to the testing laboratory, testing one cylinder at 7 days and the other two cylinders at 28 days in accordance with ASTM C39. Four copies of certified test results shall be forwarded to the District upon completion of the testing.

*****END OF SECTION*****

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SECTION 32 10 00 - PAVING, RESTORATION, AND RESURFACING WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work required under this section consists of furnishing all labor, materials, tools, and equipment incidental to placing new asphalt concrete and/or driveway, road restoration. Paving shall include asphalt concrete surfacing and untreated aggregate base course. Paved and gravel roads includes excavation, filling, spreading, and compaction of the filled areas to conform to the lines, grades, and slopes as shown on the drawings. The work also includes furnishing, installing and maintaining temporary paving and trench plates during construction.

1.02 SUBMITTALS

- A. The Contractor shall submit manufacturer data including catalog cuts, drawings and samples, as appropriate, and letter(s) of compliance as required by Section 01 33 00 - Submittals.

PART 2 MATERIALS

2.01 AGGREGATE BASE/SURFACING

- A. Aggregate shall conform to the requirements of Section 26 - Aggregate Bases, of the latest requirements of Caltrans Standard Specifications. Grading requirements shall be for 3/4" Class 2 aggregate base.

2.02 ASPHALT CONCRETE

- A. HMA shall be conform to local agencies Standard Specifications and Section 39 - Asphalt Concrete, of the latest requirements of Caltrans Standard Specifications.

2.03 CONCRETE

- A. Concrete for pavement replacement shall conform to the requirements of Section 90 of the Caltrans Standard Specifications and the requirements of the City of San Carlos, as applicable. The concrete shall meet at a minimum the State Standard Specification Class B.

2.04 ASPHALT BINDER

- A. Asphalt binding shall be Grade PG 64-10 per Section 92 - Asphalt Binders, of Caltrans Standard Specifications.

2.05 TACK COAT

- A. Material for covering all (vertical and horizontal) surfaces of old pavement shall be asphalt emulsion Types SS-1 or RS-1, Section 94, Asphalt Emulsions, of the latest requirements of Caltrans Standard Specifications.

2.06 TEMPORARY PAVING

- A. Temporary pavement shall consist of 2" of cold mix asphalt over Class 2 aggregate base. The aggregate base shall be equal in depth to the new pavement structural section or more. The aggregate base shall be brought within two (2") inches of the top of the existing pavement and

covered with temporary “cold mix” asphalt paving using an SC-250, SC-800 or approved equal. All temporary surfacing shall be installed the same day as backfilling and shall be level with existing paving.

2.07 SLURRY SEAL

- A. Slurry seal shall be Type II conforming to Section 37 - Bituminous Seals, of the latest requirements of Caltrans Standard Specifications.

2.08 STRIPING AND PAVEMENT MARKINGS

- A. Striping and pavement markings shall be thermoplastic per Section 84 – Markings, of Caltrans Standard Specifications.
- B. Striping shall be placed in a continuous operation. The Contractor shall ensure there is enough material to prevent any stopping during placement. No overlapping of striping material or markings is permitted.

PART 3 EXECUTION

3.01 GENERAL

- A. Reconstruct surfaces to pre-construction condition or better unless otherwise indicated, including curbs, gutters, sidewalks, driveways, road shoulders, medians, pavement, ditches, drainage ways, and related items that have been temporarily removed, damaged, or displaced as part of the work.
- B. Reconstruct pavements in conformance with the Caltrans Standard Specifications and City of San Carlos Standard Specifications, as applicable, and as modified herein.
- C. Perform trench pavement restoration following the approved hydrostatic test results of the section being tested unless otherwise indicated.

3.02 SAWCUTTING

- A. Sawcut existing pavement surfaces prior to surface restoration.
- B. Sawcut in straight lines parallel or perpendicular to existing roadway centerlines a minimum of 12 inches outside the edge of trench unless otherwise indicated.
- C. Where sections of existing pavement remain that are less than 2 feet wide between the proposed sawcut and an existing edge of asphalt concrete, curb, or gutter, remove the existing remaining pavement and replace it as part of the pavement restoration.
 - 1. Where pavement is damaged outside of sawcut lines, re-cut lines and remove damaged pavement.
- D. Where voids develop under existing pavement to remain, re-cut lines, remove pavement and fill voids.

3.03 AGGREGATE BASE COURSE

- A. The aggregate base course shall be spread and compacted on the prepared subgrade as indicated on the Project Drawings. The base course material shall be placed in 6-inch max compacted layers

and shall be compacted to a minimum relative density of 95%, or for water main work be spread and compacted as described under Section 31 80 00 - Trench Excavation, Bedding, and Backfill.

3.04 AGGREGATE SURFACING COURSE

- A. Gravel road surfacing shall be an aggregate course applied to the base course after compaction in the same manner as specified for the aggregate base course. The surface course shall be placed in one layer. Special care shall be taken to maintain crown or slope for drainage.

3.05 TACK COAT

- A. Apply tack coat to all horizontal and vertical surfaces of existing pavement and to vertical surfaces of curbs, gutters, conforms, and construction joints before placing asphalt concrete on or against them, at the rate of 0.10 gallons per square yard.

3.06 TEMPORARY PAVING

- A. Temporary paving shall be installed over all trenches to a thickness of 2-inches. Temporary paving shall be installed on the same day as acceptable trench compaction is obtained and base material installed and shall be smoothed out using a vibratory plate or other means approved by the District. No tire/wheel rolling compaction will be allowed. Temporary paving shall be maintained on a daily basis until permanent paving is installed. The final paving operation shall occur within 30 days of placing temporary paving.

3.07 ASPHALT CONCRETE

- A. Asphalt concrete shall be placed in accordance with local agencies Standard Specifications and Section 39 - Asphalt Concrete, of the latest requirements of Caltrans Standard Specifications for method compaction.
 - 1. Minimum Temperature: The minimum temperature of asphalt concrete delivered to the site shall be at least 250° F, and no more than 370° F.
 - 2. Lift Thickness: Where the total thickness of asphalt concrete to be placed is greater than 3", place in lifts of equal thickness, none of which shall exceed 3".

3.08 CONCRETE PAVEMENT

- A. Concrete pavement shall be placed in accordance with Section 40 of the Caltrans Standard Specifications.
- B. Replace trench pavement to match the removed pavement thickness unless otherwise indicated.
- C. Replace trench pavement, as required by the City of San Carlos Standard Specifications, as applicable.
- D. Protect concrete in conformance with Section 90.8 of the Caltrans Standard Specifications.

3.09 CONCRETE SURFACES

- A. Reconstruct concrete surfaces including curbs, gutter, sidewalks, wheelchair ramps, medians, valley gutters and any other concrete surface or structure temporarily removed, damaged, or displaced as part of the work in accordance with Section 73 of the Caltrans Standard Specifications.

- B. Reconstruct concrete surfaces, as required by the City of San Carlos Standard Specifications, as applicable.

3.10 RESTORATION OF PRIVATE ROADS, PARKING AREAS, AND OTHER PRIVATE IMPROVED AREAS

- A. Reconstruct finished surfaces of private roads, parking areas, and other improved areas with the same materials and to not less than the pre-construction dimensions, unless otherwise indicated.
- B. Reconstruct improvements damaged as part of the work to pre-construction condition or better.
- C. Asphalt Pavement: Match existing pavement thickness, or at least 3 inches of asphalt concrete, whichever is greater.
- D. Gravel, stone, or aggregate surfaces: Match existing thickness, or at least 6 inches, whichever is greater.

3.11 SLURRY SEAL

- A. Slurry seal shall be placed in accordance with Section 37 - Bituminous Seals, of the latest Caltrans Standard Specifications. Slurry seal shall be fully cured prior of placing traffic striping/markings. All restored trenches must be slurry sealed with a minimum 10 foot width, or full lane width, whichever is more restrictive.

3.12 TRAFFIC STRIPING

- A. Traffic striping shall be placed, per the City of San Carlos and/or County of San Mateo requirements, minimum two weeks after placing slurry seal, and shall comply with Section 84 – Markings, of the latest requirements of Caltrans Standard Specifications. All damaged striping and reflectors shall be replaced in kind to duplicate, insofar as possible, pre-construction striping. Cat track shall be approved by the City/County prior to placing any striping and/or marking.

3.13 DAMAGE REPAIR

- A. The Contractor shall be responsible for any damage to existing infrastructures such as curbs, gutters, sidewalks, driveways and any asphalt concrete, liquid asphalt or asphaltic emulsion stains occurring during the course of this Contract. Stains shall be cleaned by sandblasting or any other method satisfactory to the District.

*****END OF SECTION*****

SECTION 32 91 00 - LANDSCAPING REPAIRS

1.01 GENERAL

1.01 SECTION INCLUDES

- A. Furnish labor, equipment, and materials necessary to perform the following work as indicated on the drawings and specified herein:
 - 1. Finish Grading
 - 2. Lawn and Grass Restoration
 - 3. Hardscape: Decorative rock, brick, decorative concrete
 - 4. Soil Preparation
 - 5. Clean Up
 - 6. Maintenance
 - 7. Guarantee

1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
 - 1. Section 01 33 00 – Submittals
 - 2. Section 01 32 33 – Construction Photography
 - 3. Section 02 20 00 – Site Preparation

1.03 REFERENCE STANDARDS

- A. ASPA (American Sod Producers Association) -Guideline Specification for Sodding

1.04 EXISTING CONDITIONS

- A. Before submitting bid, visit the site and become familiar with all conditions relative to landscaping, elevations, soils, area of work, clearances, etc.; no extra payment will be allowed for work occasioned by improper appraisal of existing conditions. Document existing conditions with photographs and video per Section 01 32 33.
- B. Existing landscaping shall be preserved wherever possible.

1.05 LIKE LANDSCAPING

- A. Trees removed as specified in Section 02 20 00 will not be replaced unless directed by the District.
- B. Replace damaged landscaping with plants similar in variety, size, and shape to the existing landscaping. In the event that like landscaping is not commercially available, the Contractor shall coordinate with the property owner for a replacement. In no case will the Contractor be required to replace landscaping to a higher value than the existing without additional considerations from the District.

1.06 HARDSCAPING

- A. Sawcut concrete, asphalt, and other hardscaping as appropriate and replaced in kind. Alternative methods of repair shall be approved by the property owner and the District.
- B. If existing concrete sidewalks or curbs are disturbed replace an entire section from joint to joint at a minimum.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver Sod to the site on palettes within 24 hours of stripping.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 MATERIALS

2.01 SOIL CONDITIONER

- A. Shall be treated bark, 1/4-inch size, Vita-Bark Nursery Mix, or equal.

2.02 GROWING MEDIA

- A. Topsoil: Natural, fertile, agricultural soil capable of sustaining vigorous plant growth, not in frozen or muddy condition, containing not less than six (6) percent organic matter, and corrected to pH value of 5.9 to 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, coughgrass, noxious weeds, and foreign matter. Not exceeding twelve (12) inches in depth.
- B. Fertilizer: Use commercial fertilizer formulation required by soil analysis. Deliver fertilizer mixed as specified in standard size bags showing weight, analysis, name of manufacturer. Store in a weatherproof storage location in such a manner that it will be kept dry and its effectiveness will not be impaired.
- C. Hydro mulch and seeding:
 - 1. Provide hydro-mulch and seeding for any lawn or landscape area disturbed.

PART 3 EXECUTION

3.01 PRE-CONSTRUCTION DOCUMENTATION

- A. Prior to construction, document the conditions of all surface features of the affected areas per Section 01 32 33.

3.02 FINISH GRADING

- A. Drainage: Make entire area within contract lines smooth and even and insure adequate drainage of all areas. There shall be no depressed areas where water is trapped creating wet areas. Should ponding be discovered by the District before or after completion of the landscape, the Contractor shall correct the problem at no expense to the District.
- B. Finish Grades: Insure that finish grades shall be 1/2-inch below surface of paved areas.
- C. Scars: Eliminate any erosion or construction scars.

3.03 SOIL PREPARATION

- A. All areas to be seeded or shrub planting beds shall be cleared and weeded. Fertilizer shall be applied in accordance with the recommendations of the nursery supplying the plants.

3.04 PLANTING

- A. Trees: Plant and stake trees in accordance with supplying nursery recommendations.
- B. Shrubs: Plant and support shrubs in accordance with supplying nursery recommendations.

3.05 WEED CONTROL

- A. Apply pre-emergent weed control to all shrub planting beds after completion of all planting. Follow manufacturer's direction. Do not allow any weed control in the seeded areas. After applying the pre-emergent weed control, do not over-water any areas to prevent the washing away of pre-emergent weed control.

3.06 MAINTENANCE

- A. Until the District Acceptance:
 - 1. The 2-month maintenance period will commence upon completion of the repairs and/or tree and shrub planting as verified by the District as a result of an on-site visit. The Contractor shall request this on-site visit, in writing, five days in advance.
 - 2. Completion of the maintenance period shall be verified by another on-site visit. If landscaping or maintenance is unacceptable, the maintenance period shall continue until final acceptance of the job by the District.
- B. Replacements:
 - 1. Dead plant materials and plants not in a vigorous growing condition at the end of the maintenance period shall be replaced as weather conditions permit.
 - 2. Plants used for replacement shall be of the same variety and size (where possible) as those originally planted and shall be planted as specified.
- C. Maintenance:
 - 1. Maintenance shall include all watering, reseeding, spraying, pruning, and weeding necessary to keep the planting areas neat and attractive throughout the maintenance period.
- D. The Contractor is not expected to engage in long term maintenance of the new sod. However, he shall maintain the sod as long as he is working on the private property. As soon as work is completed on each individual lot, maintenance of the sod shall shift from the Contractor to the private property owner. While the Contractor is maintaining the sod, the following conditions shall be met.
 - 1. Water as needed to promote growth and health of the sod. Water grass sufficient to moisten soil 3-5 inches deep.
 - 2. Cut grasses the first time when it reaches 2-1/2 inches and maintain to a minimum height of 2 inches. Do not cut more than 1/3 of the blade at any one mowing. Remove and dispose of clippings.

3. Replant damaged sod areas. Roll when necessary to remove minor depressions or irregularities.
 4. Control growth of weeds. When using herbicides, apply in accordance with manufacturer's recommendations. Remedy damage resulting from negligent or improper use of herbicides. Only use herbicides with the permission of the property owner. If the property owner does not allow the use of herbicides, Contractor will not be liable for weed control.
- E. Sprinkler Systems
1. Operate existing sprinkler system prior to pipeline construction.
 2. Submit a report of findings to the inspector.
 3. Measure static and residual pressure prior to the installation of the interconnection lines.
- F. Maintenance Period
1. Maintain sod until final acceptance by the District.

3.07 POST CONSTRUCTION DOCUMENTATION

- A. Produce Post-Construction photographs and video per Section 01 32 33.

*****END OF SECTION*****

SECTION 33 14 13 – WATER MAIN

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of furnishing and installing all water main piping, fittings and appurtenances shown on the project drawings and as specified herein.
 - 1. Unless otherwise specified, all water mains located west of the Caltrain R/W in the hills, including hydrant runs and tie-ins, shall be constructed entirely of Class 350 Ductile Iron pipe with restrained joint; wrapped in low density V-Bio polyethylene film and marked with No. 8 standard tracer wire.
 - 2. Unless otherwise specified, all water mains located east of the Caltrain R/W or anywhere else with known corrosive soils as directed by the District, including hydrant runs and tie-ins, shall be constructed entirely of Polyvinyl Chloride (PVC) pipe; marked with No. 8 standard tracer wire.

1.02 SUBMITTALS

- A. The Contractor shall submit manufacturers' data including catalog cuts, drawings and samples, as appropriate, and letter(s) of compliance as required by Section 01 33 00 - Submittals.

PART 2 MATERIALS

2.01 DUCTILE IRON (DI) PIPE

- A. General
 - 1. Ductile iron pipe shall conform to ANSI A21.50 and A21.51 (AWWA C150 and C151) and shall be Pressure Class 350.
- B. Joints
 - 1. Buried pipe and pipe fittings shall all have restrained push-on joints ("Field Lok,"), unless specified otherwise. At fittings and tie-ins, pipe shall have restrained push-on joints or mechanical joints (mega-lugs). Mechanical joints may be used for closures, subject to meeting thrust restraint requirements. Flanged ends, or plain ends with restrained couplings, shall be used for piping above ground.
 - 2. For mechanical joints, dimensional and material requirements for pipe ends, glands, bolts, nuts and gaskets shall conform to ANSI A21.11 (AWWA C111).
 - 3. For flanged joints, ends of pipe and fittings shall be provided with ductile iron flanges conforming to ANSI A21.10 and A21.15 (AWWA C110 and C115), as applicable. Bolts, nuts, and gaskets for flanged connections shall conform to ANSI B16.1 and as specified in Article 2.06 - Hardware. All flanged connections shall use "Ring Flange-Tyte" gaskets as manufactured by U.S. Pipe capable of withstanding pressures up to 350 psi.
- C. Fittings
 - 1. Fittings shall be ductile iron conforming to ANSI A21.53 (AWWA C153) with push-on joint bell design to fit the particular make of the pipe furnished or to fit a pipe-to-fitting adapter unless

specified on the plans. Fittings shall have a pressure rating at least equivalent to that of the pipe used.

D. Coating and Lining

1. Buried ductile iron pipe, sleeves and fittings shall be asphalt seal-coated and cement-mortar lined. The lining shall conform to the Standard Specifications of AWWA C104. All above ground fittings and couplings shall be fusion epoxy lined and coated.

E. V-Bio Polyethylene Encasement

1. All buried ductile iron pipe and fittings shall be wrapped in low density 8-mil V-Bio polyethylene in accordance with AWWA C105, Method A. The tape used to secure the encasement shall be black polyethylene pipe wrap tape, minimum 10 mil thick. No other tape is allowed.

F. Pipe End Caps During Transport / Storage

1. The interior of all pipe, fittings, and other accessories shall be kept clean and free from organic matter at all times. All pipes shall be delivered to the construction site with end caps on both ends. End cap components must adhere sufficiently to withstand the stresses caused by wind during shipment. Pipes delivered on-site with damage shall be immediately field cleaned to remove all undesirable material along the entire length of the pipe interior. New end caps shall be installed after cleaning.
2. Cut pipe lengths of 5.0 feet or less, fittings, and valves do not require end caps but shall be field cleaned prior to installation.

2.02 PVC PIPE

A. General

1. PVC water mains shall conform to the applicable requirements of latest AWWA C900. Pipes shall be DR 14 pressure class 305 with a DI pipe equivalent outside diameter. Maximum length of each section of pipe between elastomeric rings shall be twenty (20) feet.

B. Joints

1. Buried pipe and pipe fittings shall all have internally restrained push-on joints, unless shown otherwise on the drawings or specified otherwise. At fittings and tie-ins, pipe shall have restrained push-on joints or mechanical joints (mega-lugs). Plain ends with restrained couplings, shall be used for piping above ground.
2. For mechanical joints, dimensional and material requirements for pipe ends, glands, bolts, nuts and gaskets shall conform to latest ANSI A21.11 (AWWA C111).
3. For flange joints with adapters, ends of pipe and fittings shall be provided with flange couplings. Bolts, nuts, and gaskets for flanged connections shall conform to ANSI B16.1 and as specified in Article 2.06 - Hardware. All flanged connections shall use "Ring Flange-Tyte" gaskets as manufactured by U.S. Pipe capable of withstanding pressures up to 350 psi.

C. Fittings

1. Fittings for use on C900 PVC shall be DI conforming to the applicable requirements of latest ANSI A21.53 (AWWA C153). Joints shall be restrained (mega-lug). All bolt-up sets (nuts, bolts and washers) and tie rods for buried valves and fittings shall be stainless steel, ASTM A-276

type 316L. Isolated fitting and associate adjacent restraints shall be cathodically protected per Section 13 47 13 – Galvanic Anode Cathodic Protection System.

D. Coating and Lining

1. Buried and/or above ground DI fittings and sleeves shall have all internal and external ferrous surfaces coated with a fusion bonded epoxy coating of 10 mils nominal thickness. The coating shall conform to latest AWWA C116.

E. Pipe End Caps During Transport / Storage

1. The interior of all pipe, fittings, and other accessories shall be kept clean and free from organic matter at all times. All pipes shall be delivered to the construction site with end-covers on both ends. End-cover components must adhere sufficiently to withstand the stresses caused by wind during shipment. Pipes delivered on-site with damage shall be immediately field cleaned to remove all undesirable material along the entire length of the interior of the pipe. New end covers shall be installed after cleaning.
2. All pipe to be used for water main installation located in the storage area, staging area, or left overnight prior to installation shall have the ends of the pipes covered with plastic (visqueen) and secured with tape to keep the pipe free of debris and dirt.
3. Cut pipe lengths of 5.0 feet or less, fittings, and valves do not require end-covers but shall be field cleaned prior to installation.

2.03 THRUST RESTRAINTS

A. Push-On Joint Locking Gasket

1. The locking gasket type restrained joint shall consist of stainless steel locking segments molded into the gasket that shall grip the spigot end of the pipe to prevent joint separation. This restrained joint system shall be "Field Lok", manufactured by U.S. Pipe for DI pipe and "RieberLok" manufactured by McWane for PVC pipe or equivalent.

B. Mechanical Joint Restraint

1. Mechanical joint fittings shall be EBAA Iron "Megalug". Bolts, nuts, and washers shall be low alloy (Corten).
2. Wedge gaskets shall be used with all mechanical joints. Standard mechanical joint gaskets are not allowed.

2.04 THRUST BLOCKS

- A. Concrete thrust blocks are optional except where required on the drawings. Thrust blocks shall be constructed per the Standard Drawings.

2.05 PIPE CONNECTORS

A. Flexible Couplings

1. Flexible couplings shall be Macro HP Extended Range manufacturer by Romac Industries Inc. Flex coupling must conform to latest AWWA C-219, with Type 316 bolts, nuts, and washers.
2. Ductile Iron MJ sleeves in compliance with AWWA C-111.

B. Flanged Coupling Adapters

1. Flanged coupling adapters shall be EBAA 2100 adapter. Flanges, spools and sleeves shall be high strength ductile iron with Type 316 stainless steel bolts, nuts, and washers.
2. Ductile Iron MJ x Flange adaptors in compliance with AWWA C-111.
3. Flange gaskets shall conform to Paragraph 2.01. B – Ductile Iron Pipe, Joints and Paragraph 2.02.B – PVC Pipe, Joints.

C. Tapping Sleeves

1. Tapping sleeves shall be JMC 6432 all Type 316 stainless steel body, mechanical joint. Bolts, nuts, washers and associated hardware not part of a mechanical joint assembly shall be plated. No tapping sleeves shall be used for asbestos cement pipe.

2.06 HARDWARE

- A. All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 stainless steel for all buried and exposed applications. All bolts shall be furnished with finished hexagonal nuts. The dimensions of all heads and nuts shall be not less than those required for the American Standard regular, and the height shall be sufficient to break the bolt in the body portion when tested. Threads shall be American Standard screw thread, coarse thread series.
- B. Type 316 Steel bolts and nuts hardware shall be used one time per application. Reusing Type 316 Steel hardware is not permitted.
- C. Mechanical joint hardware EBAA shall be high strength, low alloy (Corten).

2.07 TUBING AND FITTINGS

- A. Copper tubing and fittings used for service connections and reconnections shall be Type K, soft, and conform to ASTM 88.

2.08 MARKER TAPE FOR BURIED PIPING

- A. Marker tape shall be metallic foil bonded to plastic film not less than 2-inches wide. The adhesive shall be colored and be compatible with the foil and film. Film shall be inert polyethylene plastic with thickness not less than ten (10) mil.
- B. The buried utility line tape shall be identified with an appropriate imprint such as "Caution: Water Main Below" and the identification repeated at approximately 24-inch intervals. Letters shall be 3/4-inch high minimum. The tape shall have a blue imprint.
- C. Marking and warning tape shall be as manufactured by Calpico, Inc., Lineguard, Inc., Allen Systems, Inc., Paul Potter Associates, all of Wheaton, Illinois, or Reef Industries, Houston, Texas, or equivalent.

2.09 TRACER WIRE

- A. Tracer wire shall be No. 8 AWG, standard copper THWM, 600 volt with solid blue insulation.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION, BEDDING AND BACKFILL

- A. Trench excavation, bedding and backfill work shall be performed in accordance with Section 31 80 00 - Trench Excavation, Bedding and Backfill, per the Standard Drawings, unless otherwise indicated.

3.02 EXISTING UTILITIES AND STRUCTURES

- A. The locations of underground utilities and drainage facilities, where shown on the project drawings, are approximate only. It is the Contractor's responsibility to determine the exact locations of all existing utilities. Where existing culverts, underground facilities, under-ground structures, power, telephone or guy poles or guy wires interfere with construction, the Contractor shall be responsible for coordinating with the appropriate utility companies before removing or relocating any interfering utilities providing that the interfering utilities are shown on the drawings or are visible above grade.

3.03 HANDLING AND DISTRIBUTION OF MATERIALS

- A. Pipe and appurtenances shall be stored in a manner to avoid damage to the materials and to linings and coatings.
- B. The pipe shall be inspected before laying for cracked, broken, or defective pieces. Pipe sections shall be carefully lowered into the trench to prevent damage using padded blocking or cables. All dirt or other foreign matter shall be removed from inside the pipe before lowering into the trench and shall be kept clean during installation. The Contractor shall replace all damaged pipe.

3.04 INSTALLATION OF BURIED PRESSURE PIPING

- A. General
 - 1. Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's instructions and in accordance with the latest AWWA C600 for DI pipe and AWWA C605 for PVC pipe.
 - 2. The Contractor shall furnish such parts and pieces as may be necessary to complete the fixtures and apparatus in accordance with best practices of the trade and to the satisfaction of the District.
- B. Handling
 - 1. The pipe shall be protected to prevent entrance of foreign materials during installation.
 - 2. All pipe and fittings shall be carefully examined for defects, and no piece shall be installed which is known to be defective. Special care shall be taken to avoid leaving bits of wood, dirt, or foreign particles in the pipe.
 - 3. All pipe and fittings shall be carefully handled at all times and at no time while loading, unloading, moving, or installing any lined pipe and fittings shall be dropped. All pipe and fittings shall be handled by mechanical means. Wye belt sling shall be used for all coated pipe.

C. Alignment

1. Piping shall be installed as indicated on the project drawings. Where not detailed, exposed pipe shall be installed in straight horizontal and vertical runs parallel to the axis of the structures.
2. Parallel runs of pipe shall be grouped and kept uniformly parallel. Bends and fittings shall be properly located to maintain uniform spacing and elevation of pipe groups at changes of direction and at branch connections.
3. All pipe shall be carefully placed and supported, and proper lined and grade. Minor adjustments may be necessary to avoid architectural and structural features. Major relocations shall be approved by the District.
4. Project drawings are diagrammatic for piping that is not shown in detail. Size of piping and their location are indicated, but it is not limited to show every offset and fitting nor every structural difficulty that may be encountered during the installation for the work. The pipe alignment shall be varied from indicated on the project's drawings without extra expense to the District where necessary to complete the fixtures and apparatus in accordance with the best practice of the trade and to the satisfaction of the District.
5. The allowable angle of deflection at any joint shall not exceed the amount recommended by the pipe, or coupling, manufacturer for the particular pipe size used.
6. A minimum 3 foot homogeneous length of pipe shall be installed before and after any fitting, valve or other appurtenance. Any sections less than 3 feet will not be permitted.
7. Trench Dams shall be placed on new water main alignments where slopes exceed 10% or as directed by the District and shall be placed every 100' in accordance with the Standard Drawings.

D. Valves

1. Valves shall be set with the stems upward and in vertical position, unless indicated otherwise on the drawings. The Contractor shall not operate existing District valves at any time.

E. Joints

1. Pipe shall be assembled and joined in accordance with the manufacturer's published instructions for the type of pipe and joint used. All portions of the joints shall be thoroughly cleaned before the sections of pipe are assembled. The ends of each pipe shall abut against the next pipe section in such a manner that there will be no unevenness of any kind along the bottom half of the interior of the pipe.
2. Where mechanical joints are used with ductile iron pipe, the pipe shall be marked in such a manner that it can be determined after installation that the pipe is properly seated.

F. Pipe Plugs

1. When pipe laying is not in progress, the open ends of the installed pipe shall be closed with a water tight plug. The plug shall be fitted with means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation if the trench fills with water.

G. Thrust Resistance

1. Restrained joints shall be provided on all joints, at all bends, vertical bends, tee branches, and dead ends for ductile iron pipe.
2. Concrete thrust blocks shall be cast between undisturbed ground and the fitting to be anchored as shown on Standard Drawings. Blocks shall be poured so that the pipe and the fitting will be accessible for repairs.
3. Restraints must be used throughout the full length of any DI and/or PVC pipe installed in a casing to the nearest fitting on each side of the casing (i.e., the casing installation does not provide effective thrust resistance).
4. Where restraints are used, the manufacturer's written instruction for installation shall be followed.

H. Encasement for Ductile Iron Pipe and Fittings

1. Installation of 8-mil V-Bio polyethylene encasement for ductile iron pipe and fittings shall be in accordance with ANSI/AWWA C105/A21.5-05 Method A.
2. Ductile iron pipe and fittings shall be encased with the encasement prior to placement in the trench. Encasement shall be cut approximately 2 ft. longer than the length of the pipe. It shall be slipped around the pipe, centering it to provide a 1 ft. overlap on each adjacent pipe section and bunching it in an accordion-fashion lengthwise until it clears the pipe end.
3. After assembling the pipe joint, the overlap of the encasement from the proceeding shall be pulled over to the new length of pipe and secured in place. Then, the overlap end of the encasement from the new pipe section shall be slip over to the preceding pipe and secured in place. Installation of the next section of pipe shall be in the same manner.
4. The excess encasement along the length of the pipe shall be folded back and secured at quarter points. The slack of the pipe shall be snug but not tight.
5. Cuts, tears, punctures, or other damage to the encasement shall be repaired with adhesive tape or with a short length of encasement sheet wrapped around the damaged area.
6. Bends, reducers, offsets, and other pipe shaped appurtenances shall be covered with encasement in the same manner as the pipe.

I. Installation of Marker Tape

1. Install tape in backfill directly over each water main, as shown on the Standard Drawings.

J. Installation of Tracer Wire

1. Standard tracer wire No. 8 shall be taped to PVC and DI pipe every six feet (6') along top center axis.

K. Corrosion Protection

1. Corrosion protection for buried metallic fitting and appurtenances located east of the Caltrain right of way or anywhere else with known corrosive soils as directed by the District shall be used per Section 13 47 13 - Galvanic Anode Cathodic Protection System.

L. Disinfection

1. Disinfection of the water main shall be supervised by the District. The Contractor shall not disinfect the water main until they have coordinated with the District.
2. Disinfection of water main shall be in accordance with latest ANSI/AWWA C651.
3. Prior to construction, Contractor shall submit disinfection plans and material information for the District review and approval, per Section 01 33 00 – Submittals.
4. Filling and contact time shall be per AWWA C651. When installation is completed, the water main shall be filled with water at a rate to ensure the water within the water main will flow at a velocity no greater than 1 ft/sec (0.3 m/sec). Precautions shall be taken to ensure air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less than 41 F (5 C), the water shall remain in the water main for at least 48 hours.

M. Bacteriological Test

1. Standard conditions:
 - a. After the final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new water main. At least one set of samples shall be collected from every 1,200 ft of the new water main, plus one set from the end of the line and at least one set from each branch. Samples shall be tested for bacteriological (chemical and physical) quality in accordance with the most recent *Standard Methods for the Examination of Water and Wastewater* (AWWA, 6666 W. Quincy Avenue, Denver, CO 80232, (303) 794-7711, APHA, 800 I Street, NW, Washington, DC 20001, (202) 777-2742, or WEF, 601 Wythe Street, Alexandria, VA 22314-1994, (800) 666-0203). Water shall show absence of coliform organisms, and the chlorine residual shall be within 0.4 mg/l of the chlorine residual of the water being used to fill the new water main and HPC count shall be less than 500 colony-forming units (cfu) per ml. If the first sample test fails the District will require additional tests to find the turbidity, pH, and a standard heterotrophic plate count (HPC) level.
2. Special conditions:
 - a. If excessive quantities of dirt, debris, or trench water have entered the new water main, bacteriological samples shall be taken at intervals of approximately 200 ft or as directed by the District. Additional samples shall be taken of water that stood in the new water main for at least 16 hours after final flushing has been completed.
3. Sampling Procedure:
 - a. Samples for bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulfate, as required by *Standard Methods of the Examination of Water and Wastewater*. No hose or fire hydrant shall be used in the collection of samples without prior approval from the District. If no other sampling ports are available, a well-flushed fire hydrant with a hose bib may be used with the understanding they do not represent optimum sampling conditions. A corporation-stop with a copper standpipe assembly or a temporary combination blow-off assembly may be used for sampling the new water main. The sampling pipe must be dedicated and clean, disinfected and flushed prior to sampling.

There should be no water in the trench up to the connection for sampling. All samples shall be delivered to the lab within 8 hours after collection.

4. Sample Results.

- a. If sample results from the lab indicate a measured coliform organism and/or HPC greater than 500 colony-forming units (cfu) per mL, flushing should be resumed and another coliform and HPC set of samples should be taken until no coliform are present and the HPC is less than 500 cfu/mL.

5. Record of Compliance.

- a. The record of compliance shall be the bacteriological test results certifying the water sampled from the new water main is free of coliform bacteria contamination.

6. Re-disinfection

- a. If the initial disinfection fails to produce satisfactory bacteriological results, the new water main shall be re-flushed, re-chlorinated, and re-sampled at the expense of the Contractor. If check samples also fail to produce acceptable results, the water main shall be re-chlorinated until satisfactory results are obtained – that being two consecutive sets of acceptable samples taken 24 hours apart.

N. Tie-ins

1. Final connection to existing water main shall be in accordance with latest ANSI/AWWA C651.
2. Water main and all appurtenances must be completely installed, flushed, disinfected, and satisfactory bacteriological sample results received prior to permanent connections being made to the active distribution system. The new pipe, fitting, and valve(s) required for the connection shall be swabbed with a minimum 1-5% solution of chlorine just prior to installation.
3. District shall be notified at least 2 working days in advance of any scheduled tie-ins.
4. No tie-ins, or shutdowns, will be allowed on Fridays or the day preceding a holiday.
5. No shutdown shall exceed 6 hours in duration.
6. The Contractor shall designate a person to contact should trench maintenance or other problems arise during non-working hours or days. The District shall be given that person's name and phone number.

3.05 INSTALLATION OF ABOVE GROUND EXPOSED PRESSURE PIPING

A. General

1. Pipe, fittings, and appurtenances shall be installed in accordance with the manufacturer's specifications and related Article 3.04 of these Standard Specifications or as directed by the District.

B. Exposed Pipe

1. Extreme care shall be taken to ensure watertight joints. All pipe shall be free of all dirt and grease to secure a tight bond with concrete or waterproof material.
2. Metallic pipe shall be coated with fusion epoxy bound.

3.06 ACCEPTANCE TESTS FOR PRESSURE PIPING

- A. All newly installed sections of pressure piping including but not limited to service connections shall be pressure and leak tested as described herein. Testing procedures shall be in accordance with the requirements of latest AWWA C600 for ductile iron pipe and latest AWWA C605 for PVC pipe as modified herein. The tests may be run simultaneously at the Contractor's option.
- B. For buried pressure water mains, tests shall be made on sections not to exceed 2500 feet in length. All necessary equipment, material and labor required shall be furnished by the Contractor. The District will monitor all testing operations. Testing against new valves is permitted at the Contractor's risk. No testing is permitted against existing system valves.
- C. Tests can only occur after the trench has been backfilled.
- D. The test pressure shall not be less than 1.25 times the stated working pressure of the water main measured at the highest elevation along the test section and not less than 1.5 times the stated working pressure at the lowest elevation of the test section. The test pressure in the main shall be maintained for a period of 2 hours. The test pressure shall not vary by more than ± 5 psi for the duration of the test. The water required to maintain the test pressure within the allowance pressure loss shall be measured by means of a graduated barrel, drum or similar device at the pump suction.
- E. No leakage shall be permitted for exposed piping.
- F. Allowable leakage for buried pipe shall be as follows:

$$L = \left(\frac{SD\sqrt{P}}{148,000} \right) \times 2$$

L = testing allowance (makeup water) (gph for 2 hours)

S = length of pipe tested (ft)

D = nominal diameter of the pipe (in.)

P = average test pressure during the hydrostatic test (psi [gauge])

Allowable Leakage for DI/PVC (gal/1000 ft./2 hrs.)

Test Pressure	6-inch	8-Inch	10-Inch	12-Inch
150 psi	0.99	1.32	1.66	1.99
175 psi	1.07	1.43	1.79	2.15
200 psi	1.15	1.53	1.91	2.29

- G. Should testing disclose leakage in excess of that required in the preceding table, defective joints or pipe shall be located, repaired and retested until satisfactory at no additional cost to the District.

3.07 FLUSHING AND DECHLORINATION

- A. Flushing and dechlorination of the water main shall be supervised by the District. The Contractor shall not flush or dechlorinate the water main until they have coordinated with the District.
- B. A Storm Water Pollution Control Plan must be approved by the District prior to any flushing or draining of the new/abandoned water main, fire hydrants, reconnects.

- C. Prior to any flushing, the Contractor shall install and secure BMPs at storm drain inlets/catch basins. Repair, replace, and secure BMPs if needed before proceeding with the flushing operation.
- D. A flushing sock shall be installed to treat chlorinated water with dechlorination tablets.
- E. All foreign matter shall be flushed from the water main prior to disinfection. Hoses, temporary piping, or other devices shall be provided to dispose of flushing water without damage to adjacent properties. An approved backflow device shall be used when flushing and filling newly-constructed mains.
- F. Following chlorination, all treated water shall be flushed from the mains until the replacement water shall, upon testing, both chemically and bacteriologically, be proven equal to the water quality at the point of supply. Chlorination shall be repeated, if necessary, by the Contractor if the replacement water does not prove equal to the water quality at the point of supply. Actual testing of the bacteriological water sample for chlorine residual shall be conducted by District personnel.
- G. A disposal plan of chlorine-water mixture shall be submitted to the District 5 working days in advanced for review. Upon approval of the disposal plan by the District, the Contractor may proceed with disposal of the chlorine-water mixture per Section 01 57 23 - Storm Water Pollution Control Plan\Erosion Control.
- H. The Contractor shall not allow the treated water to discharge onto open surface or waterway without adequate dechlorination or other satisfactory method of reducing the chlorine concentration to zero.

3.08 CUTTING AND DISPOSAL OF EXISTING ASBESTOS CEMENT PIPE

- A. Contractor shall use due care when working with asbestos cement pipe and shall comply with all applicable laws and regulations regarding such work. When cutting asbestos cement pipe, Contractor shall ensure that adequate means are used to protect its workers and the environment against asbestos exposure. Asbestos cement pipe shall not be cut with a saw or comparable dust-generating tool, unless adequate encapsulation is provided. Asbestos cement pipe removed by the Contractor's operations shall become his property and be properly bagged and disposed of in an approved manner as required by federal, state, and local regulations.
- B. Contractor shall use due care when working with asbestos cement pipe and shall comply with applicable laws and regulations regarding such work.
- C. When cutting asbestos cement pipe, Contractor shall ensure that adequate means are used to protect its workers and the environment against asbestos exposure.
- D. Asbestos cement pipe shall not be cut with a saw or comparable dust-generating tool.
- E. Snap cutters shall be used to cut asbestos cement pipe. Asbestos cement pipe shall not be cut with a saw or cutting tool. Asbestos cement pipe removed by the Contractor's operations shall become their property and be properly bagged and disposed of in an approved manner as required by federal, state and local regulations.

*****END OF SECTION*****

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SECTION 33 14 20 - VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Work included under this section consists of furnishing and installing valves and appurtenances as shown on the Standard Drawings and as specified herein.

1.02 SUBMITTALS

- A. The Contractor shall submit manufacturer's data including catalog cuts, drawings and letter(s) of compliance as required by Section 01 33 00 - Submittals.

PART 2 MATERIALS

2.01 GENERAL

- A. Brass goods furnished under this section shall be new and unused. All fittings shall conform to latest ANSI/AWWA Standard C800.
- B. All brass components in contact with potable water must be made from either CDA/UNS Brass Alloys C89520 or C89833 with a maximum lead content of .25% by weight. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved. Brass saddles shall be made from CDA/UNS C83600.
- C. All fittings shall be stamped or embossed with a mark or name indicating that the product is manufactured from the low-lead alloy as specified above.

2.02 GATE VALVES

- A. Gate valves shall be Mueller A-2362 and have either flanged or mechanical joint ends as shown on the Standard Drawings. The valve shall be resilient seat and fully comply with the latest AWWA C509, and also be UL listed and FM approved. The valves shall be tested and certified to ANSI/NSF 61.
- B. The valve shall have a 250psig working pressure. Each valve shall be factory seat tested to 250psig and shell tested to 500psig. Buried valves shall be NRS (non-rising stem), equipped with a 2-inch square bronze operating nut (open left), and have an arrow cast on the operating nut opening direction. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.
- C. All main line valves shall be 8" or larger in diameter and shall have flanged or mechanical joint ends (on PVC or DI pipes) or push-on with FieldLok (on DI pipes). Valves smaller than 8" shall require prior written approval by the District. Flanges shall be dimensioned, faced and drilled in accordance with ANSI B16.1 for Class 125 unless stated otherwise on the drawings or the specifications. All necessary caulking materials, gaskets, bolts, and nuts shall be provided. All valves shall be protected from damage before installation and until completion of work.
- D. All buried valves shall be furnished with Type 316 stainless steel valve stem packing and bonnet bolts. All external flanged bolts, nuts and washers for all valves shall be Type 316 stainless steel. Corten T-bolts are allowed on mechanical joints.

- E. The valve stem shall be made of ASTM B98-C66100/H02 (Everdur) bar stock material. The stem shall have at least one “anti-friction” thrust washer above and below the stem collar to reduce operating torque. The design of the NRS valve stem shall be such that if excessive input torque is applied, stem failure shall occur above the stuffing box at such a point as to enable the operation of the valve with a pipe wrench or other readily available tool. The stem material shall provide a minimum 70,000psi tensile strength with 20% elongation and yield strength of 38,000psi. Valves with two-piece stem collars are unacceptable.
- F. The NRS valves shall have a stuffing box (with dirt seal) that is o-ring sealed. Two o-rings shall be placed above and one o-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the o-rings from the waterway and from outside contamination providing permanent lubrication for long term ease of operation. Valves without a stuffing box are unacceptable. Valves without at least three stem o-rings are also unacceptable.
- G. The valve disc and guide lugs must be fully (100%) encapsulated in EPDM. The peel strength shall not be less than 75 pounds per inch. Guide caps of an Acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque. Guide lugs placed over bare metal are not acceptable.
- H. The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.
- I. The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

2.03 GATE VALVE EXTENSION

- A. Gate valve extension is required on any valve nuts installed more than 3’ below finished grade. Gate valve extension shall be ProSelect, PS4000 series with centering plate.
- B. The Contractor shall have various sizes of valve extension on hand to accommodate varying field conditions. The extension length selected shall be such that the top of extension nut is installed at least 18-inch but no more than 20-inch below the finished grade.

2.04 HYDRANTS

- A. Hydrants shall be Clow 860 (wet barrel) with Clow Valve model LB400 break-off check valve assembly. The break-off check valve assembly shall have Type 316 stainless steel bolts and nuts between the body and extension/riser.
- B. Hydrants shall have two 2-1/2-inch outlets and one 4-1/2-inch pumper outlet. Hydrants shall have a 6-inch flanged inlet per the Standard Drawings.
- C. The Contractor shall have various sizes of hydrant buries on hand to accommodate varying field conditions. The bury length selected shall be such that the bottom of the break-off flange is at least 1-inch but no more than 4-inch above the finished grade.
- D. Hydrants and all metal above the concrete collar shall be factory painted “white” using Ellis priming V17500 and semi-gloss high solids polyurethane P29 direct to metal paint as manufactured by Ellis. Contractor shall submit a color sample for review.

- E. All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 stainless steel.

2.05 COMBINATION AIR VALVES

- A. Combination air valves shall be capable of positive action in releasing air accumulations in water mains under full line operating pressure and shall vent or exhaust air during filling and draining operations. Valves shall be of the size and pressure rating indicated on the project drawings or if not so indicated shall be 1-inch with a 5/64-inch orifice and simple type lever, rated for operation at 300 psi minimum for water main 8-inch and smaller, and 2-inch with a 3/32-inch orifice and simple type lever, rated for operation at 300 psi minimum for water main 10-inch and larger. Combination air valve shall be A.R.I. D-040.

2.06 METER VALVES AND COUPLINGS

- A. All service fittings shall be certified as suitable for contact with drinking water by an ANSI accredited organization in accordance with ANSI/NSF Standard 61, Drinking Water Systems Components – Health Effects.
- B. Compression ball angle meter valves shall be angle pattern, with lock wing. Compression ball angle meter valves for 5/8" and 1" meter connections shall be Mueller B-24258N. Compression ball angle meter valves for 1-1/2" and 2" meter connections shall be Mueller B-24276N.
- C. When a 5/8" meter is being installed, Ford A-13-NL and/or Ford A-14-NL meter adapters shall be installed on the inlet and/or outlet sides of the meter.
- D. Meter couplings shall be Mueller H-10871N (insulated).
- E. Residential ball valve shall be Red White 5044AB
- F. When the customer's water service is PVC, Mueller V-15442 (female) or V-15440 (male) Pack Joint connection shall be used.

2.07 CORPORATION STOPS

- A. Corporation stops shall be Mueller N-35008N (insulated), with inlet AWWA taper thread and outlet compression connection for 5/8" and 1" service.
- B. Corporation stops shall be Mueller B-20045N on a 1" combination air valve.
- C. Corporation stops shall be Mueller N-35008N on a 1-1/2" to 2" service connection.
- D. Corporation stops shall be Mueller B-20045N on a 2" combination air valve.

2.08 SERVICE SADDLES

- A. Service saddles shall be bronze with neoprene gaskets with double bronze straps, Mueller No. BR2B "CC" for DI pipe and Mueller No. BR2S "CC" for PVC pipe, sized for the exact outside diameters of the pipes on which they will be installed.

2.09 BLOWOFF ASSEMBLY

- A. Unless otherwise indicated, blowoff assembly shall have a 2-inch vertical FIP inlet and 2-inch NIP for mains 6-inches and smaller, or 4-inch vertical FIP inlet and 4-inch MIP outlet for mains 8-inches and larger. Blowoff assembly shall be operated by turning a top-mounted square operating nut.

All internal working parts and the inlet and outlet fittings shall be manufactured from low-lead brass. All working parts shall be serviceable from above without removing the valve box. Blowoff assembly shall be Truflo Model No. TF550 (2-inch) or Model No. 7600 (4-inch) as manufactured by the Kupferle Foundry Co., St. Louis, MO.

2.10 BACKFLOW PREVENTER

- A. Backflow preventer shall operate on the reduced pressure principle and shall consist of two spring-loaded check valves and a spring-loaded, diaphragm actuated, differential pressure relief valve located between the two check valves, in accordance with the Standard Drawings. The backflow preventer assembly shall meet all applicable requirements of latest AWWA C511 and shall be included on the most current "List of Approved Backflow Prevention Assemblies" of the San Mateo County Health System.
- B. Backflow preventer shall be provided on all service connections to properties having a supplemental source of water, wells, fire sprinkler system, irrigation system that has an automatic chemical feeding control, pumps, multi story buildings or any other instances that has a potential to contaminate potable water supply or as directed by the District.

2.11 VALVE AND METER BOXES

- A. Valve boxes shall be concrete traffic-type boxes with cast iron traffic covers. Covers shall be marked "WATER". Concrete extension pieces shall be provided with each box as required. For deep bury conditions for valve boxes, 8" SDR 35 PVC pipe extensions shall be. Diameter shall be 10-3/8-inches minimum with 9-inch throat diameter. Valve boxes shall be Christy "Machined Faced" Model G05T with G505CT cover.
- B. For 5/8-inch or 1-inch meters, meter boxes shall be Christy Model B16 concrete box with B16P reinforced concrete lid. For 1-1/2 inch or 2-inch meters, meter box shall be Christy Model FL30T Fiberlyte box with a FL30P Fiberlyte lid. For 1-1/2-inch or 2-inch meters with bypass, meter box shall be Christy Model N48 concrete box with a N48-62D-P Steel lid. Meter Lids shall be marked "WATER" and have one recessed probe hole, made for Sensus FlexNet radio readers. Traffic rated box and cover shall be provided in traffic area and where directed by the District.
- C. Water service PRV boxes shall be concrete reinforced concrete cover. For 1-inch PRV, boxes shall be a Christy BX09B with a BX09D reinforced concrete lid or as noted on the plans. For 2-inch PRV, boxes shall be a Christy B16B with a B16G reinforced concrete lid or as noted on the plans.
- D. Boxes for the 2" and 4" blowoff assembly shall be Christy Model B1324 (H/20 loading) with B1324-61JH steel checker plate cover.
- E. Boxes installed in driveways and other paved areas shall be traffic rated box and have traffic rated covers.

2.12 PRESSURE REDUCING VALVE

- A. The pressure reducing valve shall be installed according to the project plans. Contractor shall submit for review and approval shop drawings for the pressure reducing valve and vault assembly.
- B. Pressure reducing valve shall be a Cla Val, models approved by the District, and installed per the plans and manufacturer's recommendation.
- C. Pipe supports shall be installed per detail drawings.

- D. Pressure gages shall be liquid filled and accommodated pressure shown on plans.
- E. After the pressure reducing valve and vault has been installed, the vault shall be cleaned from all construction debris.
- F. All bolts, nuts and washers, and restraining tie rods and associated hardware, used with flanged fittings, couplings and appurtenances shall be Type 316 stainless steel.
- G. Contractor shall coordinate with District for a temporary shutdown.

PART 3 EXECUTION

3.01 INSTALLATION OF VALVES

- A. Valves shall be carefully installed in their respective positions, accessible for operation and repair, and free from all distortion and strain, with joints made as specified, and shall be left in satisfactory operating condition. Buried gate valves, and valve boxes, shall be installed in accordance with the Standard Drawings.
- B. Before installation, all valves and appurtenances shall be thoroughly cleaned of all foreign material, and shall be inspected for proper operation, both opening and closing and to verify that the valves seat properly. Valves shall be installed so that the stems are vertical.
- C. A marker post shall be installed adjacent to each gate valve, combination air valve, air/vacuum valve, and blow-off assembly. The location for each post will be selected by the District based on field conditions.
- D. Valves located within 10' of a fitting shall be moved directly to the fitting and connected via a flanged joint or as directed by the District.
- E. Gate valve marker signs will be supplied by the District, it is the responsibility of the Contractor to install the post and affix the sign on the post per Standard Drawings.

3.02 INSTALLATION OF VALVE AND METER BOXES

- A. Valve boxes shall be centered and set plumb over the wrench nuts of the valves and shall not transmit shock or stress to the valves. Valve box covers shall be set flush with the surface of the finished grade or as directed by the District. Backfill shall be placed around the valve boxes and thoroughly compacted to a 95% relative in such a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be re-excavated, replumbed, and backfilled at the Contractor's expense. No riser or extension rings are allowed. 8" SDR 35 PVC pipe extensions shall overlap the gate valve box a minimum of 6".
- B. Water meter boxes shall be the last item set after the existing angle meter and copper piping is removed. Meter boxes shall be set parallel to the service line following the contour of existing ground. After the box is set and aligned with the meter, contractor may use native material, aggregate base, or fines to backfill around the box as directed by the District and as applicable. Soil within a 12-inch perimeter of the box shall be compacted to a relative density of 90% using a pneumatic device such as a "Powder Puff" or other mechanical means approved by the District.
- C. Finished elevation of the box shall be 1-inch above finished grade when located in non-traffic areas and flush with pavement when located in traffic areas and pathways.
- D. Contractor shall set the box "knockout" in-line with service, and a 1-inch clearance between the box and service line. The box shall not sit on top of the service line.

- E. After the box has been set and compacted, any debris and dirt inside the box shall be removed and disposed of to the satisfaction of the District.
- F. Contractor shall bear the responsibility of private property structures such as mail boxes, retaining walls, landscaping, etc., during construction.

3.03 INSTALLATION OF SERVICES

- A. All services shall be 1" or 2" in size and installed in conformance with the Standard Drawings. Applications for services larger than 1" require hydraulic calculation justification and prior approval from the District. Services larger than 2" also require submitting a shop drawing.
- B. When connecting copper to PVC, Mueller's V-15442 (female) or V-15440 (male) pack joint connections shall be used. Contractor is responsible to determine ahead of time the necessary material to connect the service with the resident's service line. Contractor shall coordinate with the District to determine the configuration and location of the service.
- C. Direct tapping of ductile iron pipe shall be done using the "preferred method" described in AWWA C600, Section 4.8 to preserve the integrity of the existing encasement. This method requires the application of two or three layers of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. The corporation stop shall then be installed directly through the polyethylene tape and encasement. If damaged, the encasement and/or tape shall be repaired with tape.
- D. Direct tapping of PVC pipe shall be done using the "preferred method" described in AWWA C605, Section 6.4.
- E. Service relocations shall be done by "freezing" the service line with CO₂ or other approved method by the District to temporarily discontinue the supply of water while relocating the service. Crimping will not be allowed to temporarily block the supply of water.

3.04 INSTALLATION OF FIRE HYDRANTS

- A. Fire hydrants shall be plumbed vertical and installed in accordance with the Standard Drawings. Fire hydrants shall be set so the bury line mark on the break-off is level with finish grade.
- B. All hydrants shall be flushed and tested after installation to ensure a sound setting and smooth operation. All valves shall close drip tight.
- C. Contractor shall install a two-way, reflective pavement marker at each fire hydrant location as directed by the local agencies. If the marker does not adhere to existing ground, place it on top of the gate valve cover located directly off the main. For fire hydrants located on fire roads, a fire hydrant marker post shall be installed per the Standard Drawings. The markers shall be furnished and installed in accordance with applicable paragraphs of Section 84 – Markings, of the latest requirements of Caltrans Standard Specifications. Fire hydrant valve lid and rim shall be painted direct to metal white.

3.05 INSTALLATION OF BLOW-OFF ASSEMBLY

- A. Blow-off assembly shall be installed in accordance with the Standard Drawings.

3.06 INSTALLATION OF COMBINATION AIR VALVES

- A. Combination air valves shall be plumbed vertical and installed in accordance with the Standard Drawings.

3.07 INSTALLATION OF BACKFLOW PREVENTERS

- A. Backflow preventer shall be installed horizontal and level, with the minimum clearances for obstructions as shown on the Standard Drawings. Vertical installations are allowed but require District approval prior to design and installation. A ball valve shall be installed on both sides of the backflow preventer assembly. Mueller's H-15531N compression x MIPT 90's shall be used at both ends of the assembly to allow removal of the unit in the event of a malfunction. Backflow preventers assembly shall be tested and certified by a San Mateo County's Certified Tester prior to being put in service. Valves failing the test shall be replaced, and retested.
- B. Contractor is responsible to determine ahead of time the necessary material to connect the backflow preventer with the resident's service line. Contractor shall coordinate with the District to determine the configuration and location of the backflow preventer.

*****END OF SECTION*****

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**APPENDIX
FOR**

**SR101 CROSSING AT PALO ALTO MEDICAL
FOUNDATION (PAMF) WATER MAIN
IMPROVEMENTS PHASE 1**

McMillen Jacobs Associates, Geotechnical Investigation
Report, SR 101 Crossing at PAMF, June 2020



**Mid-Peninsula Water District
SR 101 Crossing at PAMF
San Carlos, California**

**Geotechnical
Investigation Report**

**Report Status – FINAL
Revision No. 0**



June 2020

June 30, 2020

Ms. Lindsey Olson
West Yost Associates
2020 Research Park Drive, Suite 100
Davis, CA 95618

Subject: Geotechnical Investigation Report

Re: Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Dear Ms. Olsen:

We are pleased to submit the accompanying geotechnical investigation report for Mid-Peninsula Water District's (the District) State Route 101 (SR101) Crossing at Palo Alto Medical Foundation (PAMF) project in San Carlos, California.


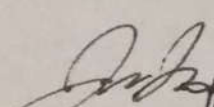
The project will be designed and constructed in two phases. Phase 1 is to design and construct a new water main by open-cut trenching within the PAMF easement between Industrial Road and SR101. A future Phase 2 will be to design and construct an extension of the new water main underneath SR101 and along Shoreway Road toward Cormorant Drive by a combination of trenchless and open-cut trenching methods.

This report presents geotechnical data and design recommendations for the multi-phased project based on current design plans for Phase 1 and on anticipated design plans for Phase 2. Therefore, the recommendations provided in this report are final for Phase 1, and preliminary for Phase 2. We should be afforded the opportunity to review the Phase 2 plans at the time of their development, and update pertinent recommendations provided herein for its design if they are warranted.

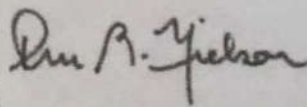
We appreciate the opportunity to serve West Yost Associates and the District on this project. Please contact us if you have any questions about the report, or if we can be of additional assistance to you on this or any other project.

Sincerely,

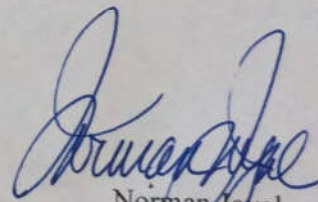
McMILLEN JACOBS ASSOCIATES

A circular professional engineer seal for Justin C. Reeves, State of California, License C 89123, dated 6-30-20, Civil.

Justin Reeves
Project Engineer



Dru Nielson
Senior Associate



Norman Joyal
Principal



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1.0 Introduction

This report presents geotechnical-related findings and design recommendations for the Mid-Peninsula Water District's (the District) SR101 Crossing at Palo Alto Medical Foundation (PAMF) Water Main Improvements project (the project) in San Carlos, California (Figure 1). Geotechnical explorations for the project include test borings performed in August 2017. Since then, the project has been split into two separate phases of design and construction. Phase 1 of the project is to design and construct approximately 700 linear feet of 12-inch ductile iron water main by open-cut trenching within the PAMF easement between Industrial Road and State Route 101 (SR101; West Yost Associates, 2020). A second phase of the project will be to design and construct an extension of the water main across SR101 and along Shoreway Road toward Cormorant Drive by trenchless and open-cut trenching methods.

This report presents geotechnical data and design recommendations for the multi-phased project based on current design plans for Phase 1, and on an anticipated design of Phase 2. Therefore, recommendations provided herein are final for design of Phase 1, and are preliminary for design of Phase 2.

2.0 Findings

2.1 History

The native ground along the project alignment is concealed below artificial fill and other man-made features such as paved roadways and landscaping (see historical maps and photographs in Figure 2). A 1920 map shows the location of the project alignment was historically within tidal marshland. By 1946 the marshland was artificially filled, and SR101 and a drainage channel were constructed across the alignment. The width and number of the SR101 lanes have been increased over the years. A 1974 photograph shows multi-story structures predating development of the PAMF facility were constructed over the planned alignment. The foundation footprint and elements of these structures relative to the planned water main are not known to us at this time. Realignment of the artificial drainage channel to along the northernmost PAMF property fenceline is visible in the 1974 photograph. Two highway signs are visible in 1956 and 1974 photographs. The exact type and location of foundations for these signs relative to the planned water main are not known to us at this time. A 2010 photo shows the PAMF property as having been razed. Also visible in the 2010 photo are high voltage utility towers along Shoreway Drive.

2.2 Test Borings

Five geotechnical test borings were drilled for the project to the depths indicated in Table 1 and illustrated in Figure 1. A total of three environmental test borings were completed by West Yost Associates at the locations shown in Figure 1. One of these three environmental borings was also geotechnically logged and characterized by representatives of McMillen Jacobs Associates, and is referred to herein as geotechnical test boring B-5.

Methods and configurations of the drilling equipment and tooling used to complete the geotechnical test borings for the project are described in the boring log legend in Appendix A and on the respective boring logs provided in Appendix B. Standard dimensions and sample methods are detailed in the boring log legend in Appendix A, and sample type and intervals are indicated on the respective boring logs in

Appendix B. Relatively undisturbed ground samples were obtained by driving a 2.5-inch inside diameter, 3.0-inch outside diameter Modified California Sampler (MCS) containing brass or steel liners into the bottom of the boring. Disturbed ground samples were obtained by driving either a 2.0-inch inside diameter and 2.5-inch outside diameter Split Spoon Sampler (SSS) or a 1.4-inch inside diameter and 2.0-inch outside diameter Standard Penetration Test (SPT) Sampler (ASTM D1586) into the bottom of the boring. A 140-pound hammer falling 30 inches per blow was used to drive all samplers.

Table 1. Partial Summary of Data from Project Geotechnical Test Borings

Boring ⁽¹⁾	Station ⁽²⁾	Depth of/to (ft) ⁽²⁾				USCS ⁽⁴⁾ Group Soil Symbols	SPT Blow Count (N) ⁽⁵⁾
		Boring	Pipe Invert	Fill/ Bay Mud	GW ⁽³⁾		
B-1	10+50	20	5.5	6	12	SC,SM/SC,CH/MH/OH,CL	15,2,9
B-2W ⁽⁶⁾	17+00	40	4	5.5	5.5 (5)	CL/CH,GC,CH/MH/OH,SM/SC,CL	15,0,0,10,15,6,6,22
B-3	-	40	-	3.5	5	CL/CH,CH/MH/OH,CL/ML,CL,CH	2,8,5,8
B-4	-	20	-	3.5	12	GC,CL/CH,CH/MH/OH,CL,GC	2,1,17
B-5	-	40	-	2.5	8	CH/OH,CL/ML,CL/CH	0,0,10,4,3,10,9

⁽¹⁾ Locations mapped in Figure 1. See complete logs in Appendix B. Drilled in August 2017 and August 2018.

⁽²⁾ Nearest station to boring location. Stationing and pipe depths from plans by West Yost Associates dated 5/12/2020.

⁽³⁾ Groundwater (GW) at the end of drilling; not necessarily the equilibrium groundwater level. An August 2017 monitoring well groundwater measurement in boring B-2W is provided in parenthesis ().

⁽⁴⁾ Unified Soil Classification System (USCS) listed as logged with increasing depth in boring and defined in Appendix A.

⁽⁵⁾ N = ASTM D1586 Standard Penetration Test (SPT) Blow Count values and listed as logged with increasing depth in boring.

⁽⁶⁾ Completed as a monitoring well screened between a depth of 7 to 40 feet.

The number of blows required to drive the samplers the last 12 inches of an 18-inch drive is recorded on the boring logs as penetration resistance (blows/ft). The penetration resistance values (blows/ft) recorded on the logs for the SPT sampler are actual ASTM D1586 N-values. The penetration resistance values recorded on the logs for MCS and SSS drives are actual blow counts for the sampler and are not equivalent SPT N-values.

Samples retrieved from the borings were logged, examined for classification, and then sealed to prevent moisture loss during transport to the laboratory for testing. Classification systems used to log the soil are described in the boring log legend in Appendix A. Descriptions provided in the logs are based on observations made during drilling and sampling, and on results of laboratory tests performed on the samples. With exception of the boring B-2W, all borings were backfilled with cement grout and covered with landscaping material or capped with new asphalt patch at the end of drilling. Boring B-2W was completed as a groundwater level monitoring well as described in Section 2.4.

2.3 Laboratory Tests

Moisture content, unit weight, Atterberg limits, grain size analysis, unconfined compression, and direct shear tests were performed in the laboratory on samples retrieved from geotechnical test borings. Tests results are summarized in the borings logs in Appendix B, and in test result figures in Appendix C.

2.4 Groundwater Measurements

The groundwater level measured in each geotechnical test boring is summarized in Table 1. The groundwater level measured in test borings may not represent the equilibrium groundwater level at the

boring location since it could take hours to days for an equilibrium groundwater level to be established in drilled borehole.

Geotechnical test boring B-2W was completed as a groundwater level monitoring well. The well was constructed of 2-inch-diameter Schedule 40 PVC well casing, using 0.020-inch slotted screen to the depths indicated in Table 1. The annular space between the well screen and drilled ground was filled with Cemex Lapis Lustre #3 Sand and plugged with bentonite and cement grout between sections of the solid casing and the drilled ground. The annular space of the well was sealed 7 feet below the ground surface with 2 feet of bentonite below cement grout to the ground surface. The surface was finished with a concrete pad 6 inches above the surrounding ground and inset with a traffic rated 6-inch-diameter well monument that was secured with a bolted cover. The top of the well casing was fitted with a locked well cap and the key was provided to West Yost Associates so that they, the District, and selected contractors can remove the cap and measure the depth to groundwater as desired. We measured the depth to groundwater in the well in August 2017 to be 5 feet below the ground surface (see Table 1).

2.5 Soils and Geology

A map and description of near surface soils in the project area is provided in Figure 3. The mapped project area soil description of reclaimed tidal flats consisting of highly plastic silt is congruent with the near surface materials encountered in the project borings. Figure 4 shows the approximate location of potential environmental concerns in the project area. Maps and descriptions of the geology in the project area are provided in Figures 5 and 6. Geotechnically, the project area is underlain by artificial fill placed over several hundreds to near a thousand feet of interfingering and unconsolidated estuarine (Bay Mud) and continental deposits deposited over the top of bedrock. Bay Mud consists of soft to very soft and loose, organic-rich, under-consolidated and compressible, saturated, low-density deposits of clay, silt, and sand that have accumulated within San Francisco Bay and its tidal flats within the last 10,000 years. The continental deposits consist of fine- to coarse-grained stream-channel deposits and fine-grained flood-plain deposits of coalescing alluvial fans.

2.6 Faulting and Seismicity

No active fault (where active fault is defined by the State of California as a fault with known surface displacement within the last 11,000 years; see Hart and Bryant 1997) is located in the project area. The nearest active fault is the San Andreas fault, located a few miles west of the project area (Figures 7 and 8). Even though the project area is not crossed by an active fault, the project area will still be subject to ground shaking during earthquakes on the San Andreas fault and on other nearby active seismogenic sources. Estimated shaking severity, intensity and peak ground accelerations in the project area during future earthquakes in the region are illustrated in Figure 9. The actual peak ground acceleration that will occur in the project area during future earthquakes will be a function of the earthquake's magnitude, epicenter distance, mode and direction of seismic wave propagation (e.g., directivity), and soil or bedrock amplification or attenuation. Correlation of expected damages to ground accelerations are described in Figure 10.

2.7 Flooding

The flood map provided in Figure 11 shows (1) the Phase 1 portion of the project has a 0.2% chance of being flooded, or is considered a small drainage area (less than 1 square mile) protected by levees from the 1% chance flood, and (2) the Phase 2 portion of the project is protected by levees from the 0.2% chance flood. Recent inundation risk maps provided in Figure 12 that account for projections of future sea

level rise and measured local land subsidence rates indicate that the project area will be inundated by at least year 2100 (Shirzaei and Burgmann, 2018).

2.8 Liquefaction

The liquefaction susceptibility map provided in Figure 13 shows that the project area has a high liquefaction susceptibility. However, no appreciable amount of highly liquefiable soils were encountered within project test borings, and no sites of liquefaction ground effects during any historic earthquake are known to exist within the project area (Knudsen and others, 2000).

2.9 Roadways

Geotechnical test borings B-3, B-4, and B-5 were drilled within the shoulder margins of Shoreway Road. Roadway pavement types and thicknesses encountered in test borings for the project are summarized in the respective boring logs in Appendix B. Pavement sections encountered in the test borings may not be of the same type and thickness as pavement sections located in other parts of the roadway. For example, composite pavements (i.e., original pavement plus subsequent pavement overlays) are generally thickest in the center of a roadway and thinner at the edges of a roadway. The thickness of the Shoreway Road pavement section encountered in project geotechnical test borings typically consisted of 6 to 12 inches of asphaltic concrete (AC) over 12 to 24 inches of aggregate baserock. A utility locating report for the project provided in Appendix D indicates 5 to 12 inches of AC along Shoreway Road, and an area of concrete that impeded potholing near boring B-5.

2.10 Utility Backfill

Except where indicated in project geotechnical test boring logs, we are not aware of the age, type, condition, density and consistency of materials used as backfill in excavations that were made for the construction of existing utilities in the project area. We are also not aware of the geometry of the excavations (i.e., vertical or side sloped). A utility locating report for the project provided in Appendix D noted sand and “dirt” when exposing utilities along Shoreway Road.

Excavation backfill for utilities typically includes noncohesive granular materials, such as sands and gravel, that tend to run and fast ravel when dry, or flow when saturated and vertically exposed. These types of materials can be a porous and permeable conduit for copious amounts of groundwater flow (e.g., from groundwater within granular backfill along the entire length of the utility as well as from other intersecting granular utility trench backfills). Perched groundwater inflows will occur in an excavation if saturated utility embedment and excavation backfill materials are encountered. Instability of new excavations (e.g., trench wall caving or raveling) can occur because of the reduction of native soil strength caused by past disturbance from former nearby excavations, even where the new excavations do not daylight into the limits of the backfilled former excavations.

3.0 Recommendations

Geotechnical-related design recommendations for construction and useful long-term performance of the project are provided in this section of the report, and are based on the findings presented in Section 2.0. Contractors should be made responsible to (1) make their own interpretation of the project findings provided herein and acquired through their additional subsurface investigations, and (2) select appropriate construction means, methods (e.g., selection of open-cut or trenchless methods), and monitoring so that

no one is injured, and so that no nearby existing structure, improvement, or utility is damaged during and/or as a result of project construction.

Mapping, and test boring findings for the project indicate ground conditions consistent with an eastward downsloping alluvial apron in which fluvial channels carried eastward fining sediment down toward San Francisco Bay from uplands to the west (Figure 5). Some of these channels were abandoned and infilled prehistorically as a result of natural fluvial meandering and anastomosing processes. Project excavations may encounter perched groundwater and running and flowing sand and gravel in buried and concealed prehistoric fluvial channels and/or man-made drainage channels that predate the most recent development of the PAMF site (see Section 2.1).

3.1 Groundwater Depth

The depth to groundwater measured in project geotechnical test borings is recorded in the boring logs, provided in Appendix B, and is summarized in Table 1. Groundwater depths measured in boring shortly after drilling and details of the installed groundwater level monitoring well in B-2W are discussed in Sections 2.1 and 2.4. Groundwater depths will vary in location and time within the project area depending on tides; local construction operations; ground types and conditions; the presence of perched groundwater, including within buried prehistoric fluvial channels and within backfill materials that surround existing nearby utilities. Seasonal fluctuations such as rainfall and flow in the drainageway bordering the PAMF property shown on Figure 1 will influence the depth to groundwater.

3.1.1 Permanent Works

Permanent structures for the project should be designed for hydrostatic pressures and buoyant uplift assuming a high groundwater level equivalent to the ground surface.

3.1.2 Temporary Works

Final shoring and dewatering for temporary works should be designed by the contractor for the groundwater conditions that exist at the work location throughout the time of construction. If project construction is during dry summertime conditions (typically between June and October), then the groundwater depth indicated in the boring nearest the project work (summarized in Table 1) can be used as a preliminary estimate of the groundwater level during construction. The depth to groundwater encountered in borings in the project area was typically at or below the planned invert of the new water main for Phase 1. If project construction is to occur during periods of rain, then (1) surface drainage should be designed and installed to prevent surface runoff from entering excavations, and (2) a groundwater level at the ground surface should be assumed.

3.1.3 Dewatering

All project construction should be performed in dry excavations. Dewatering for excavations to depths below groundwater may be necessary and will be critical components to successful construction of the project. The use of sump pumps and drainage rock blankets in project excavations may provide reasonably dry and stable bottoms in typically dry summertime periods. However, more extensive levels of dewatering (e.g., external dewatering wells) may be required if project excavations occur in or are to last through periods of rainy weather.

The contractor should be responsible for the design, implementation, monitoring, removal and effects of construction dewatering. The contractor should submit dewatering plans for District review prior to start of work. The dewatering plans should be coordinated with the contractor's shoring plan and ground improvement plan. The design of dewatering should be based on the actual rate of groundwater inflow into excavations and the type of shoring to be used. Dewatering methods will need to vary along the planned alignment to account for dewatering method limitations (Figure 14) and variations of the following:

- Rainfall
- Groundwater level
- Proximity to drainageways
- Excavation depth
- Duration of excavation
- Subsurface ground types and conditions

The rate of groundwater flow is a function of (1) the unbalanced head across which the flow is occurring, and (2) the permeability of the ground. Permeability typically ranges from greater than 1 cm/sec (very high) in granular deposits and backfill (e.g., sands and gravels) to less than 10^{-7} cm/sec (very low) in clayey (Mud) deposits. Grain size distributions for some of the ground to be dewatered as encountered in the project borings are plotted in laboratory test results provided in Appendix C.

There is a potential for a high rate of groundwater flow through native ground that is granular (i.e., sands and gravels). There is also a potential for a high rate of groundwater flow through trench backfill (including embedment and foundation materials) of nearby parallel or crossing utilities, particularly where it consists of granular materials (e.g., sands). Large volumes of groundwater within highly permeable granular backfill can be stored over large distances (e.g., along the length of the historic drainageway, and the length of utilities of intersecting utilities). The flow of groundwater into excavations from that stored within and along highly permeable granular backfill can be reduced by locally establishing bulkheads and selectively filling the pore spaces of the material with permeation grout ahead of time and in advance of the excavation. Backfill of existing nearby parallel or crossing utilities that could potentially impact the project should be sampled and evaluated by the contractor as part of their project dewatering design.

The rate of groundwater flow into project excavations will vary along the project alignment due to (1) the difference in elevation between the base of the excavation and depth to groundwater (i.e., unbalanced groundwater head), and (2) the lateral and vertical variability of composition and consistency (and hence permeability) of the subsurface fill materials and native ground. Collectively, the contractor's project dewatering design, together with their shoring and ground improvement designs, are to preserve the undisturbed bearing capacity of the subgrade soils at the bottom of excavations.

The contractor's dewatering system should achieve the following minimum performance requirements:

- A reasonably dry base of excavation
- Stable excavation walls and bottom
- Draw down the groundwater level to a minimum of 3 feet below and beyond the excavation bottom and sidewalls to establish a reasonably dry base of excavation and to prevent ground

piping and groundwater boiling through the excavation bottom where shoring is not designed to resist hydrostatic pressures

- Filter native ground and prevent loss of ground from dispersion and erosion
- Prevent damaging settlement to nearby structures, utilities and/or pipelines
- Prevent the migration of contaminated groundwater plumes, if any
- Be installed and removed in accordance with governing jurisdictional requirements
- Not cause subsidence and/or settlement damage
- Allow for controlled release of groundwater to its static level in a manner that prevents ground disturbance and prevents flotation or movement of structure or pipelines

The contractor should be required to submit alternate dewatering, ground improvement and shoring designs; and, the contractor should be prepared to implement the alternative designs should the initial designs not achieve the minimum performance requirements. Uncontrolled seepage of groundwater through excavation sidewalls or bottom will cause the excavations to be unstable and unsuitable for support. Consequently, the contractor should be prepared to locally dewater or modify (e.g., by ground improvement) construction excavations, if and where needed, to provide stable and relatively dry excavations.

If the shoring is not designed to resist hydrostatic pressures and the dewatering system is designed to draw the groundwater level down a minimum of 3 feet below the excavation bottom, then groundwater level monitoring wells should be required adjacent to the excavation to monitor groundwater levels prior to and while the excavation is open. A purpose of the monitoring is to confirm that the groundwater level is adequately lowered prior to and throughout the duration of the excavation.

Prolonged dewatering causes an increase in effective stress on underlying soils. There is also a risk of soil dispersion and erosion into improperly filtered wells. Therefore, settlement monitoring points should be set between and on nearby critical structures, utilities and regularly monitored during active dewatering. Modifications to contractor shoring, dewatering and/or ground improvement should be required if settlements are measured or if damaging settlements are likely to occur given measured trends, the anticipated duration of dewatering, and the location of settlement monitoring points relative to existing critical structures, utilities and pipelines.

Installation and removal of wells is to be in accordance with governing (e.g., county and state) requirements. The project contractor should be required to remove all wells installed for the project design, including groundwater-level monitoring well B-2W.

3.1.3.1 Trenchless Shafts

Shafts excavated for trenchless operations below groundwater should either be with a “water-tight” shoring system with portal stabilization (e.g., see Figures 15, 16.1, and 16.2) or with appropriately designed external and internal dewatering systems. Given the relative fine-grained particle size of the water-bearing ground encountered in the project area (see boring logs in Appendix B), the radius of influence (i.e., drawdown curve) of a conventional gravity well will be very small (Figure 14) and may take several weeks to effectively develop.

3.2 Temporary Excavations

Temporary excavations for the project will include open-cut trenching and trenchless shafts. These excavations will be in and through varying thicknesses and types of pavements, man-placed fills, and soft native soil (see Section 2) that will require shoring, local dewatering, and/or ground improvement.

3.2.1 Excavatability

The contractor should be made responsible for choosing its excavation means, methods, and equipment based on the contractor's investigations and interpretations of the excavatability of the ground to be encountered in project excavations. As part of the contractor's investigation, the contractor should become familiar with the descriptions of the ground in the project area that are provided in this report. The contractor should be required to submit excavation plans for District to review prior to mobilization.

Project excavations through existing trench backfill, and native near-surface soils like those encountered in project test borings can generally be made with appropriately sized conventional excavation equipment. However, additional excavation effort and/or special excavation equipment (e.g., hoe rams, jack hammers, ripper teeth) and methods may be required where Portland cement concrete pavement is encountered (see Section 2.9).

3.2.2 Cal/OSHA Soil Classification

Cal/OSHA soil (also referred to as materials or ground) classification for temporary excavations includes the following types:

Type A: Excludes materials that are part of a sloped or layered system dipping into the excavation at a slope $\geq 4H:1V$, but includes cohesive soil with an unconfined compressive strength of ≥ 1.5 tsf that is:

- Not fissured
- Not subject to vibration from heavy traffic, pile driving, or similar effects
- Not been previously disturbed

Type B: Excludes material that is part of a sloped or layered system dipping into the excavation at a slope $\geq 4H:1V$, but includes the following:

- Cohesive soil with an unconfined compressive strength between 0.5 and 1.5 tsf
- Angular gravel and silt
- Previously disturbed soil, except soil otherwise classified as Type C
- Soil fissured or subject to vibration and not otherwise Type C soil
- Dry rock that is not stable

Type C: Includes the following:

- Material that is part of a sloped or layered system dipping into the excavation at a slope $\geq 4H:1V$
- Cohesive or disturbed soils with unconfined compressive strength ≤ 0.5 tsf

- Sand and nonangular gravel
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable

A determination of the Cal/OSHA classification of ground types encountered in project excavations is the responsibility of the contractor's Cal/OSHA approved and qualified "competent person." Cal/OSHA soil types can vary over short lateral and vertical distances; therefore, project excavations should be continuously monitored and documented by the contractor's competent person, and the contractor should be prepared to make changes and modifications to shoring requirements for excavation safety in response to these changes consistent with governing regulations in the field at the time of excavation.

The ground encountered in project borings typically varied from Cal/OSHA Type B to Type C. Noncohesive soils (including granular utility backfill) and soils below groundwater are classified as Cal/OSHA Type C.

3.2.3 Shoring

The contractor should be required to select, design, implement, monitor, remove, and be responsible for the effects of project excavations and shoring. A civil engineer licensed in the State of California should be required to design, sign, and stamp the contractor's shoring plans and calculations. Contractors should be required to include information from this report into their shoring designs. The contractor is to submit shoring plans and calculations together with all other interdependent submittals (e.g., dewatering and ground improvement) for District review before start of work.

Shoring must be consistent with Cal/OSHA Construction Safety Orders, Article 6 - Excavations and is to be coordinated with dewatering (Section 3.1.3), and ground improvement (Section 3.3) where needed, in order to achieve the following minimum performance requirements:

- Protect personnel that enter the excavation.
- Be compatible with the ground conditions encountered, including stabilization, embedment, and backfill material of existing pipeline (contractor should evaluate these materials for purposes of shoring design).
- Resist lateral earth pressures including those from hydrostatic pressures and lateral loads from existing structures, vehicular traffic, construction equipment, and spoils.
- Sequence and perform excavations and install shoring in a manner that protects and prevents damage to nearby utilities, improvements, and structures.
- Provide stable excavation walls and bottom including preventing raveling, running, and flowing ground from excavation walls and associated loss of adjacent ground even when it is subject to vibrations from construction.
- Provide a reasonably dry base of excavation and draw down the groundwater level to below and beyond the excavation bottom and sidewalls by a minimum of 3 feet where shoring below groundwater is not designed to resist hydrostatic pressures.
- Prevent ground vibrations, settlement, and heave that could damage utilities, structures, and improvements.

- Remove or abandon shoring in a manner and sequence that do not damage structures, pavements, utilities, and improvements including by being in step with the backfilling sequence so that shoring is not removed ahead of backfilling; and by not causing disturbance and loosening of subsurface material.
- Completely fill any void space created by shoring removal with controlled low strength material (CLSM) or equivalent.
- Allow entry, exit, and installation of trenchless equipment, materials, and pipeline.

Shoring submittals should contain contingent systems that the contractor will implement should any segments of shoring not meet the minimum performance requirements. Preliminary braced earth shoring diagrams and pressures are provided in Figure 17, and minimum surcharge pressures and diagram are provided in Figure 18. These diagrams and pressures represent ground conditions mapped in the project area (e.g., see Figures 3, 5 and 6) and/or encountered in geotechnical test borings (Appendix B), assuming a completely dewatered excavation condition.

The final earth shoring pressures and surcharge pressure diagrams used in calculations by the contractor's shoring designer must be based on the following at the time of construction:

- Soil conditions
- Groundwater conditions
- Shoring type, design, and installation methods
- Dewatering and ground improvement
- Traffic loads, stockpiling, and any other surcharge load adjacent to the excavation

Solid sheeting is required by Cal/OSHA in Type C ground. Excavations in Cal/OSHA Type C ground will tend to flow, run, or fast ravel, and will have little to no stand-up time. Where exposed in excavations, unimproved granular utility backfill will flow, run, or fast ravel back to the cut line of the original excavation for the utility. Backfill of nearby parallel and crossing utilities is discussed in Section 2.10 and should be evaluated by the contractor for purposes of their final shoring and ground improvement designs.

Cal/OSHA Type B materials typically have sufficiently long enough stand-up time to allow for short reaches of full-depth excavation prior to installation of shoring (e.g., trench boxes or speed shores with intermittent backing). However, project excavations in wet (i.e., below groundwater) granular noncohesive or soft cohesive Cal/OSHA Type C ground will have no stand-up time and will flow and squeeze when exposed in excavations. Trench boxes and speed shores (e.g., aluminum hydraulic trench jacks) should not be used to shore excavations below groundwater in materials that exhibit flowing ground behavior (see Figure A-1 in Appendix A for ground behavior definitions). Materials that exhibit flowing ground behavior should either be (1) improved by ground improvement (see Section 3.3) and/or externally dewatered before and throughout the duration of the excavation; or (2) shored with a method that will provide complete and positive shoring ahead of the excavation and that will cut off groundwater seepage through the sides and up into the base of the excavation (e.g., via interlocking sheet piles with sufficient toe embedment to cut off seepage through the base of the excavation).

Dry (i.e., above groundwater), granular, noncohesive soils (e.g., typical utility backfill) qualify as Cal/OSHA Type C ground, and will have little to no stand-up time and will tend to run or fast ravel when exposed in unshored vertical excavations. Similarly, dry fine-grained soils with low cohesion will have little stand-up time and will tend to fast ravel when exposed in vertical unshored excavations. Running or fast-raveling, granular, noncohesive materials, and fast raveling, fine-grained soils with low cohesion (particularly those subject to construction vibrations) will have insufficient strength and stand-up time to safely maintain full-depth vertical excavations long enough for complete trench box or solid-sheet speed shore installation (solid sheeting is required by Cal/OSHA in Type C soil). The use of trench boxes in these conditions will require (1) careful interior (i.e., from within the trench box) excavation with backer plates pushed below the bottom of the trench box ahead of the excavation, and/or (2) prior ground improvement (e.g., external dewatering and/or permeation grouting of existing granular utility backfill).

The use of solid-sheet speed shores in running and fast-raveling ground (i.e., Cal/OSHA Type C material) that has not been improved (e.g., by permeation grouting or dewatering) will result in excavation wall loss and related undermining of adjacent pavements, utilities, and structures where the stand-up time of the material exposed in the vertical excavation is less than that required for placement of the speed shores.

Shoring installation and removal must be monitored and performed in a manner that does not cause settlement to any project element or nearby structure, improvement, or utility. If settlement is indicated during shoring installation or extraction, then the contractor should be required to immediately stop and revise his methods of installation or extraction, or leave the shoring in-place (for example, for sheet piles abandon them in-place by cutting them off below grade; typical sheet pile cutoff depth is on the order of 5 feet below finished grade). Detailed as-built drawings should be prepared documenting the location and depth of all shoring which has been abandoned in place.

Shoring systems that do not provide continuous positive support of excavation walls (i.e., passive systems like trench boxes that allow for minor movement of the trench wall toward the excavation) may also cause surface settlement and related damage to nearby utilities, structures, and improvements. A summary of the potential surface settlement of passively shored excavations is provided in Table 2.

Table 2. Potential Surface Settlement of Passively Shored Excavations

Soil Type	Surface Settlement (% of Excavation Depth)¹	Lateral Zone of Disturbance (Multiples of Excavation Depth)¹
Sand	0.5%H	H
Soft to Medium Stiff Clay	1–2%H	3–4H
Stiff Clay	<1%H	2H

¹ From Suprenant and Basham (1993). H = depth of excavation.

3.2.3.1 Special Shoring

Special shoring design should be required for long-term trenchless shafts and where excavations will be within an imaginary plane projected downward at an inclination of 1H:1V from the nearest adjacent property and/or foundation edge of any critical structure or utility. Special shoring design should account for surcharge pressures on and demonstrate positive lateral support for the structure or utility. Areas requiring special shoring and/or ground improvement designs should receive preconstruction condition surveys and real-time monitoring during construction. Examples of shoring with water-tight shafts and portal seals at receiving and launching shafts are provided in Figures 15, 16.1, and 16.2.

3.3 Ground Improvement

Ground (whether native soil or excavation backfill) with running, flowing, and fast-raveling behavior will have little to no stand-up time in unshored vertical excavations and can produce large inflows where located below groundwater and not prestabilized by ground improvement. The failure surface of an inadequately shored and unstable excavation in running granular noncohesive materials could extend to the angle of repose of the material, which is typically on the order of 30 degrees for sand and gravel. The failure surface of an inadequately stabilized excavation in flowing materials would be flatter. Consequently, inadequately stabilized excavations will result in existing nearby utilities, structures, and roadways being damaged by loss of support, undermining, or vibration-induced settlement.

Therefore, excavation backfill of nearby parallel and crossing utilities should be evaluated by the contractor for its final shoring and ground improvement designs. Excavation that will occur in running, flowing, or fast-raveling materials should be stabilized by ground improvement, such as grout stabilization by a specialized and experienced grouting contractor, where not completely and continuously shored (i.e., at utility penetrations through shoring), to avoid related damage to existing utilities, pipelines, structures, and roadways.

Prior to grouting, the contractor should notify Underground Service Alert to mark subscribing subsurface utilities in the vicinity of the planned excavations and grouting. The contractor should use the project drawings and make a detailed site inspection to locate existing subsurface utilities prior to the start of project grouting and excavations. Proposed grout injection location within 5 feet of an existing utility should be probed for utility clearance prior to grout pipe installation and relocated where necessary upon required approval.

The selection, design, implementation, and monitoring of ground improvement for the project should be made the sole responsibility of the contractor and should be submitted by the contractor for the District's review prior to start of work. Ground improvement submittals should include the following:

- A layout plan and subsurface profile detailing the location and identification of grout injection casings and vertical grout injection stages within these casings including proposed method of casing installation and sequence of grouting. This would include fast-setting grout bulkheads.
- Materials including grout mix design, unconfined compressive strengths and set times
- Equipment including drill rigs, mixers, pumps, grout injection casings, gauges, etc.
- Methods and procedures of grouting execution
- Anticipated grout injection volumes (i.e., intake volumes based on void ratio/porosity of material to be grouted, and dimensions of grouted prism required to resist earth pressures and hydraulic head)
- Methods of monitoring and evaluating quality assurance
- Contingencies for environmental containment and plan for clean-up and site restoration.

The grout mix must not be corrosive to existing utilities nor contain environmentally hazardous materials. and be designed with fluidizers to have a set time to allow for the permeating grout flow to completely fill all voids in the existing granular material being grouted. The grout injection pressure should be designed to not damage nearby utilities, pipelines, and structures and not cause heave of the ground surface. No

heave of the ground surface should be allowed, and all existing utilities, pipelines, and structures should be protected from damage during the grouting work. Temporary elevation benchmarks should be installed in the grouting area at suitable distances outside of the grouting area for monitoring ground surface movement. Scheduled elevation measurements should be recorded during all grouting operations and a daily log of cumulative changes in the elevations should be maintained and monitored within predetermined alarm limits.

Grouting through grout injection casings should continue until grout returns are noted in the next adjacent pre-drilled/driven grout injection casing. Success of this system will require careful balance between grout injection pressures (always to be less than the pressures that could damage the existing utilities), grout fluidity/set times, and grout injection casing layout dimensions. A daily log of grouting operations should be maintained including grout injection casing number, location, grouting pressure and rate, stage depth, and grout quantity and batch used. Grout batch records should include time of mix and amount and type of components (e.g., water, cement, additives) used, and anticipated set time. A sample should be taken from each mixed batch and properly identified, stored, and tested for compressive strength. During and upon completion of grouting, the work area should be cleaned and restored to the original condition in accordance with the respective governing regulations including adequate disposal of all generated waste and wastewater.

3.3.1 Permeation Grouting

Permeation grouting typically consists of injecting a fluid mixture of cement and water with fluidizer additives into porous and permeable ground. A reason to use permeation grouting on the project would be to provide bulkheads and to fill all voids within existing coarse granular backfill (backfill also refers to related embedment and stabilization material) with grout for one or more of the following purposes:

- To stabilize materials that would be unstable when exposed in vertical excavations
- To stabilize materials that would be subject to vibration densification
- To reduce the rate and volume of perched groundwater transmission within porous and permeable materials

Permeation grouting should completely bind the granular material into a single coherent grouted mass (grouted prism). Permeation grouting is to be done prior to shoring installation and prior to any dewatering. For permeation grouting, the grout mix should be designed with fluidizers so that its set time allows for permeating grout flow to completely fill all voids in the existing granular material being grouted between pregrouted bulkhead ends.

3.3.2 Compaction Grouting

Compaction grouting injects a low slump grout to densify loose, granular soils and to fill/stabilize subsurface voids and sinkholes. This method may be suitable for stabilization of dry loose backfill material similar to permeation grouting. A reason for compaction grouting on the project would be to fill voids behind shoring or densify loose coarse grained backfill material. This method does not directly reduce the permeability of the material being improved and is typically not suitable for groundwater cutoff for shafts and portals or improving utility backfill below groundwater.

3.3.3 Jet Grouting

Jet grouting uses a drilled monitor advanced to a determined treatment depth with a rotating jet of high pressure, fluid mixture of cement which erodes, mixes, and improves varying ground conditions into cemented soil. Water and air nozzles provide additional erosion and mixing capabilities in challenging ground types with cylindrical geometries determined by modifying the rotation pattern of the jet monitor. Soil erodibility is a major determinant in predicting the quality of the ground improvement. The high pressures required for jet grouting may have damaging effects. Abrasive effects to adjacent structures and utilities and rapid evidence of heave may occur in response to the high pressures (especially at shallow depths) if not designed with an appropriate safety factor for overburden pressure or reduced pressures within close proximity to underground features and the ground surface.

3.4 Pilot-Tube-Guided Boring

The project pipeline crossing of SR101 is designed for the new water main to be installed within a minimum 22-inch diameter steel casing which is to be tunneled into place using the pilot-tube-guided boring (PTGB) method. Refer to ASCE's 2017 Manuals and Reports on Engineering Practice No. 133 for descriptions and definitions of PTGB and to McMillen Jacobs Associates 2018 Geotechnical Review Memorandum of West Yost Associate's 90% trenchless plans and specifications for the project.

A partial summary of the selected tunnel zone conditions for the PTGB crossing of SR101 (referred to herein as the tunnel and Reach 1) and a segment along Shoreway Road (Reach 2) is provided in Table 3 and are illustrated in Figures 19 and 20, respectively.

Table 3. Partial Summary of Selected Tunnel Zone Conditions

Tunnel ⁽¹⁾					Tunnel Zone Conditions			
Reach (Crossing)	Length (ft)	Shaft	Profile Station	Depth (ft)	Nearest Test Boring ⁽²⁾	USCS Group ⁽³⁾	SPT "N" ⁽³⁾	Ground Class ⁽⁴⁾
1 (SR101)	300	Jacking	17+08	24.5	B-2	CL	15,6	Raveling to Squeezing
		Receiving & Jacking	20+18	20	B-3	CL/ML	8	Raveling to Squeezing
2 (Shoreway Rd)	350	Receiving	23+64	19.5	B-5	CL/ML	10,4	Raveling to Squeezing

⁽¹⁾ Data are approximate, locations and depths from Phase 1 project drawings and from 90% design drawings of the future SR101 crossing in Phase 2 (West Yost, 2020 and 2018).

⁽²⁾ Boring locations mapped in Figure 1 with complete logs provided in Appendix B.

⁽³⁾ Unified Soil Classification System Group Symbol and ASTM D1586 SPT sampler blow count noted on logs.

⁽⁴⁾ Tunnelman's Ground Classification System, described in Figure A-1 of Appendix A.

The contractor should be made solely responsible to select its means and methods to complete the tunnel crossings, compatible with the conditions to be encountered as described in this report and in the contractor's own geotechnical investigation. The contractor should be required to provide submittals detailing its proposed tunneling means and methods for District review prior to mobilization. The selected means and methods must show it can maintain specified line and grade without allowing uncontrolled loss of subsurface materials into the tunnel face from outside the tunnel zone. Loss of ground outside the

tunnel should be prohibited since it would produce voids that would result in damage to nearby utilities, pavements, and structures.

Ground conditions along the tunnel may differ from that encountered in pertinent project geotechnical test borings and may include mixed-face and change-in-reach ground conditions (see Figure 21). Not all the subsurface ground that will be encountered during tunneling will necessarily be native, and the native ground encountered may vary from those logged in project test borings. For example, tunneling beneath and in close proximity to existing utilities along Shoreway Road may encounter granular non-cohesive utility backfill. Pre-tunneling permeation grouting of existing granular utility backfill may be necessary to prevent inadvertent and uncontrolled loss of ground in and through the tunnel.

3.4.1 Launching and Receiving Shafts

PTGB installation eliminates the need for trench shoring, dewatering, trench excavation, backfill, and surface restoration along the tunnel alignment; however, these items will be required at PTGB launching and receiving shafts. Therefore, recommendations pertaining to these items as provided in Sections 3.2 and 3.3 of this report apply to tunnel launching and receiving shafts. The condition of critical nearby utilities, pipelines, and structures should be evaluated and monitored when shoring is installed and removed. Shoring installation and removal must not cause heave, settlement, or vibrations that cause damage to any nearby utility, pipeline, structure, or pavement. Any void space created by shoring removal should be completely filled with approved material.

3.4.2 Launching and Receiving Portals

Soil located immediately behind launching and receiving shaft shoring must be stable when exposed in launching or receiving portals. Noncohesive soils (e.g., sand and gravel) or fine-grained soils with low cohesion (e.g., Bay Mud) that are exposed in portal openings would flow, run, ravel, or squeeze into the shaft excavation where not stabilized. Water-tight portal seals are recommended to be provided at launching and receiving shafts (see Figures 15, 16.1, and 16.2) to prevent uncontrolled groundwater transmission, if any, and/or loss of soil into the shaft. Confirmation of stabilization of the portal area must be required before cutting the portal opening for tunnel equipment launching or receiving. Confirmation should be performed by cutting small-diameter holes (less than 1 inch) through the shoring and probing the soil behind the area of the planned portal. If soils are observed to move into the excavation through the holes, ground improvement will be required until the portal is stable.

3.4.3 Casing and Overcut

The casing should be designed with an appropriate factor of safety to withstand (1) the maximum axial compressive force to be exerted on the pipe by jacking; (2) earth loads due to full overburden pressure and surcharge loading; and (3) point loads including those caused by extraneous large particles (e.g., gravel) abrading the outside of the casing as it is jacked along the tunnel.

An overcut in excess of the actual diameter of the casing consistent with the PTGB method is typically less than 1 inch on the diameter. The annular space created by the casing overcut should be completely filled during installation with a suitable lubricant that is continuously injected between the outside surface of the jacked casing and the surrounding ground. The volume of lubricant must be at least equal to the volume of the overcut annular space, completely filling of the annular overcut, thereby reducing related systemic settlement and induced skin friction loads. Loose, noncohesive and very soft soils may not stand

and support an overcut without lubrication. As a factor of safety, the contractor's estimates of required jacking force should take into account possible nonlubricated lengths of casing.

Careful timing and coordination are required so that at no time is any length of the tunnel unsupported as the excavation progresses. Modeled cases of systemic settlement above a tunnel with a 1-inch overcut on the diameter around a 22-inch diameter steel casing are provided in Table 4. The amount of systemic settlement can be reduced by reducing the overcut and ensuring a completely lubricated annular space.

Table 4. Modeled Systemic Settlement

Top of Tunnel Casing Depth (ft) ⁽¹⁾	Station	Point of Interest	1-inch Diameter Tunnel Casing Overcut Annular Space Infilling ⁽²⁾ (%)	Systemic Settlement (in)
5	20+10	54" SSFM	100	0.6
10	23+25	36" & 39" SD	100	0.35
15	22+00	Shoreway Rd	100	0.25
20	18+00	SR101	100	0.2

⁽¹⁾ Based on 90% project drawings (West Yost, 2018).

⁽²⁾ Reduced with use of lubrication during and contact grout after tunneling.

3.4.4 Thrust Blocks

The contractor should have a professional civil engineer licensed in the State of California make careful analysis of anticipated jacking force for the tunnel drive and provide that information to the District for review prior to construction. A thrust block should be designed to provide an adequate reaction for the anticipated jacking forces. A maximum allowable jacking shaft thrust block soil-bearing-pressure of 1,500 psf in ground like that encountered at the planned tunnel depth in geotechnical test borings B-2W, B-3, and B-5 and the passive pressure diagram for reaction wall design provided in Figure 22 can be used for preliminary design. This recommended allowable jacking shaft thrust block bearing pressure is based on a minimum thrust block width of 8 feet and limiting thrust block deflections to 1 inch or less.

Careful attention must be given to adjacent utilities within the zone of influence of the thrust block to avoid damage to the utilities. The minimum zone of influence of the thrust block should be taken as the width of the thrust block above, below, laterally, and behind the thrust block. The recommended allowable jacking shaft thrust block soil-bearing-capacity may be modified for thrust block size and shape and allowable deformation (thrust block capacity may further be modified by ground treatment such as grouting). Final thrust block capacity will be evaluated based on the contractor's submittal of shaft type and configuration, thrust block type and configuration, and thrust block bearing capacity calculations.

3.4.5 Miscellaneous

Line and grade measurements using a theodolite to monitor the pilot-tube advancement should continuously monitored and the necessary steering adjustments performed to maintain the PTGB within specified line and grade tolerances. The tunnel heading should balance external soil pressures and prevent overexcavation and loss of ground into the tunnel and related settlement of the overlying ground. A comparison of careful real-time accounting of spoils volume to tunnel excavation and advance rate should be made. Inadvertent overexcavation should be suspected where the real-time volume of spoils generated by tunneling exceeds what the real-time volume of the excavated tunnel should be. In such a case, immediate action by the contractor is required to stop and rectify the overexcavation including by filling

voids caused by the overexcavation. Unless promptly and adequately mitigated, inadvertent overexcavation will cause damaging settlement to nearby elements (e.g., structures and utilities).

The contractor should be made solely responsible for repairing any damage resulting from tunneling or other construction operations. A preconstruction survey and real-time monitoring of all streets, sidewalks, buildings, utilities, and any improvements in close proximity to the tunnel work should be performed in order to document baseline conditions and to monitor for movement during construction. A Typical subsurface settlement monument detail is provided in Figure 23. The preconstruction survey should include establishment of vertical control points along the ground surface, both above and offset from the tunnel alignment by a California licensed land surveyor.

The contractor should have an emergency contingency plan that will provide for (1) the adequate closure of the tunnel in the event of uncontrolled transmission of groundwater and/or uncontrolled loss of ground through the shaft portal, tunnel, or its overcut annular space; and (2) the filling of void space that may develop between the pipeline and surrounding in situ ground to prohibit ground surface settlement and adjacent structure and utility damage. Careful timing and coordination of tunneling is required so that at no time is any length of the tunnel unsupported as the excavation progresses. Any loss of ground from outside the tunnel zone into the tunnel must be properly replaced with grout to fill all voids. In the absence of inadvertent overexcavation, tunnel-induced ground surface settlement will be solely systemic and caused by the annular overcut.

The contractor should submit documentation for District review (i.e., shop drawings and design calculations) that demonstrates that the selected materials and methods of tunnel construction will meet project requirements. The contractor should submit records daily regarding tunnel operations—including monitoring, stationing, and line and grade, lubrication volumes, steering corrections, jacking forces, planned excavated volume vs. actual spoils volume, and contact grout injection pressures and volumes.

3.5 Bedding and Backfill

The contractor should protect pipe from damage during placement and compaction of excavation backfill (which includes foundation and embedment materials as defined herein). Excavation backfilling should be performed in accordance with the following requirements where not exceeded by those from the City, District, or pipe manufacturer, and as long as they will not cause damage. See Figure 24 for excavation backfill.

3.5.1 Foundation Material

Foundation material, if and where required, should consist of a minimum thickness of either 6 inches of Controlled Density Fill (CDF or referred to herein as CLSM for Controlled Low-Strength Material); or 12 inches of clean, durable, natural, 1.5-inch crushed (i.e., angular) rock wrapped with geotextile fabric. See Table 5 for crushed rock gradation requirements and Section 3.5.5 for CLSM mix requirements.

The geotextile fabric is used to separate the open-graded drain rock from the surrounding, finer grained native soils and pipe bedding material, and should be overlapped a minimum of 12 inches. Foundation material is required for excavations in which the bottom is unstable, yielding, or disturbed by construction activity, or where overexcavation occurs.

Table 5. Gradation Requirements for 1.5-inch Crushed Rock

Sieve Size	Percent Passing
2 in.	100
1-1/2 in.	90–100
3/4 in.	5–30
3/8 in.	5–20
No. 200	0–4

The geotextile fabric should be a nonwoven material consisting of polyester, nylon, and polypropylene filaments formed into a stable network. The fabric should be permeable, not act as a wicking agent, be inert to commonly encountered chemicals, be rot proof, and be resistant to ultraviolet light. The geotextile fabric should also conform to the physical properties in Table 6.

Table 6. Geotextile Fabric

Property	Test Value	ASTM Test Method
Weight	5.4 oz/yd ² (min.)	D5261
Grab tensile strength	150 lb (min.)	D4632
Elongation at break	50% (max.)	D4632
Puncture strength	80 lb (min.)	D6241
Burst strength	300 psi (min.)	D3786
Apparent opening size	#70 (max.)	D4751
Permittivity	1.0 sec ⁻¹ (min.)	D4491
UV resistance	70% (min.)	D4355

The thickness of the stabilization material is to be based on the depth at which a firm unyielding stable base is reached or the depth at which a firm unyielding stable base can be created by the placement of the stabilization material. Decisions regarding the use, extent, and thickness of stabilization material should be made by the construction manager at the time of construction.

3.5.2 Pipe Embedment Material

As long as placement would not damage the pipe, and where approved by the pipe manufacturer, the embedment material around the pipe should consist of CLSM, or Class 2 aggregate base (Class 2AB) uniformly graded to the requirements in Table 7. The embedment material type, compaction, and thickness should be selected to provide the lateral support necessary to prevent pipe deformation. Embedment material should extend a minimum distance of 4 inches below the pipe to 6 inches above the pipe for CLSM, or for Class 2AB 6 inches below the pipe to 12 inches above the pipe.

3.5.3 Excavation Backfill Material

Excavations should be backfilled above the pipe embedment zone with CLSM or Class 2AB.

Table 7. Class 2AB

Sieve Size	Percent Passing	
1 in.	100	
3/4 in.	90–100	
No. 4	35–60	
No. 30	10–30	
No. 200	2–9	
Test	California Method No.	Requirement
Resistance (R-Value)	301	78 min.
Sand Equivalent	217	22 min.

3.5.4 Lightweight Backfill

Very soft, organic-rich, lightweight, under-consolidated and compressible Bay Mud is mapped to exist below artificial fills that were placed to reclaim the project area from its historic tidal marshland condition in the 1940's to 1960's (i.e., 60 to 80 years ago). Bay Muds are subject to long-term primary consolidation settlement where subjected to new additional loads. Ultimate settlement of Bay Muds takes years to develop (Figure 25). We recommend that the project pipeline be designed so that there is no increase in the loading condition on the underlying Bay Mud. Therefore, the project should be designed so that the total weight of the pipeline, its product, and excavation backfill materials collectively weigh no more than the existing ground excavated to construct the pipeline. This may require that excavation backfill (i.e., foundation material, Class 2AB, and/or CLSM) be made of lightweight materials.

The depth of fill and the depth to the top of the Bay Mud encountered in test borings for the project are summarized in Table 1. Also provided in Table 1 is the planned invert depth for the project pipeline.

Excavations for construction of the planned pipeline at the locations of test borings for Phase 1 of the project (i.e., borings B-1 and B-2W) will be within artificial fill that was historically placed over the Bay Mud (see Table 1). A typical average dry unit weight for artificial fills like those logged in borings B-1 and B-2W can be taken as 100 pcf. To minimize the potential for long-term consolidation settlement of the underlying Bay Mud, the dry unit weight of trench backfill materials for Phase 1 of the project should not exceed 100 pcf.

Excavations for construction of the project pipeline at the locations of test borings for Phase 2 of the project (i.e., borings B-3, B-4, and B-5) will be within Bay Mud (see Table 1). Laboratory test results of the Bay Mud from these borings indicate that its dry unit weight varies from 28 to 55 pcf. To minimize the potential for long-term consolidation settlement of the underlying Bay Mud, the dry unit weight of trench backfill materials for Phase 2 of the project should not exceed 40 pcf.

3.5.5 Controlled Low Strength Material (CLSM)

CLSM should be used as excavation backfill where backfill material cannot otherwise be properly compacted, including below existing crossing utilities. Requirements for CLSM include the following:

- Be a self-compacting, hand-excavatable mixture of cement, pozzolan, coarse and fine aggregate, and water that has been mixed in accordance with ASTM C94 and is in a flowable state during placement;

- Have a minimum 28-day compressive strength of no less than 50 psi and a maximum 28-day compressive strength of no more than 150 psi;
- Be noncorrosive (physiochemical properties that do not damage the pipe);
- Be placed in appropriate lifts or with methods to prevent movement of the pipe, including by flotation; and
- Be installed with approved anchor blocks or deadman concrete collars, as needed, to secure the pipe in place.

Placement of backfill, pavement section, or concrete on top of CLSM should not be allowed until the CLSM passes the ball drop test of ASTM D6024.

3.5.6 Compaction

The following recommendations assume that the pipeline and underlying ground can support mechanical compaction as recommended herein. Where this is not the case, then the pipe embedment material and excavation backfill material should consist of CLSM. Relative compaction referred to herein is in accordance with ASTM D1557, unless stated otherwise. All water that accumulates in the bottom of excavations must be removed so that the work can be done under relatively dry conditions. Stabilization material should be placed (CLSM) or densified (crushed rock) in place to provide a stable trench bottom capable of supporting compaction of the pipe embedment material. Three passes with a vibra-plate compactor are typically adequate to sufficiently densify crushed rock to a firm, unyielding state.

Pipe embedment material consisting of Class 2AB should be compacted to a minimum of 90% relative compaction at a moisture content at or above optimum. The pipe embedment material at the bottom of the pipe (i.e., pipe subgrade) should be compacted to a smooth, uniform plane to match the desired pipe slope. Where applicable, flange or bell holes should be excavated out at each pipe joint to ensure uniform pipe support to proper line and grade over the full length of each pipe segment. After the pipe is laid in the excavation, embedment material should be uniformly placed in maximum 8-inch-thick lifts on each side of the pipe, hand-shovel-sliced around the haunches to support the sides of the pipe and to prevent pipe displacement, and then compacted to 90% relative compaction at or above optimum moisture conditions. Compacting and testing Class 2AB below the springline of the pipe will be dependent on the excavation width selected for installation of the pipeline and on the shoring and dewatering systems. It may not be practical to test compaction below the springline with less than 12 inches of side clearance between the pipe and shoring wall. Above the springline, the pipe embedment material should be placed in maximum 8-inch-thick loose lifts and compacted to a minimum of 90% relative compaction at or above optimum moisture content. Three passes with a vibra-plate compactor for each 8-inch-thick lift should typically be adequate to densify crushed rock for pipe embedment support.

Excavation backfill should be placed in maximum loose lifts of 8 inches above the pipe embedment material and should be compacted to a minimum of 90% relative compaction at or above optimum moisture content to within 3 feet of the pavement subgrade and to a minimum of 95% relative compaction within the upper 3 feet of backfill.

It should be made the contractor's responsibility to protect the pipeline from damage at all times during its transport and construction, including during placement/compaction of the embedment material (e.g., from stresses on the pipeline by heavy equipment). The contractor's performance in achieving compaction requirements for pipeline embedment material should be monitored and tested. This includes

ensuring that removal of shoring is completed in step with placement and compaction of the embedment material. Removal of shoring must not cause loosening of the compacted embedment material (i.e., either by gaps formed upon shoring removal or by vibration). Where shoring removal is permitted, the shoring should be removed in vertical stages, with final placement and final compaction of lifts of embedment material completed only within the unshored portion of the excavation.

3.5.7 Trench Dams

Trench dams consisting of CLSM or compacted clay can be constructed along the project pipeline to isolate and prevent the transmission of external water in permeable excavation backfill materials.

3.6 Pipeline and Backfill Settlement

Installation of the pipeline as recommended herein will not add any new appreciable loads to the underlying subgrade. Consequently, settlement of the pipeline will depend mostly on the condition of the excavation bottom, as determined by the contractor's performance in achieving the minimum recommendations for excavation bottom stability provided in this report. Therefore, it is imperative that stable excavation bottoms are maintained at all times and that loose, disturbed, or otherwise softened soils are not allowed in excavation bottoms. Backfill loading upon such soils can produce random settlements much greater than 1 inch, and that can be abrupt and localized over short sections of pipeline.

3.6.1 Backfill Compression

Where excavations are located beneath paved surfaces, the finished pavement will reflect backfill compression settlement. Backfill placed within excavations will compress (settle) by self-weight even when well compacted. We estimate settlement of excavation backfill compacted as recommended in this report to be less than 0.2 to 0.4 percent of its thickness. CLSM that passes the ASTM D6024 ball drop test will not compress by self-weight.

3.6.2 Recompression

Excavations for project pipeline construction will be backfilled to its original grade, and the compacted backfill will exert no significant additional loads on the underlying ground. Only elastic recompression of the ground induced by backfill placement is anticipated. Elastic recompression will occur quickly upon load application. The maximum recompression of undisturbed trench excavation bottoms (less than 5 feet wide) should be less than 1/2 inch and should occur upon backfilling. The maximum differential recompression between differing undisturbed ground types along the project alignments should be less than 1/4 inch. The maximum recompression settlement of shafts and pits that are less than 12 feet wide should be less than 1 inch and should occur upon backfilling.

Differential settlement can occur at the transition between trenchless installations and adjacent backfilled shafts and pit. Pipeline installed by trenchless methods (e.g., PTGB) should experience no settlement while that portion of the pipeline constructed in shafts, pits and trench excavations that are subsequently backfilled may experience up to 1 inch of recompression settlement. Closely spaced pipe joints or other design measures, such as slightly overbuilding the base of manholes within the trenchless shafts to accommodate recompression, should be used to address this type and amount of differential settlement.

3.6.3 Vibration-Induced

Settlements damaging to the project pipeline and adjacent improvements (e.g., existing underground utilities and street pavement) can occur as result of soil densification or loss of shear strength upon vibration. Vibration-induced settlements occur as a result of localized liquefaction and densification of saturated, uniformly graded, non-cohesive soils (e.g., nonplastic silts and sands) and sensitive soils (Bay Mud). Case histories cited by Lacy & Gould (1985) indicate 3 to 6 inches of pipeline settlement upon vibratory sheet pile extraction in these soil types. Therefore, all sheets/shoring extending below the bottom of excavations and into silts and sands should be installed and extracted, if allowed by the specifications, with caution relative to the generation of vibrations; noting that static pull-out of shoring may be required. Shoring removal, if allowed, should be performed in a manner that does not cause settlement. The project pipeline should be monitored for settlement when adjacent shoring is removed.

3.6.4 Consolidation

Consolidation settlement of the pipeline is expected if additional loads are applied to the subgrade by installation of backfill materials that have higher dry unit weights than that which will be removed to construct the pipeline. See the discussion of lightweight backfill in Section 3.5.4.

3.7 Vertical Loads on Pipe

Vertical loads applied to project pipeline will consist of dead loads imposed by trench backfill and intermittent live loads imposed by vehicle traffic. Design criteria for live loads on the pipeline from vehicular traffic (H-20 loading) are provided in Figure 26.

3.8 Restrained Joints

Thrust forces from the internal pressure of the pipeline (e.g., at bends, tees, reducers, etc.) may be resisted by restrained joints. The controlling design angle of internal friction of 30 degrees can be used for Pipe Embedment Material compacted as recommended in this report. The design friction factor between a smooth-walled pipeline and Pipe Embedment Material is 0.35. This value assumes that the Pipe Embedment Material is properly placed and compacted as recommended in this report or that it has a minimum thickness of 6 inches around the pipeline where CLSM is used. Only one-half of the actual overlying unit weight should be used in design calculations for thrust load transfer to account for the effects of arching, trench side friction and perched groundwater conditions.

3.9 Construction Vibrations

The project will be constructed in ground that will transmit construction vibrations to existing nearby surface structures (e.g., existing commercial buildings) and subsurface structures (including utilities and pipelines). Therefore, the type and operation of equipment to be used during project construction should be selected by the contractor to limit construction vibrations (a function of frequency and peak particle velocity) to levels that will not damage existing surface structures and improvements, and existing subsurface structures including utilities and pipelines. A commonly accepted damage threshold criterion for high frequency peak particle velocity vibrations at existing surface structures and improvements is on the order of 1.0 to 2.0 inches per second (Siskind and others, 1980). High frequency peak particle velocities above these values can cause cosmetic damage to structures (e.g., cracking of plaster and drywall).

Construction vibrations should be monitored and documented by qualified technicians with approved vibration measuring equipment (seismographs) located at structures nearest the site of actual ongoing construction. Vibration levels greater than 1.0 inch per second at nearby surface structures will require modification of the contractor's construction procedures to reduce vibration levels. Photographic precondition surveys of the structures located adjacent to the project alignment should be performed to establish baseline conditions prior to project construction and to aid in assessing any construction damage claims.

3.10 Roadway Pavement Replacement

Roadway pavements constructed to repair or replace roadway pavements should match or exceed existing sections, be designed to appropriate traffic indices, and meet the requirements of the governing agency. Roadway pavements in and leading to the project area could be damaged by heavy construction traffic loads that are typically required for construction of this type of project. The repair of roadway pavement damaged by construction traffic should be included as a bid item for contractors. A preconstruction pavement condition survey should be performed to provide baseline criteria. Pavement section replacement or repair should at least match the existing section. Additionally, pavement section replacement or repair should be designed for appropriate traffic indices and meet the requirements of local jurisdictions.

3.11 Seismic Design

The project area will be subject to ground surface accelerations that may damage project elements (see Section 2.6). The project should be designed for ground shaking in accordance with seismic provisions of building codes adopted by the governing agency. The ground type and conditions typically encountered in test borings in the project area consisted of more than 10 feet of Bay Mud (see boring logs in Appendix B), and therefore, in accordance with the site classification procedure for seismic design (ASCE 7-16) the project is designated as Site Class E. The project alignment has a high liquefaction susceptibility (see Section 2.8); however, no appreciable amount of liquefiable soils were encountered within project geotechnical test borings, and there are no known sites where liquefaction ground effects occurred in the project area during any historic earthquake.

4.0 Additional Services and Limitations

4.1 Additional Services

We recommend that McMillen Jacobs Associates be given the opportunity to provide the following additional services:

- Geotechnical review of final plans and specifications for Phase 2
- Review of geotechnical-related contractor submittals (e.g., excavation, tunneling, shoring; dewatering; ground improvement; backfill materials; and monitoring plans)
- Review of geotechnical-related contractor requests for information
- Periodic observations of subsurface conditions exposed during construction to evaluate if they are consistent with those anticipated by this report, for which recommendations provided herein are based and contingent upon.

4.2 Limitations

This report has been prepared for the exclusive use of the Mid-Peninsula Water District and West Yost Associates for design of the project. Project details referred to herein are from information provided by West Yost Associates as cited herein. The project will be designed and constructed in two phases as described in Section 1.0. This report presents geotechnical data and design recommendations for the multi-phased project based on current design plans for Phase 1, and on anticipated design of Phase 2. Therefore, the recommendations provided herein are final for design of Phase 1, and are preliminary for design of Phase 2. We should be afforded the opportunity to review the Phase 2 plans at the time of their development, and update the recommendations provided herein for its design if warranted at that time.

Our scope of services and this report included logging geotechnical test borings and providing geotechnical recommendations for project design. Bidding contractors and their geotechnical consultants should be required to perform their own independent evaluation of the subsurface conditions in the project area.

Ground conditions can vary between test boring locations and with time as a result of natural processes and the activities of man. As a result, conditions that differ from those summarized in this report can occur. McMillen Jacobs Associates is not responsible for the interpretation by others of the data contained in this report. If differing ground conditions are exposed during construction, or if design is changed from that as described herein, then McMillen Jacobs Associates should be retained to evaluate them and provide written modifications, as necessary, to this report. In addition, changes to laws, regulations, codes, and standards of practice could occur over time that would require modifications to the recommendations provided herein.

This is not a comprehensive study of the ground excavatability or of the groundwater conditions that will be encountered during construction of the project. Studies of the absence, existence, and/or effects of natural environmental conditions (e.g., soil corrosion and naturally occurring asbestos) or man-caused environmental conditions (e.g., contamination and asbestos pipe) that may impact the project are outside our level of expertise and are not part of our scope of services; they are to be addressed by qualified others as needed and directed by the District. Information pertaining to environmental conditions encountered in the course of our geotechnical investigation and references to such in this report are provided solely as an out-of-scope courtesy.

The services we have rendered for this report have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical profession currently practicing under similar conditions in the same area. This document is intended to be used in its entirety. No portion of this report, by itself, wholly represents the geotechnical findings and recommendations of the project.

5.0 References

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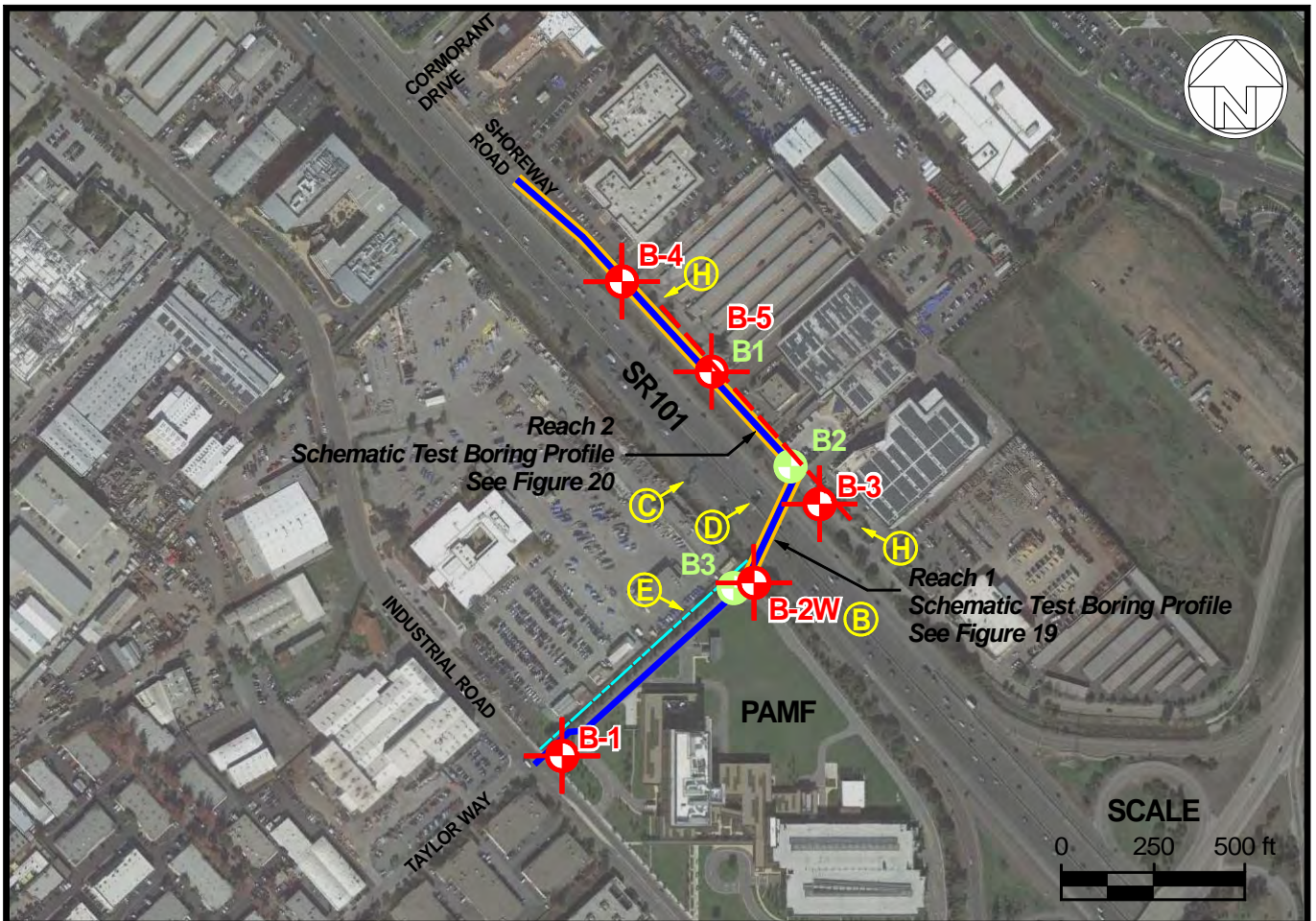
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Figures



LEGEND:

- - Phase 1 project alignment
(planned open-cut within the PAMF easement)
- — - Future SR101 crossing and open-cut along Shoreway Road
- - Drainageway
- - Overhead power lines along Shoreway Road
- ⊕ B-1
⊕ B-2W - Geotechnical test boring, "W" denotes boring completed as a groundwater level monitoring well
- ⊕ B1 - Environmental test boring by West Yost Associates
- ⊙ - Point of interest described in Figure 2



Maps modified from Google Earth (2017)



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June 2020

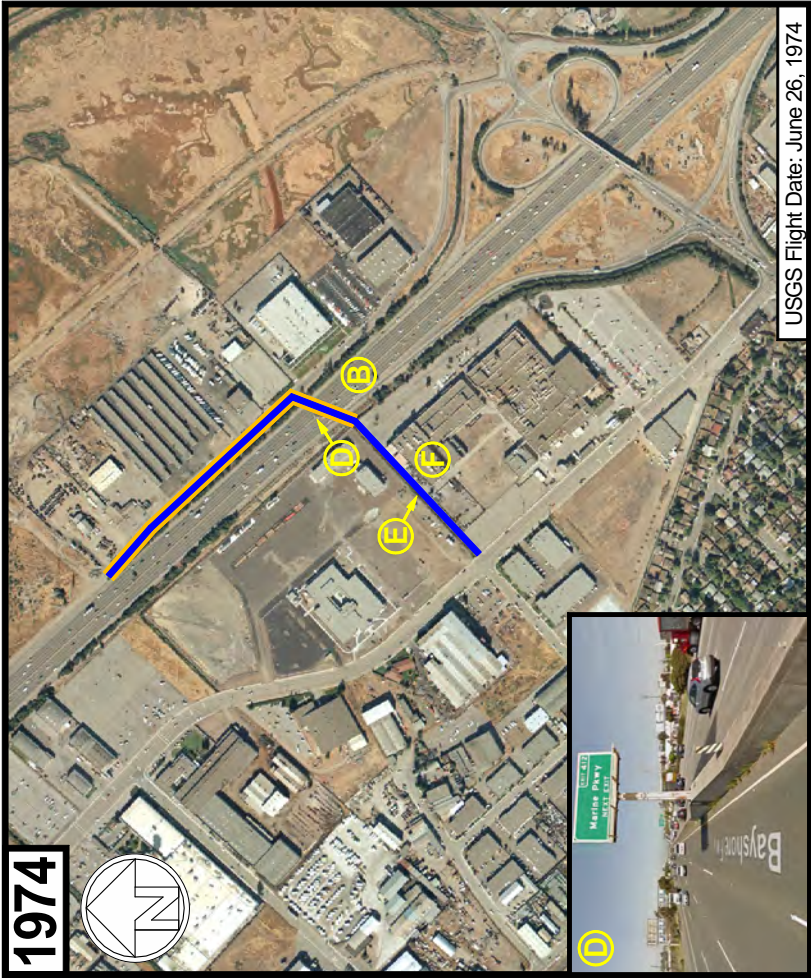
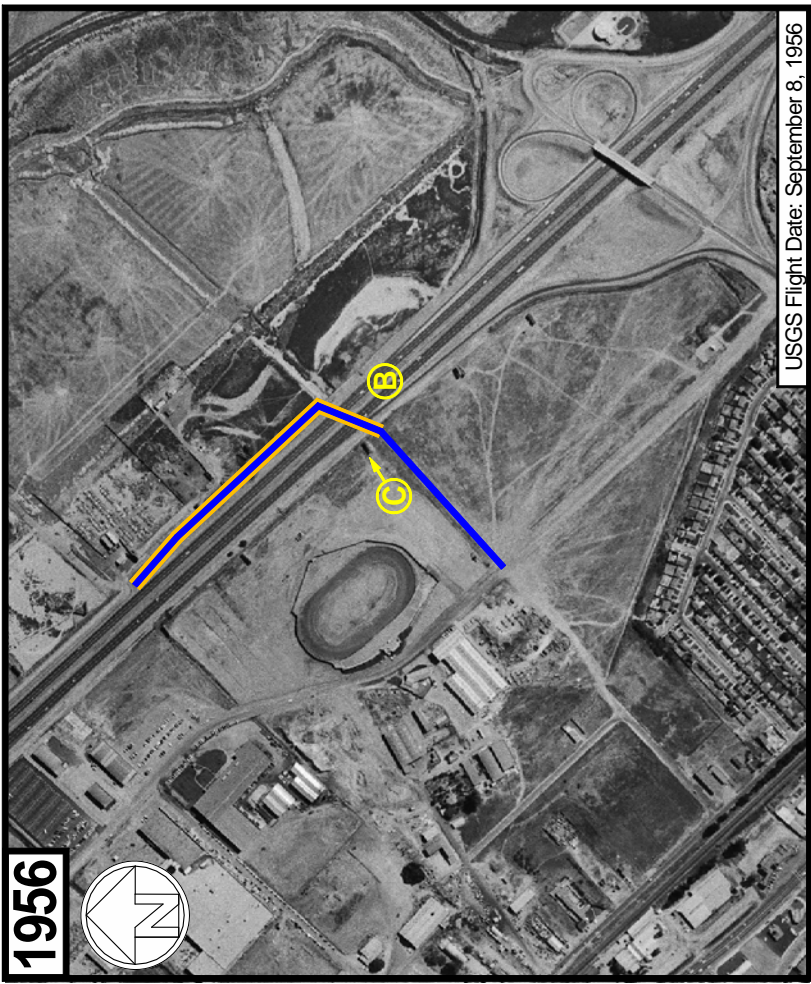
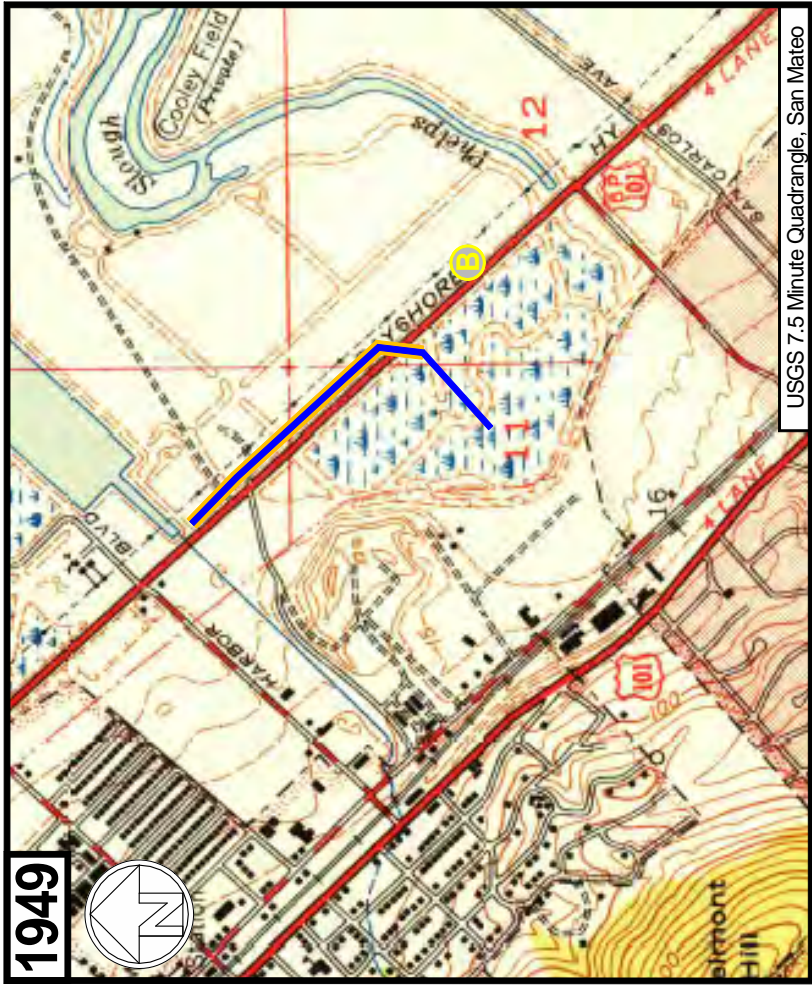
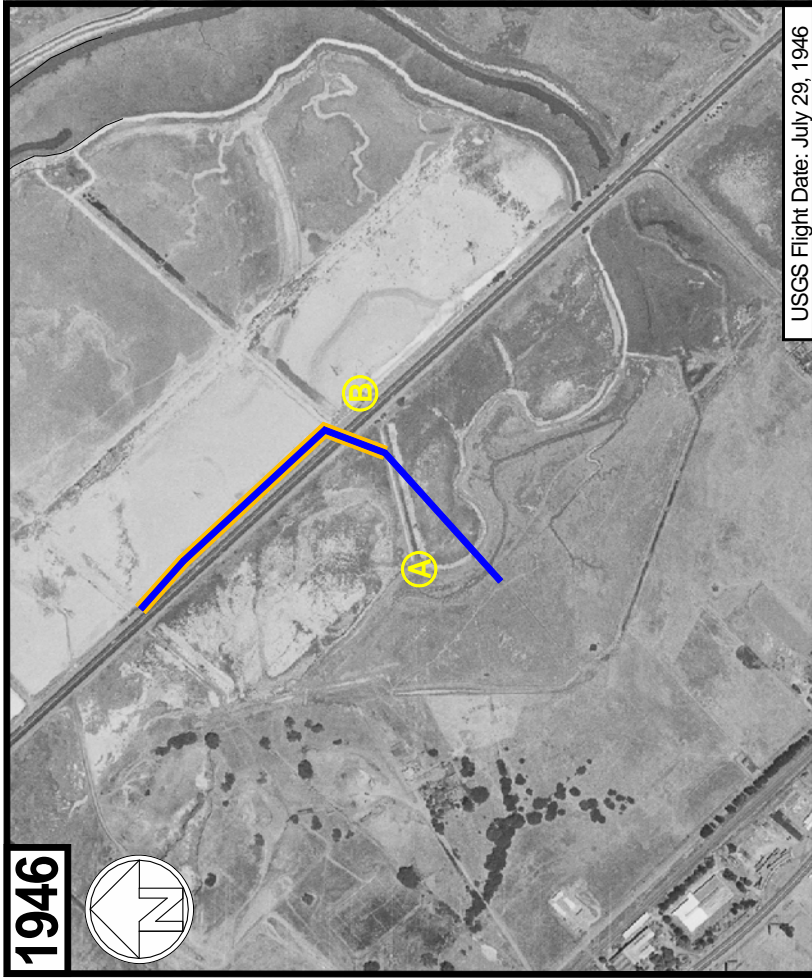
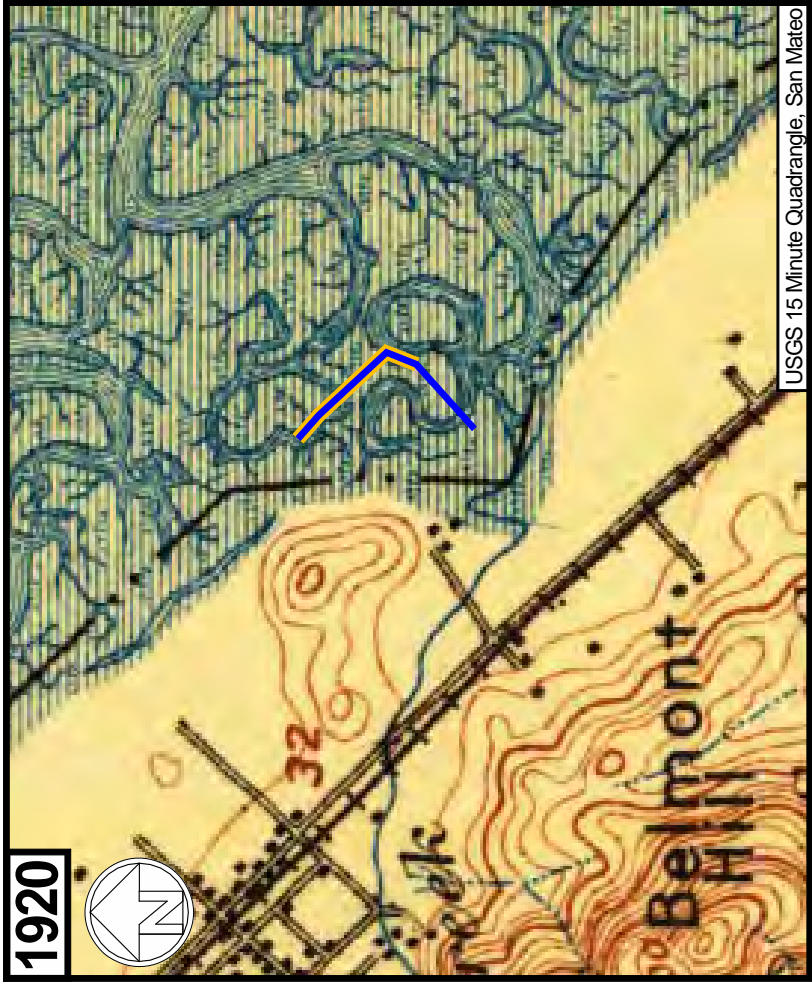
West Yost Associates

Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Project Map

Figure

1



LEGEND (also see Figure 1):

- Phase 1 project alignment
- Future SR101 crossing
- Former artificial drainage channel
- Highway 101; gradually increased in width and lanes over the years

- Highway signage
- Highway signage
- Artificial drainage channel
- Structures pre-dating PAMF development
- Razed and barren lot prior to PAMF development
- Utility tower

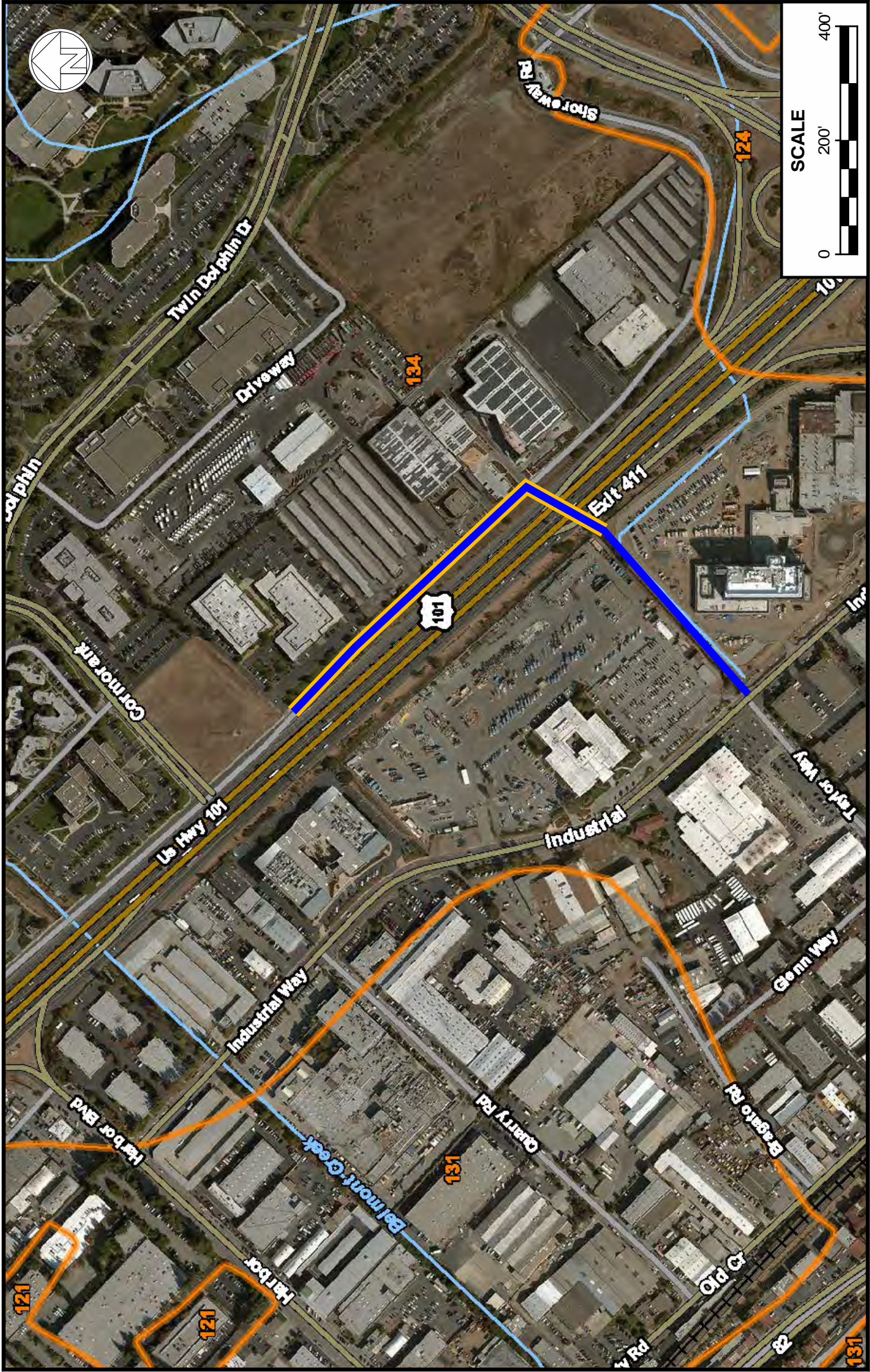
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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

McMILLEN JACOBS ASSOCIATES
File No. 5701.0 June 2020

Figure 2

Historic Topographic Maps and Aerial Photos



LEGEND:

- Phase 1 project alignment
- Future SR101 crossing

Mapped Soil		Below Ground Depth (in)	USCS Group Symbol	% Passing Sieve:		Atterberg Limits		High Water Table (ft)	Risk of Corrosion	
ID	Name			No. 4	No. 200	Liquid Limit	Plasticity Index		Uncoated Steel	Concrete
134	Urban Land*-Orthen's** reclaimed complex on tidal flats	0 - 40 40 - 60	- MH	- 100	- 85 - 95	- 50 - 70	- 20 - 30	2.5 - 5	High	High

*Urban Land - areas where > 85% of the surface area is covered by man-made features.

**Orthen's - areas of cut and fill, where properties and characteristics are highly variable because of the differences in the kind and amount of fill material.

Modified from U.S. Soil/Natural Resources Conservation Service (2017)



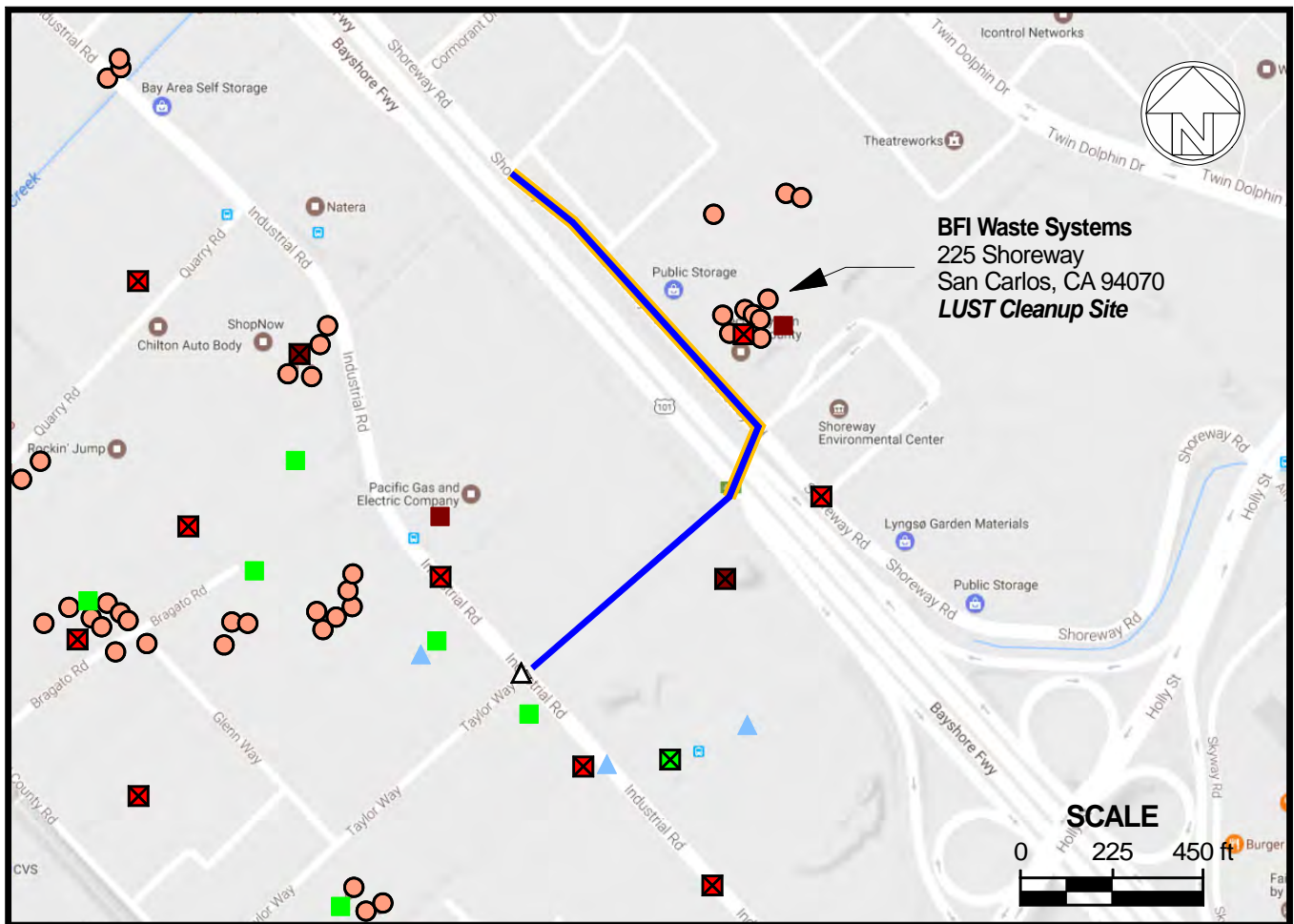
File No. 5701LOJune 2020

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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Soil Map

Figure3



Modified from Geotracker (California State Water Resources Control Board, 2017)

LEGEND:

- - Phase 1 project alignment
- - Future SR101 crossing
- Leaking Underground Storage Tank Cleanup Site
- Permitted Underground Storage Tank Facility
- ▲ Department of Toxic Substances Control Cleanup Site
- ▲ Department of Toxic Substances Control Hazardous Waste Permit Site
- Cleanup Program Site
- X Signifies Closed Site
- Monitoring Well

NOTES:

1. Prior to the operation of the former waste transfer station located to the north, the parcel was a storage yard with two USTs. The cleanup program encountered petroleum impacted soil and groundwater.



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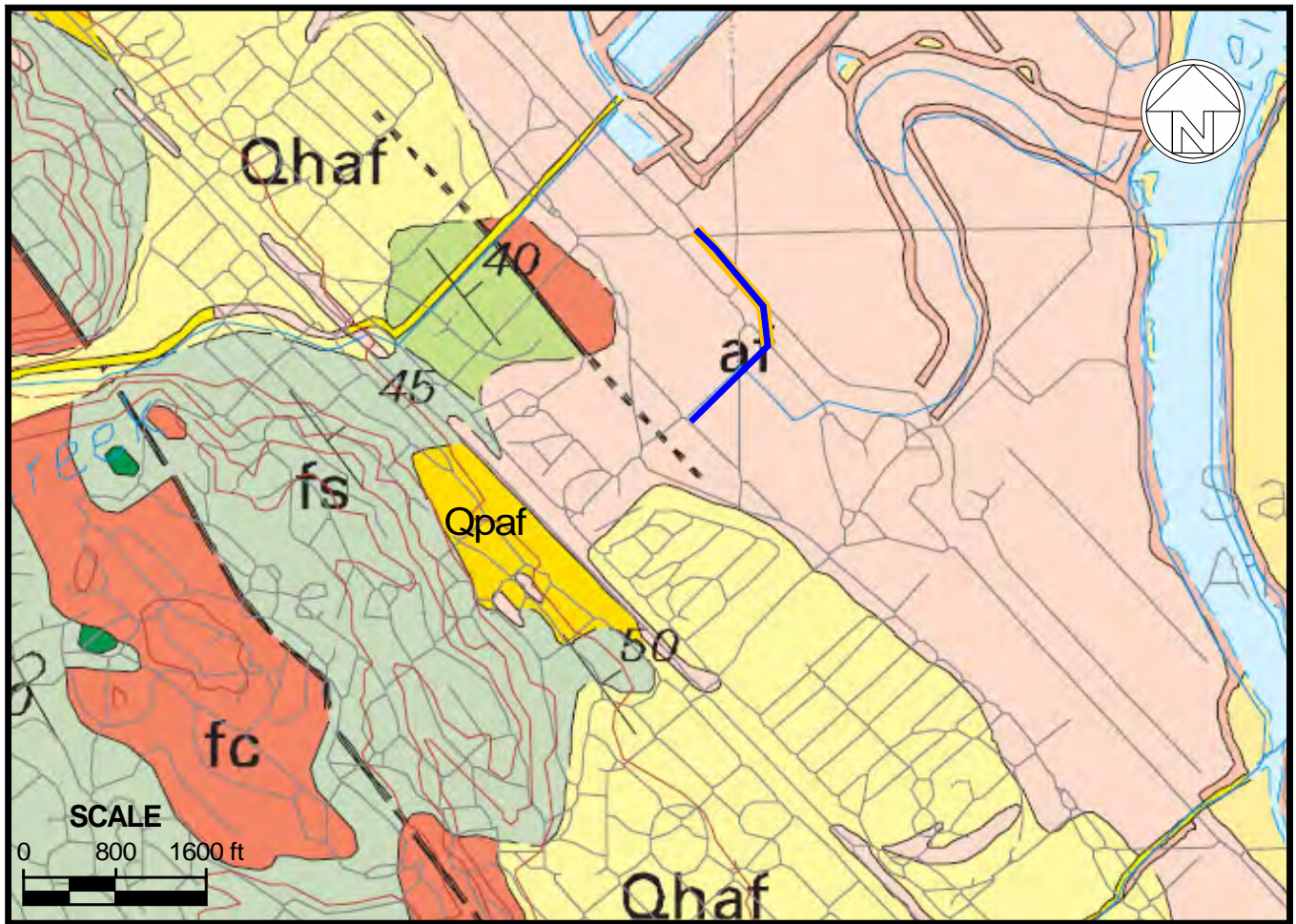
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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Geotracker Map

Figure

4



Modified from Brabb and others (USGS, OFR 98-137)

LEGEND:

- Phase 1 project alignment
- Future SR101 crossing

- af** **Artificial Fill** - Sand, silt, clay, rock fragments, organic matter, and man-made debris in various combinations, typically placed on very soft, compressible and organic Young Bay Mud (see Figure 3). Fill made before 1965 is nearly everywhere not compacted and consists simply of dumped materials.
- Qpaf**
- Qhaf** **Alluvial Deposit** - Gravely and clayey sand or clayey gravel that fines upward to sandy clay.
- fc** **Alluvial Deposit** - Gravely sand or sandy gravel that generally grades upward to sandy or silty clay.
- fcg** **Chert** - Rhythmic banding of thin layers of Chert and Shale cropping out in lenticular bodies.
- fs** **Conglomerate** - Well-rounded pebbles and cobbles in a graywacke matrix.
- Sandstone** - fine to coarse grained sandstone interbedded with siltstone and shale

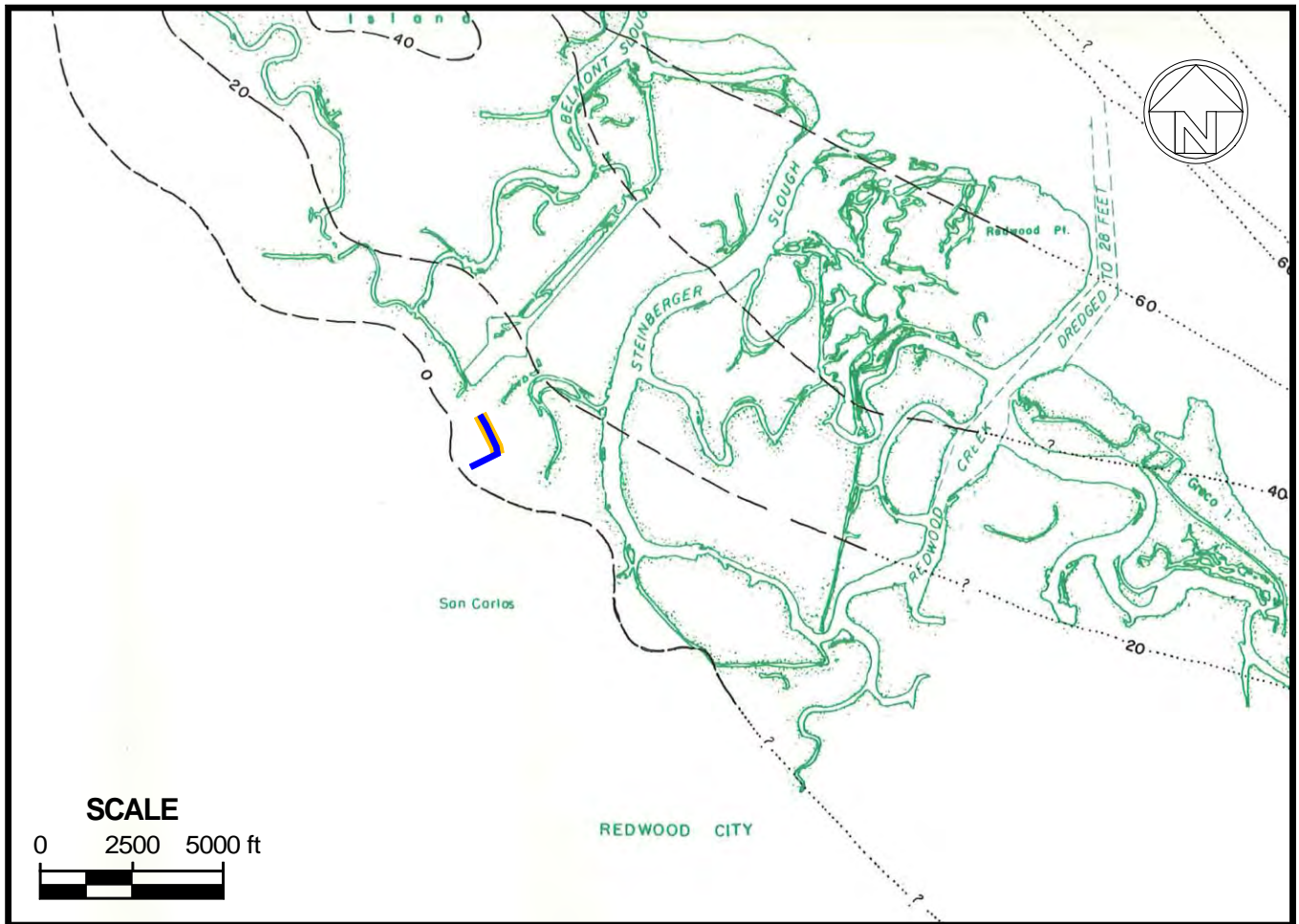
Franciscan
Assemblage



West Yost Associates
Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California
Geology Map

Figure

5



Map modified from Goldman (1969)

LEGEND:

— - Phase 1 project alignment

— - Future SR101 crossing

— 20 — - **Young Bay Mud thickness contours** - typically consists of very soft, organic-rich, compressible silts and clays deposited within San Francisco Bay during the last 12,000 years.



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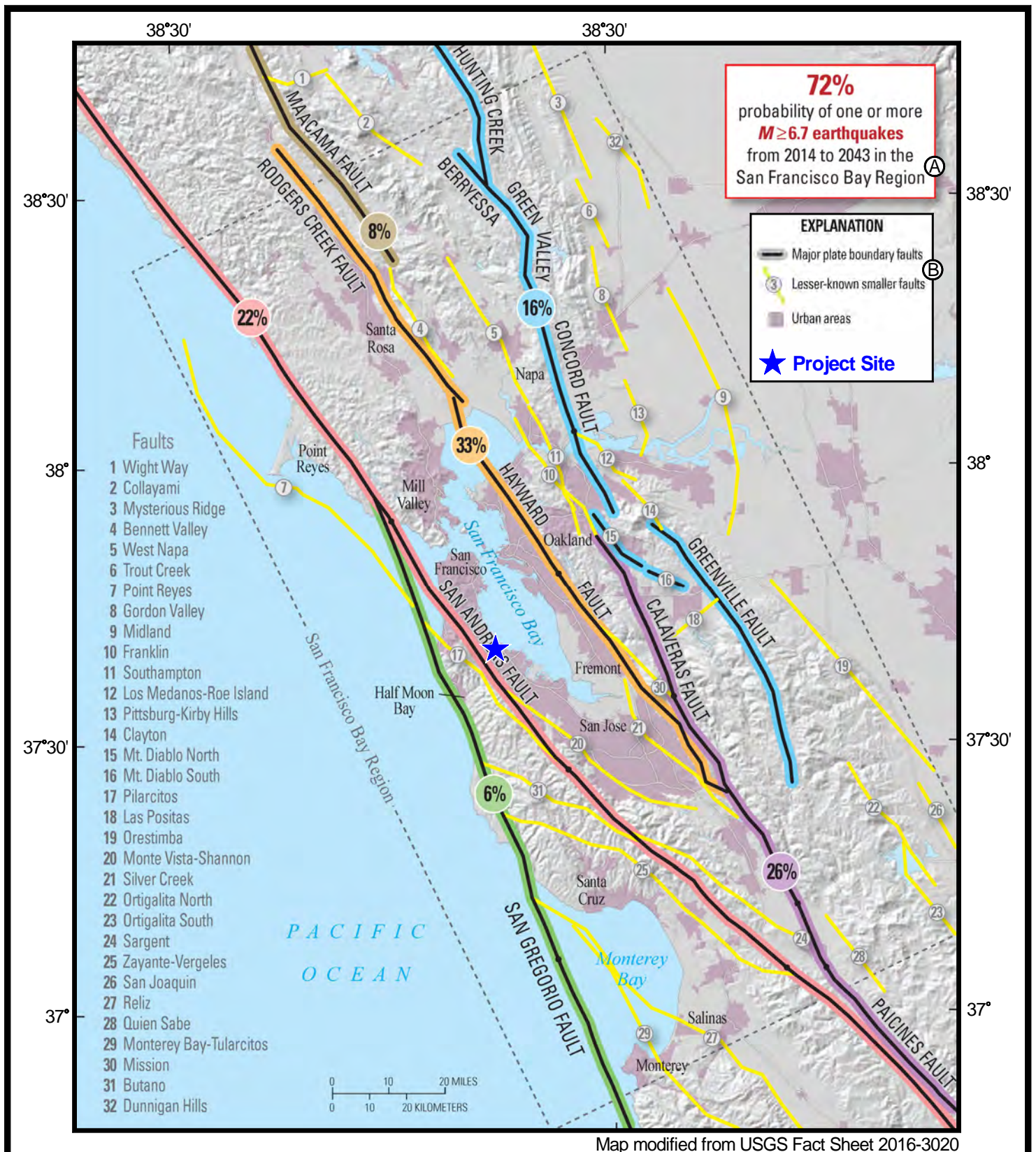
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SR101 Crossing at PAMF
San Carlos, California

Bay Mud Map

Figure

6



(A) On major plate boundary faults, lesser-known faults, and unknown faults.

(B) The probability that a $M > 6.7$ earthquake will involve one of the lesser known faults is 13%.



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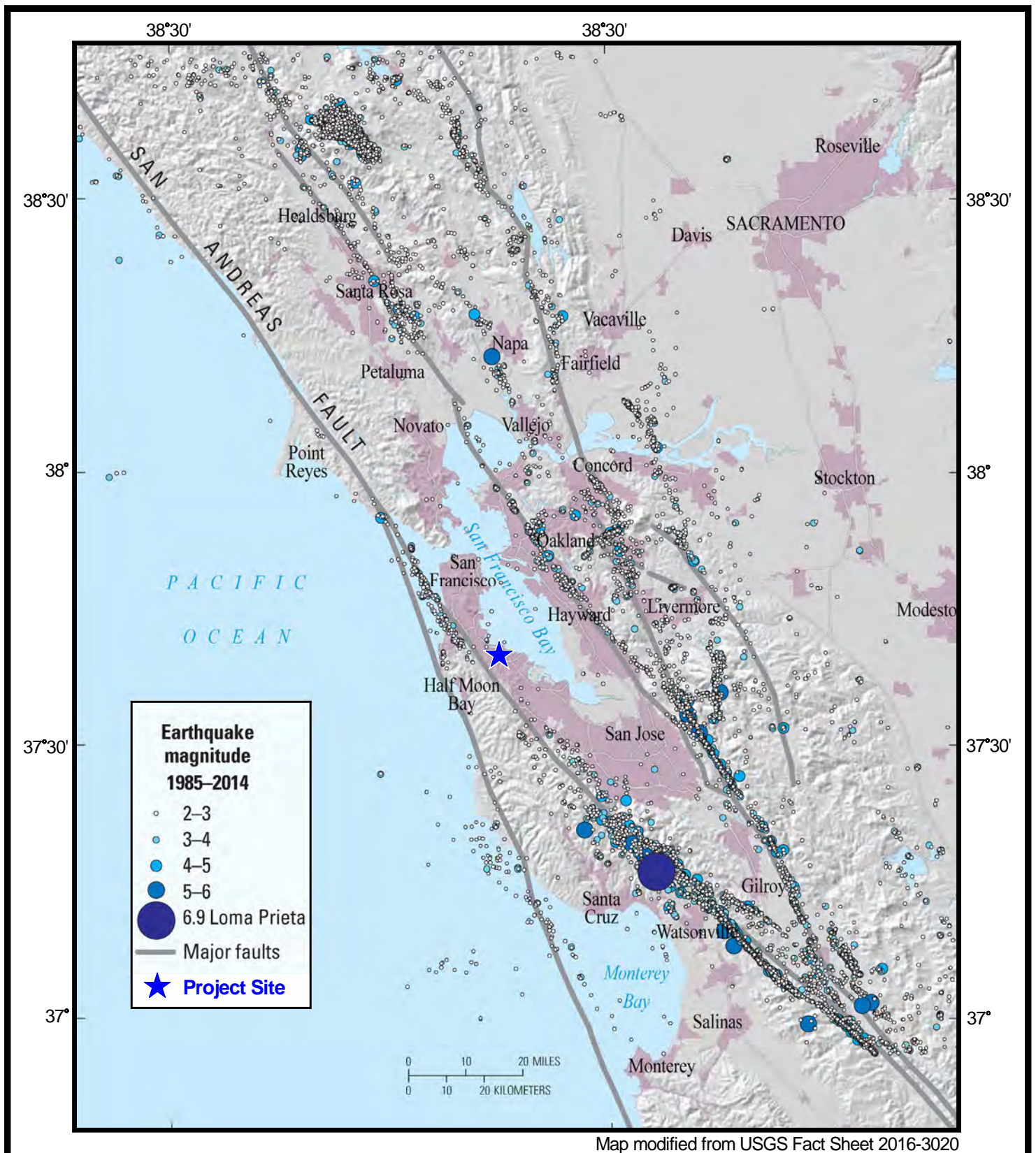
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SR101 Crossing at PAMF
San Carlos, California

Bay Area Fault Map

Figure

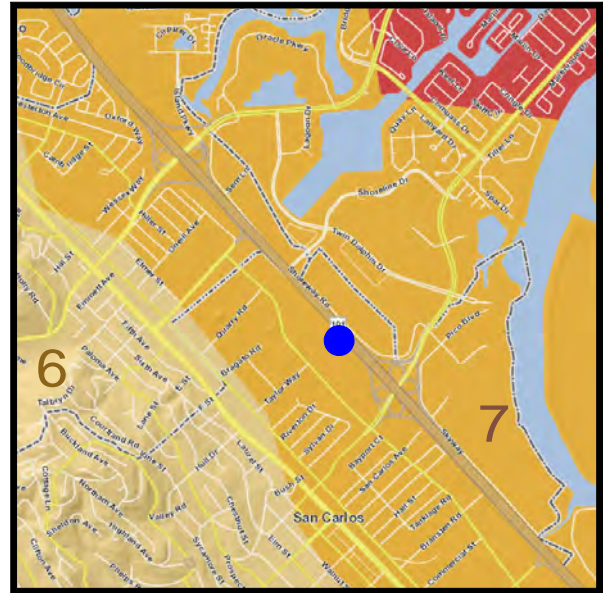
7



EARTHQUAKE SHAKING SCENARIOS

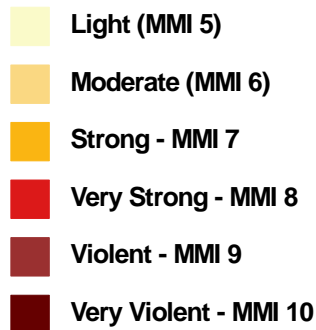


San Andreas Fault (M7.8)



Hayward Fault (M7.0)

Shaking Severity and Intensity



Latitude/Longitude	N 37.516°/ W 122.260°
Peak Ground Acceleration: (ASCE 7-10 Figure 22-7)	0.7 g

U.S. Seismic Design Maps (2016 CBC, USGS 2017).

NOTES:

1. See Figure 10 for the Modified Mercalli Intensity (MMI).
2. Map modified from the Association of Bay Area Governments (ABAG 2017, last updated 2014)



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SR101 Crossing at PAMF
San Carlos, California

Seismic Shaking Map

Figure

9

**AVERAGE PEAK
VELOCITY
(cm/s)**

**MODIFIED MERCALLI
INTENSITY VALUE AND DESCRIPTION**

**AVERAGE PEAK
ACCELERATION
(gravity 9.80 m/s²)**

	I. Not felt except by a very few under especially favorable circumstances.	
	II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.	
	III. Felt quite noticeable indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing vehicles may rock slightly. Vibration like passing of a truck. Duration estimated.	
1 - 2	IV. During the day felt indoors by many, outdoors by few. At night some awakened. Rattling of dishes, windows, and doors; walls make creaking sounds. Hanging objects swing. Sensation like a heavy truck passing. Standing vehicles rocked noticeably.	0.015 - 0.02g
2 - 5	V. Felt by nearly everyone, many awakened. Some dishes, windows and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles and other tall objects sometimes noticeable. Pendulum clocks may stop. Buildings trembled throughout.	0.03 - 0.04g
5 - 8	VI. Felt by all, many frightened and run outdoors. Some moderately heavy furniture moved; a few instances of fallen plaster and damaged chimneys. Trees, bushes, shaken slightly to moderately. Damage slight in poorly constructed buildings. Broken dishes, glassware and some windows. Moved furnishings and overturned furniture.	0.06 - 0.07g
8 - 12	VII. Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; chimneys cracked to considerable extent. Noticed by persons driving vehicles. Waves on ponds, lakes, running water. Broke numerous windows, heavy furniture overturned. Dislodged bricks and stones.	0.10 - 0.15g
20 - 30	VIII. Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving vehicles disturbed.	0.25 - 0.30g
45 - 55	IX. Damage considerable in specially designed structures; well-designed frame structures thrown out-of-plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. Reservoirs threatened.	0.50 - 0.55g
> 60	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Railroad rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks. Reservoirs greatly damaged. Open cracks in cement pavements and asphalt road surfaces.	> 0.60g
	XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly. Dams, dikes, embankments severely damaged. Destroyed large well-built bridges.	
	XII. Damage total. Practically all works of construction damaged greatly or destroyed. Landslides, falls of rock, slumping of river banks extensive. Fault slips in firm rock, with notable horizontal vertical off-set displacements. Water channels, surface and underground disturbed and modified greatly. Waves seen on ground surfaces.	

REFERENCE: "Earthquakes & Volcanoes," Volume 21, Number 1, 1989
"Earthquakes A Primer," Bruce A. Bolt, W.H. Freeman and Company, San Francisco, Copyright 1993.



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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

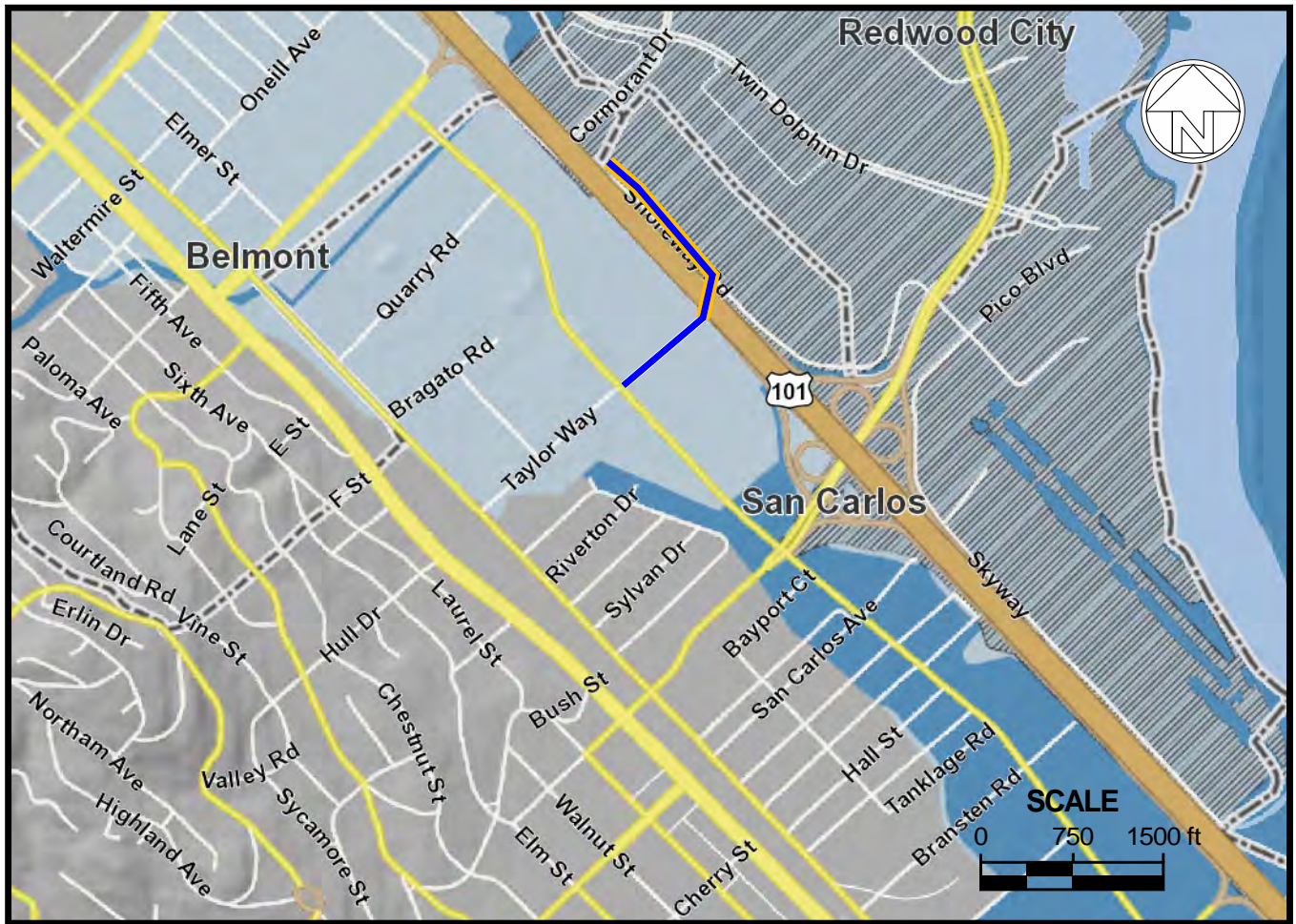
Figure

10

File No. 5701.0

June 2020

Modified Mercalli Intensity Scale

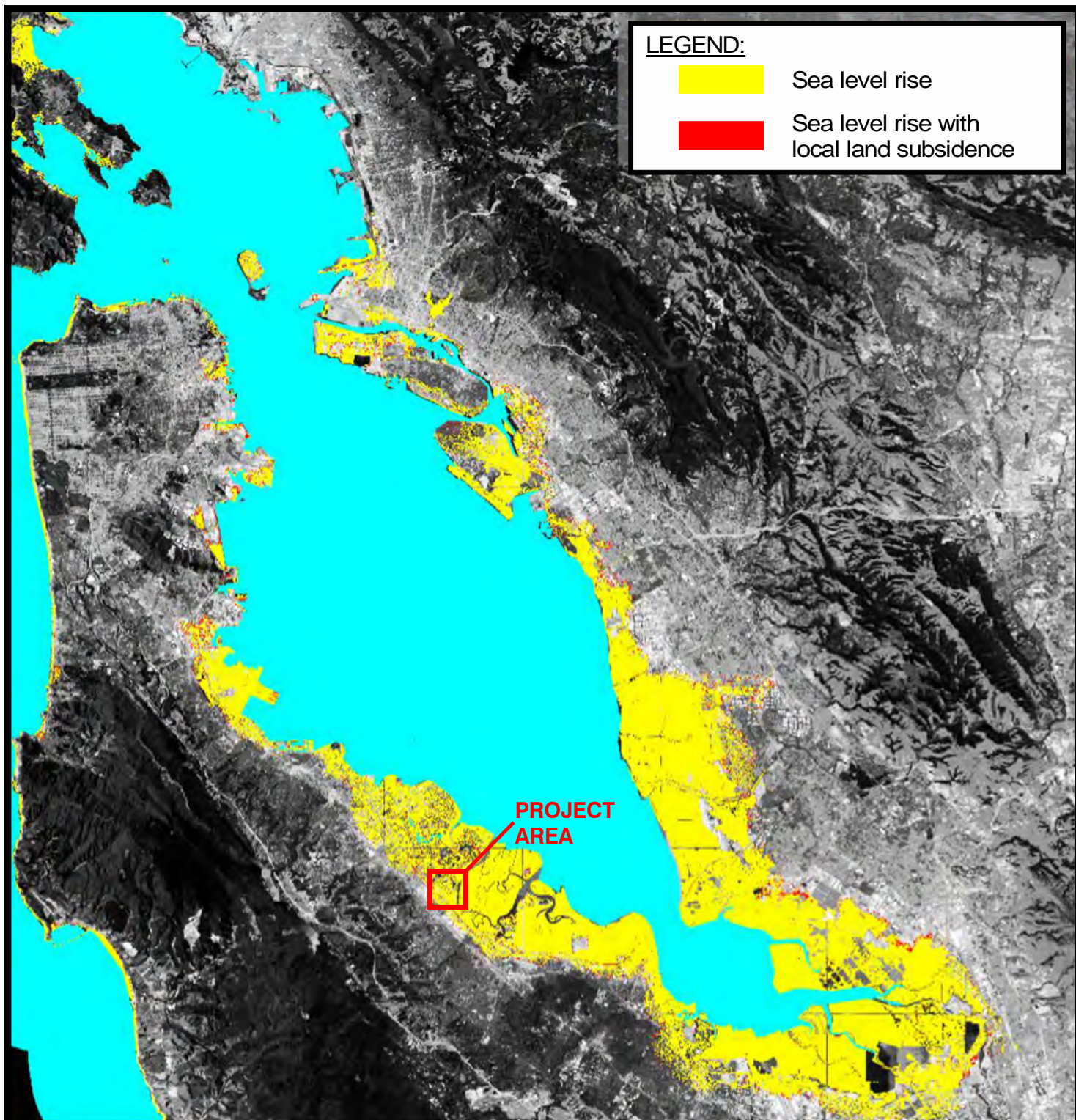


Map modified from Association of Bay Area Governments (ABAG, 2017; reportedly based on Flood Zones - 2003 FEMA Q3 and 2009 DFIRM)

LEGEND:

- - Phase 1 project alignment
- - Future SR101 crossing

- **ZONE V** - Coastal flood zone inundated by the 1% annual chance flood with velocity hazard (wave action).
- **ZONE A** - Special flood hazard area inundated by the 1% annual chance flood.
- **ZONE X/XL** - An area determined to be outside of the 0.2% annual chance flood; and areas protected by levees from the 0.2% annual chance flood.
- **ZONE X500** - An area inundated by the 0.2% annual chance flood with average flood depths less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from the 1% annual chance flood.



LEGEND:



Sea level rise

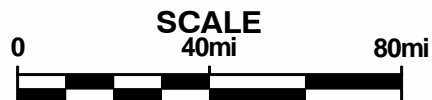


Sea level rise with
local land subsidence

**PROJECT
AREA**

Notes:

1. Modified from Figure S15 in Shirzaei and Burgmann (2018).
2. A sea level rise projection scenario in which higher rates of Antarctica and Greenland ice loss will develop throughout the second half of the 21st century.



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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Inundation Map at Year 2100

Figure

12



Map modified from Association of Bay Area Governments (ABAG, 2018) based on Knudsen & others (2000) and Witter & others (2006)

LEGEND:

- - Phase 1 project alignment
- - Future SR101 crossing

LIQUEFACTION SUSCEPTIBILITY

- Very High
- High
- Moderate
- Low
- Very Low



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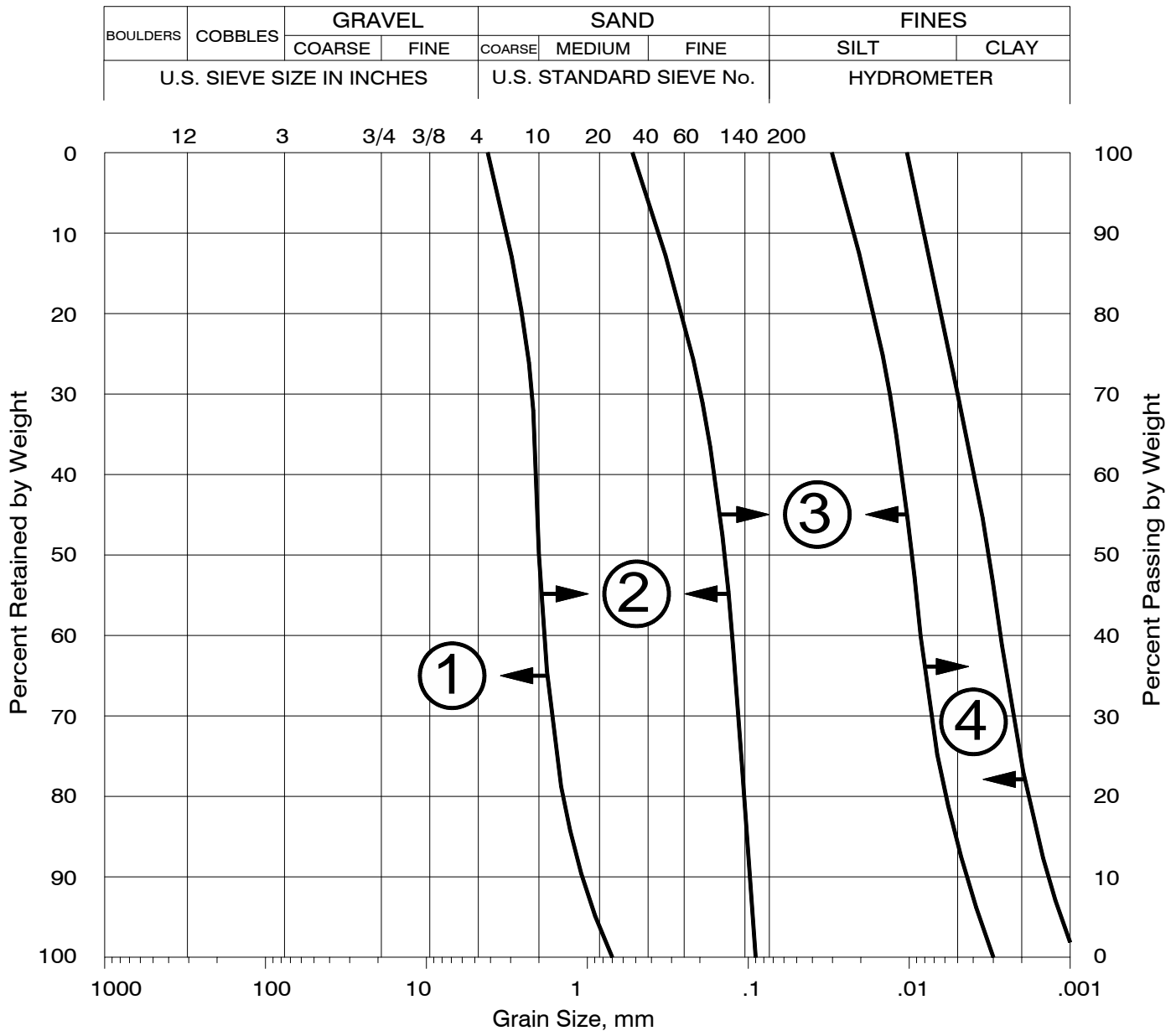
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SR101 Crossing at PAMF
San Carlos, California

Liquefaction Susceptibility Map

Figure

13



NOTES:

- ① Subaqueous excavations or cutoff wall required.
- ② Limits for gravity systems including sumps, well points, and deep wells.
- ③ Limits for well point vacuum methods.
- ④ Electro-osmosis possible.

REFERENCE: Naval Facilities Engineering Command, 1986, Design Manual 7.02 Foundations and Earth Structures, Figure 14.



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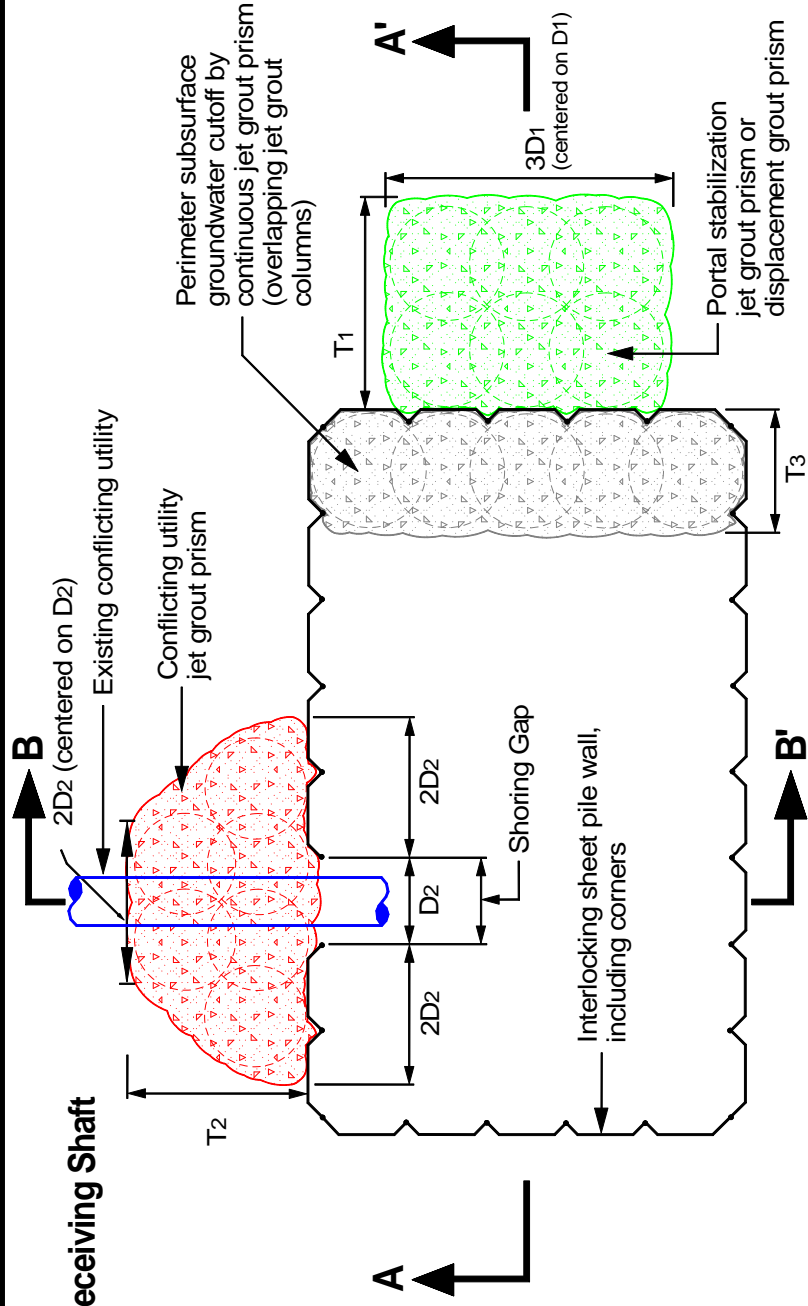
Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Dewatering Limits vs. Grain Size

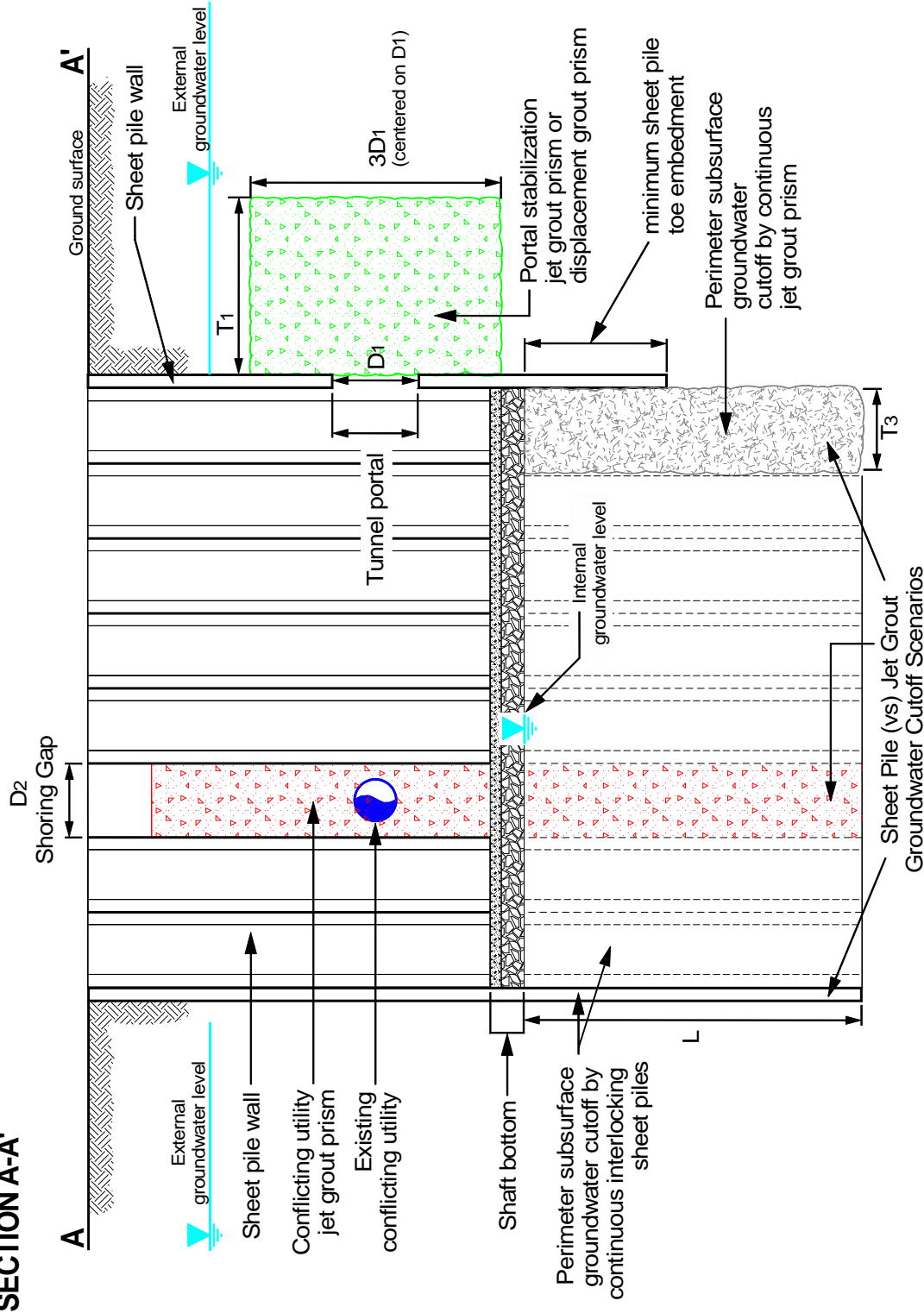
Figure

14

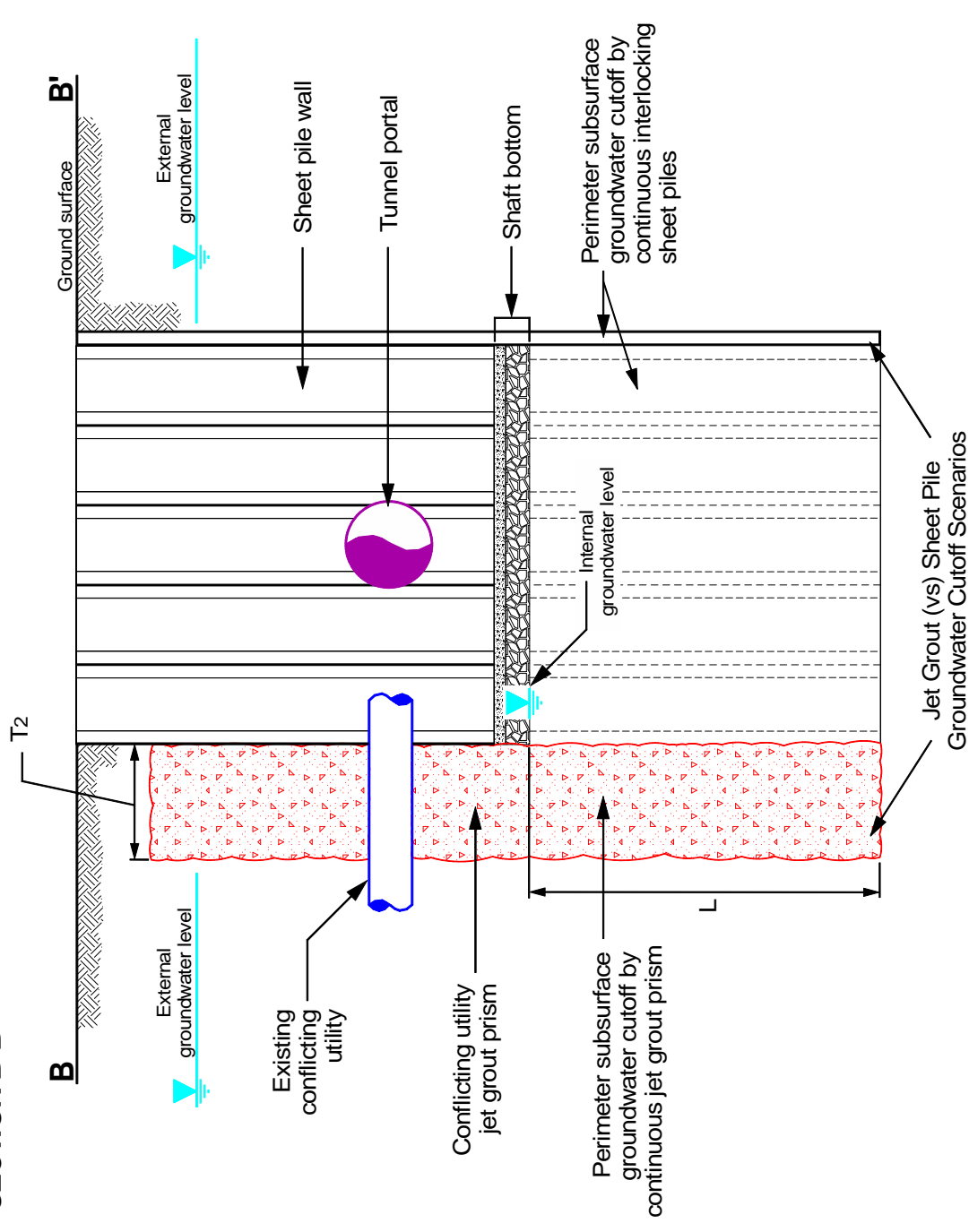
PLAN VIEW
Launching/Receiving Shaft



SECTION A-A'

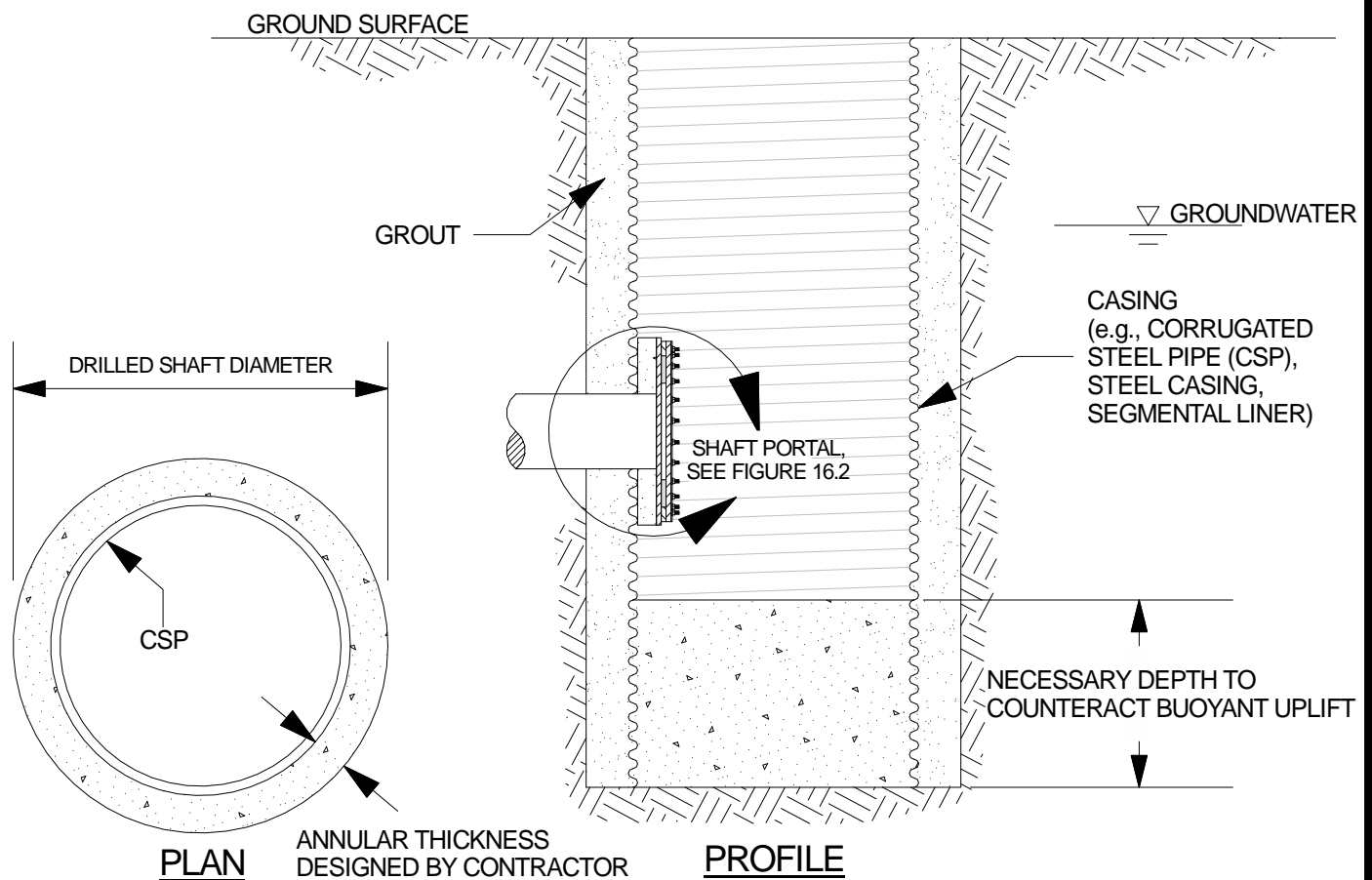


SECTION B-B'



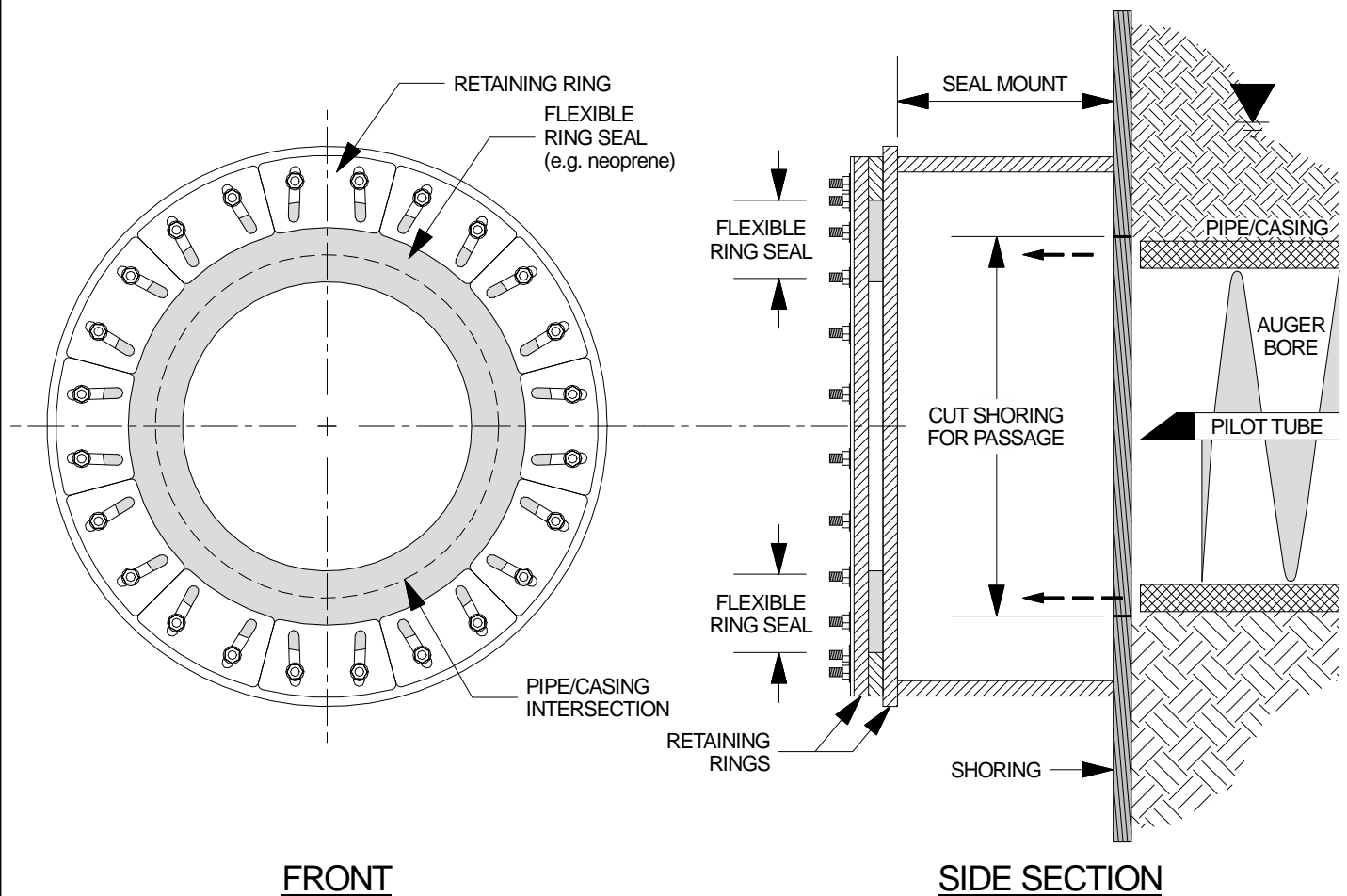
NOTES:

1. Drawings are schematic and not to scale. The diameter and number of jet-grout columns needed to form the minimum jet-grout prism dimensions shown should be designed and submitted by the Contractor for review.
2. L = Toe embedment depth of continuous perimeter sheet piles and/or jet grout prism required to form a subsurface groundwater cutoff into shaft. Groundwater cutoff may be accomplished with sheet piles or jet grout or a combination thereof. "L" may be reduced by lowering the external groundwater level.
3. As an alternative to establishing a groundwater-flow cutoff and preventing shaft-bottom boiling (i.e., piping) solely by continuous perimeter shoring embedment, the entire base of the shaft can be stabilized by jet grouting to prevent shaft-bottom boiling. The thickness of the grouted-prism below the entire base of the shaft required for stabilization and to prevent shaft bottom boiling will be a function of (1) the unbalanced hydraulic head (which can be reduced by external dewatering), and (2) the permeability and strength of the grouted prism materials, and will most likely result in a grouted prism length below the entire shaft bottom of less than "L".
4. D = Tunnel portal diameter (D1), or shoring gap (D2)
5. T = Minimum grout prism thickness required to: stabilize portals (T1); stabilize gaps in continuous interlocking sheet piles around existing conflicting utilities (T2); or to form a subsurface groundwater cutoff into shaft (T3). "T" is based on unbalanced hydraulic head (groundwater level), earth pressures, surcharge loading, and grout prism strength. "T" can be reduced if the external groundwater level around the shaft is lowered by dewatering.
6. Final design to be developed by the contractor.



TYPICAL SEQUECE OF CONSTRUCTION:

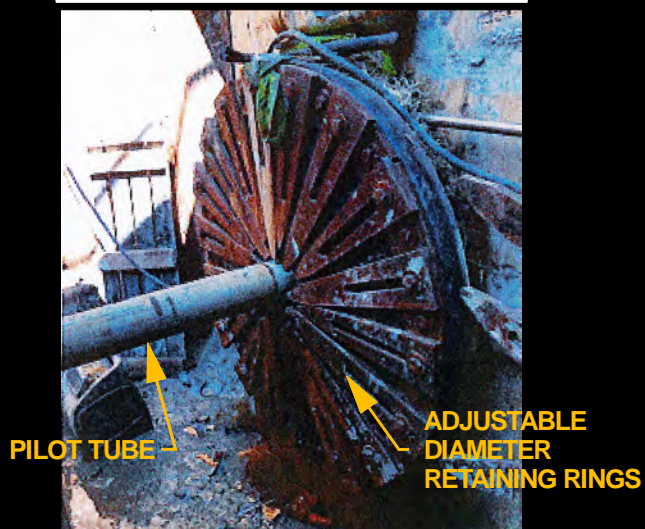
1. Shaft drilled in the wet with bentonite to prevent flowing or raveling ground conditions.
2. Install casing inside drilled shaft.
3. Tremie grout annular space and concrete floor.
4. Pump out water and bentonite mix.
5. Prepare portal opening.



NOTES:

- A. Ring seal flips into seal mount during launching, creating a tight seal around the pilot tube and pipe/casing.
- B. Ring seal flips out of seal mount during receiving, creating a tight seal around the pilot tube and pipe/casing.

LAUNCHING SHAFT PORTAL EXAMPLE



RECEIVING SHAFT PORTAL EXAMPLE



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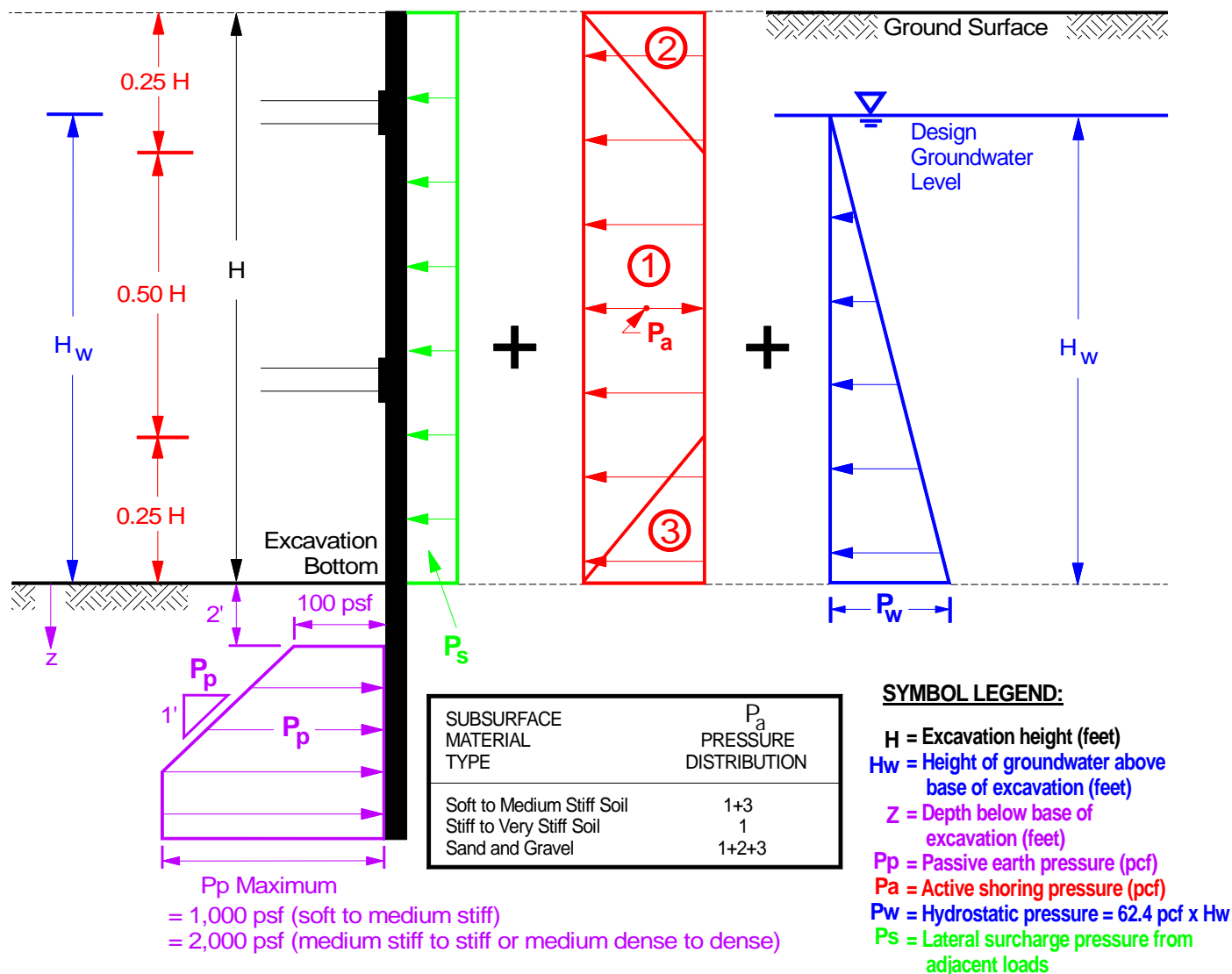
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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Receiving and Launching Shaft Portal Seal

Figure

16.2



Subsurface Material Type:	Soft to Medium Stiff Silt and Clay		Medium Stiff to Stiff Silt and Clay		Medium Dense to Dense Sand and Gravel	
	AGW	BGW	AGW	BGW	AGW	BGW
P_a	60H	30H	50H	25H	40H	20H
P_p (Ultimate)	220z	110z	300z	150z	360z	180z

AGW - Above Design Groundwater Level (requires full dewatering)
 BGW - Below Design Groundwater Level (does not include hydrostatic pressure)

NOTES:

1. These preliminary pressure diagrams are for excavations of less than 20 feet in depth.
2. A minimum factor of safety of 2 should be used in passive pressure calculations.
3. Excavation base stability should be analyzed after base width has been selected.
4. Final design shoring pressure diagrams are to be developed by the contractor based on the contractor's selection of shoring system lateral surcharge (i.e., existing structures, stockpiling, equipment, etc.) and on the ground conditions encountered during construction.

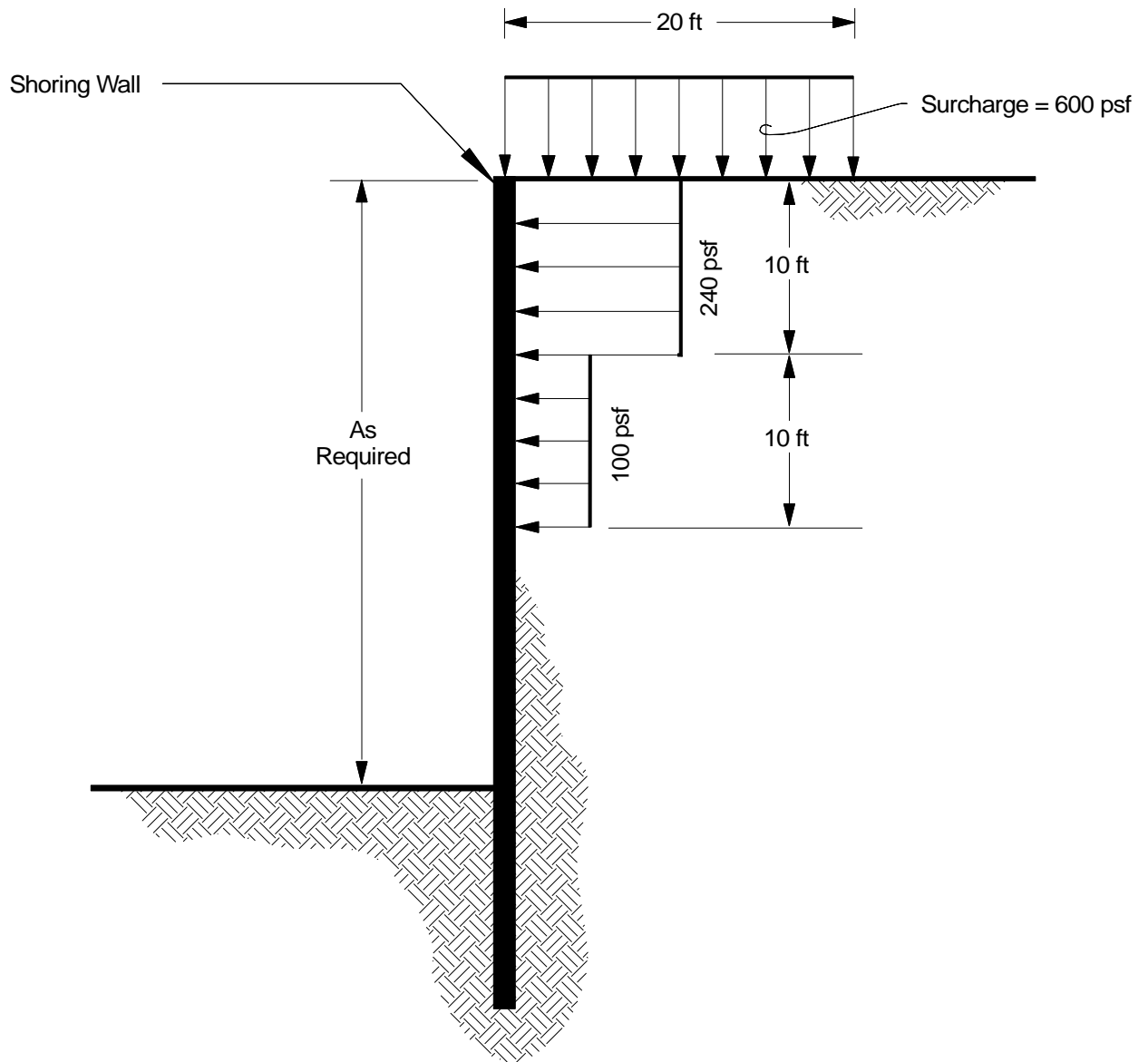


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Mid-Peninsula Water District
 SR101 Crossing at PAMF
 San Carlos, California

Figure

17



NOTES:

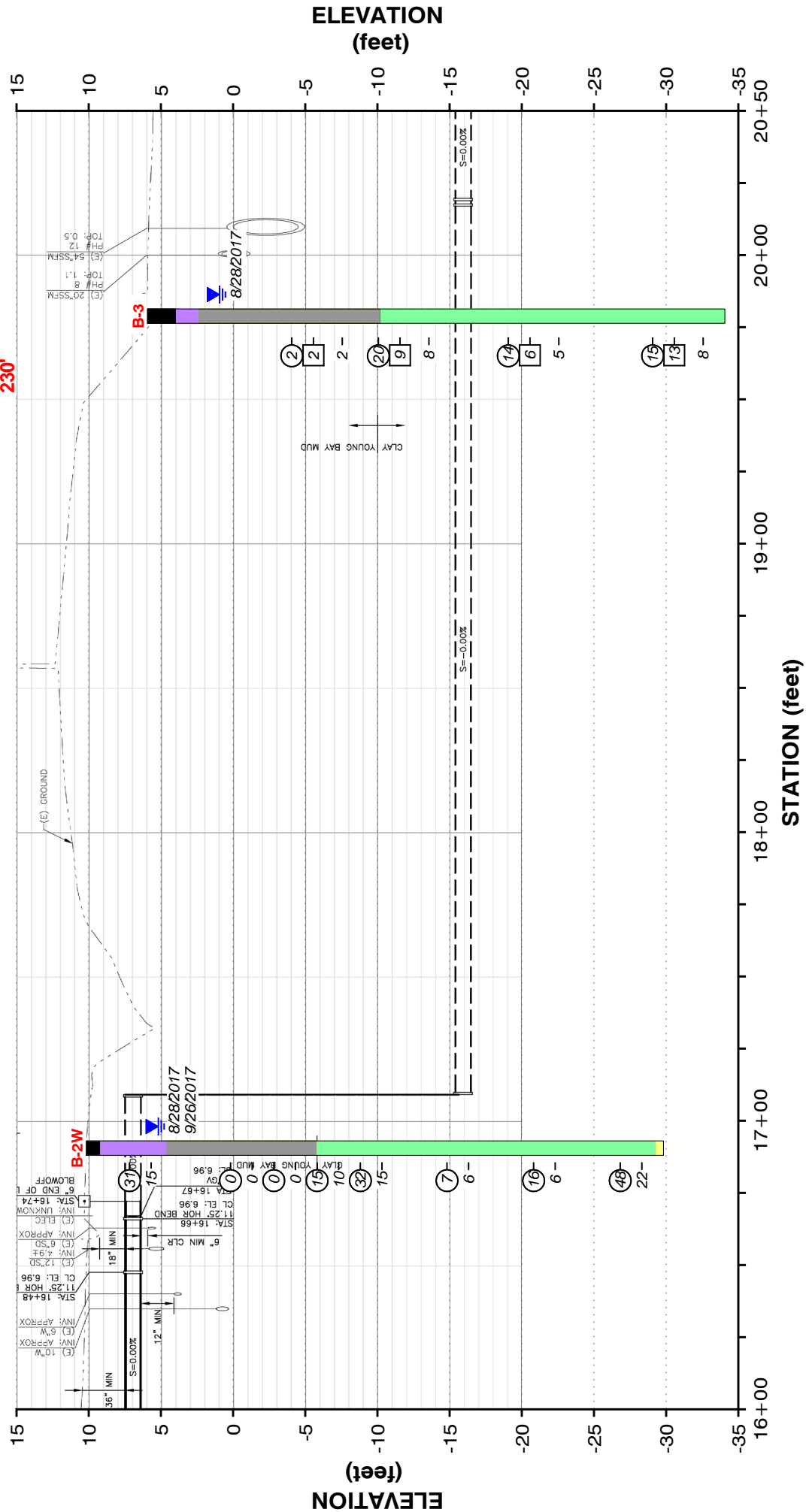
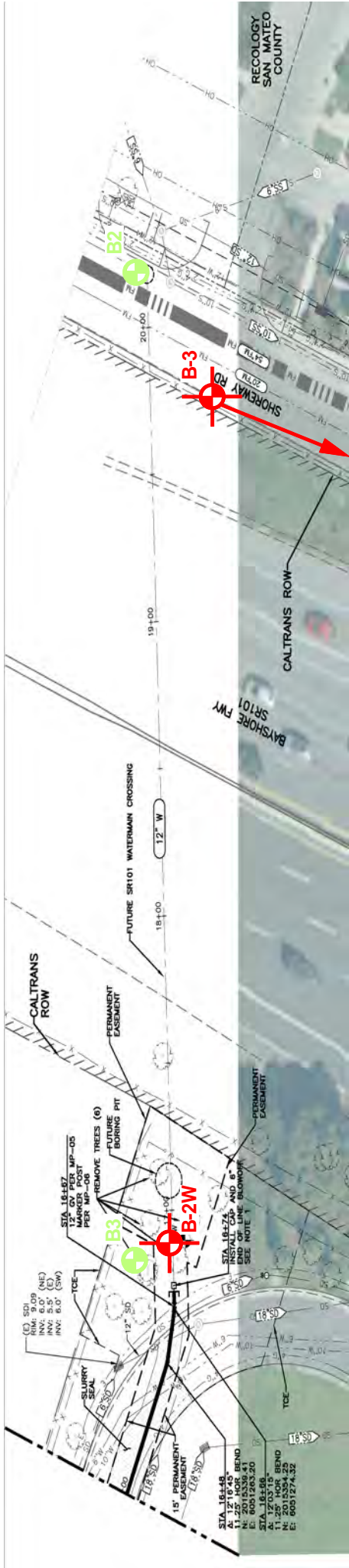
1. These are minimum shoring pressures to be used for traffic and equipment surcharges. Shoring pressures from construction activities or equipment that produce larger or different surcharge loading patterns than that shown should be determined by the shoring designer using geotechnical computational methods.

INTERPRETIVE BORING LOG LEGEND:

- Pavement section or landscaping
- Fill:
- variable
- Young Bay Mud - predominantly organic-rich silt and clay
- cohesive, squeezing to raveling
- Fine grained - predominantly clay:
- cohesive, firm to raveling
- Coarse grained - predominantly sand:
- noncohesive, raveling to flowing

B-1
McMillen Jacobs Associates geotechnical test boring,
projected to profile as indicated
(logs in Appendix B)

- B1**
West Yost Associates environmental test boring,
(no logs available)
- Groundwater level measured on date indicated
(see text of report for additional measurements)
- Penetration resistance SPT "N" blow count
- Penetration resistance MCS blow count
(not reduced to "N" blow count)
- Penetration resistance SS blow count
(not reduced to "N" blow count)



NOTES:

1. Plan stationing and profile elevations are based on West Yost Associate plans (2018 and 2020).
2. Width and placement of graphic test boring log on profile has been exaggerated and approximated for clarity.
3. Ground types shown are projections from off-alignment test borings.
4. Ground types between and away from test borings may include the effects of stratal undulations, lensing, and lateral facies changes from that shown on the profile.
5. Ground type descriptions are provided in Figure A-1, Appendix A.

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Schematic Test Boring Profile - SR101 Crossing at PAMF

Figure

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INTERPRETIVE BORING LOG LEGEND:

- Pavement section or landscaping
- Fill:
- variable
- Young Bay Mud - predominantly organic-rich silt and clay
- cohesive, squeezing to raveling
- Fine grained - predominantly clay:
- cohesive, firm to raveling
- Coarse grained - predominantly sand:
- noncohesive, raveling to flowing

B-1
McMillen Jacobs Associates geotechnical test boring,
projected to profile as indicated
(logs in Appendix B)

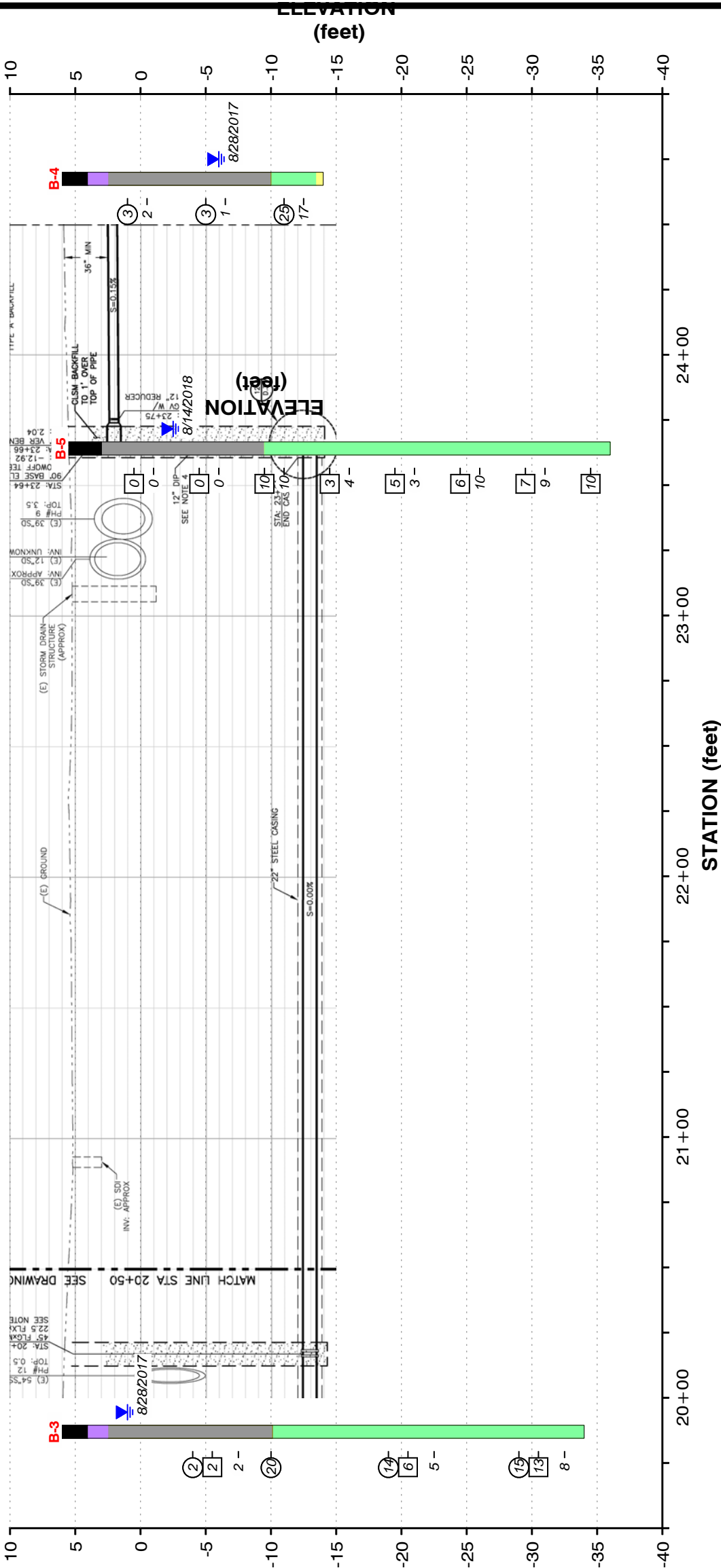
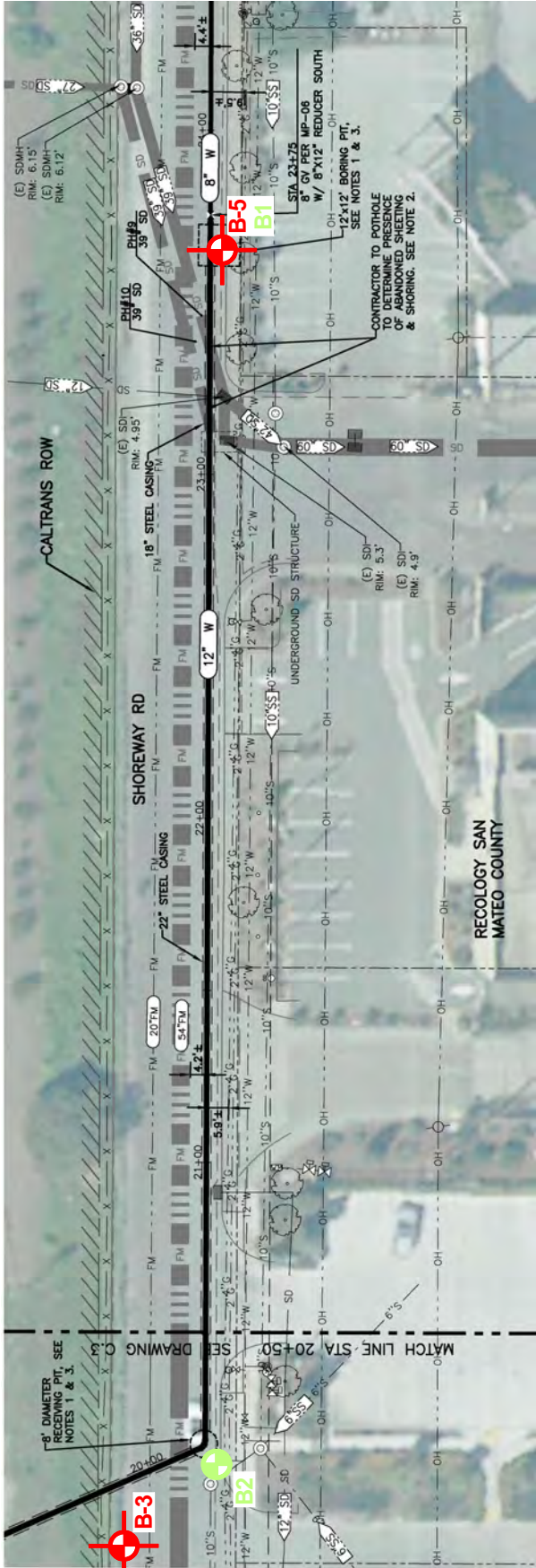
B1
West Yost Associates environmental test boring,
(no logs available)

- Groundwater level measured on date indicated
(see text of report for additional measurements)
- 21-

Penetration resistance SPT "N" blow count
- Penetration resistance MCS blow count
(not reduced to "N" blow count)
- Penetration resistance SS blow count
(not reduced to "N" blow count)

NOTES:

1. Plan stationing and profile elevations are based on West Yost Associate plans (2018).
2. Width and placement of graphic test boring log on profile has been exaggerated and approximated for clarity.
3. Ground types shown are projections from off-alignment test borings.
4. Ground types between and away from test borings may include the effects of stratal undulations, lensing, and lateral facies changes from that shown on the profile.
5. Ground type descriptions are provided in Figure A-1, Appendix A.



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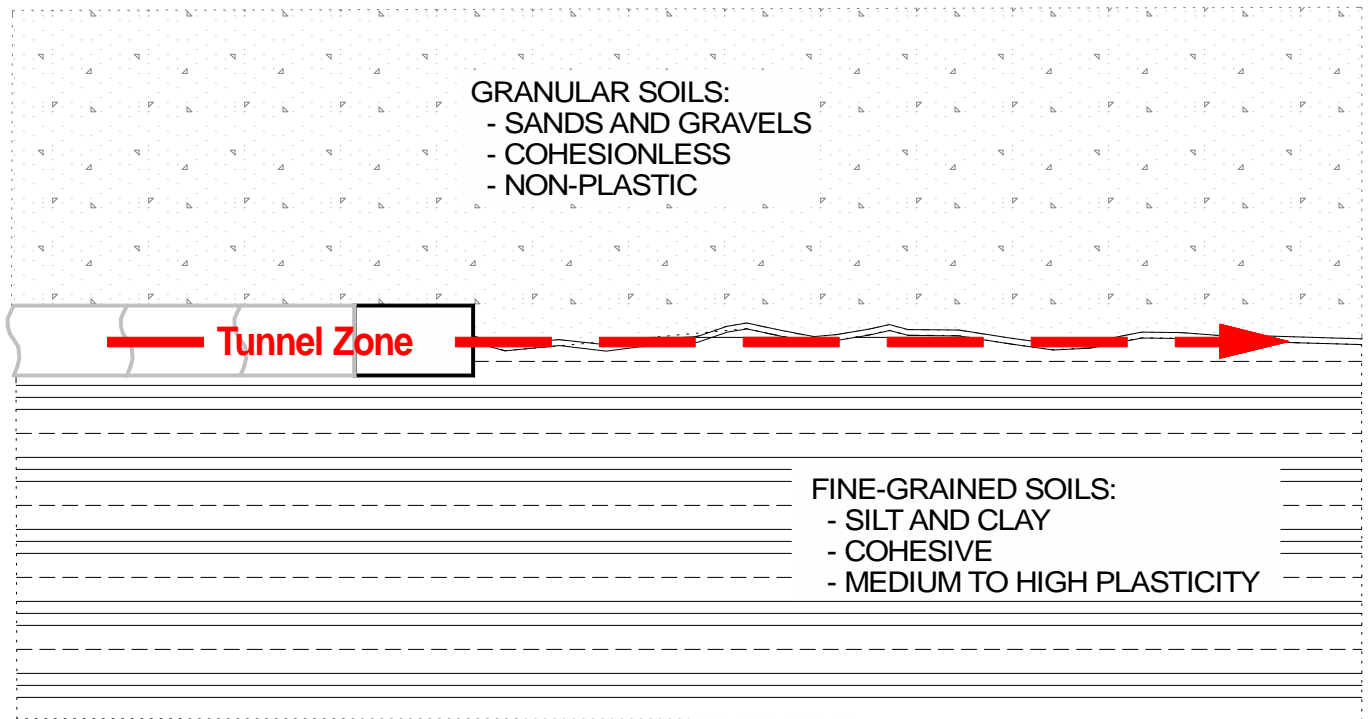
File No. 5701.0 June 2020

Figure

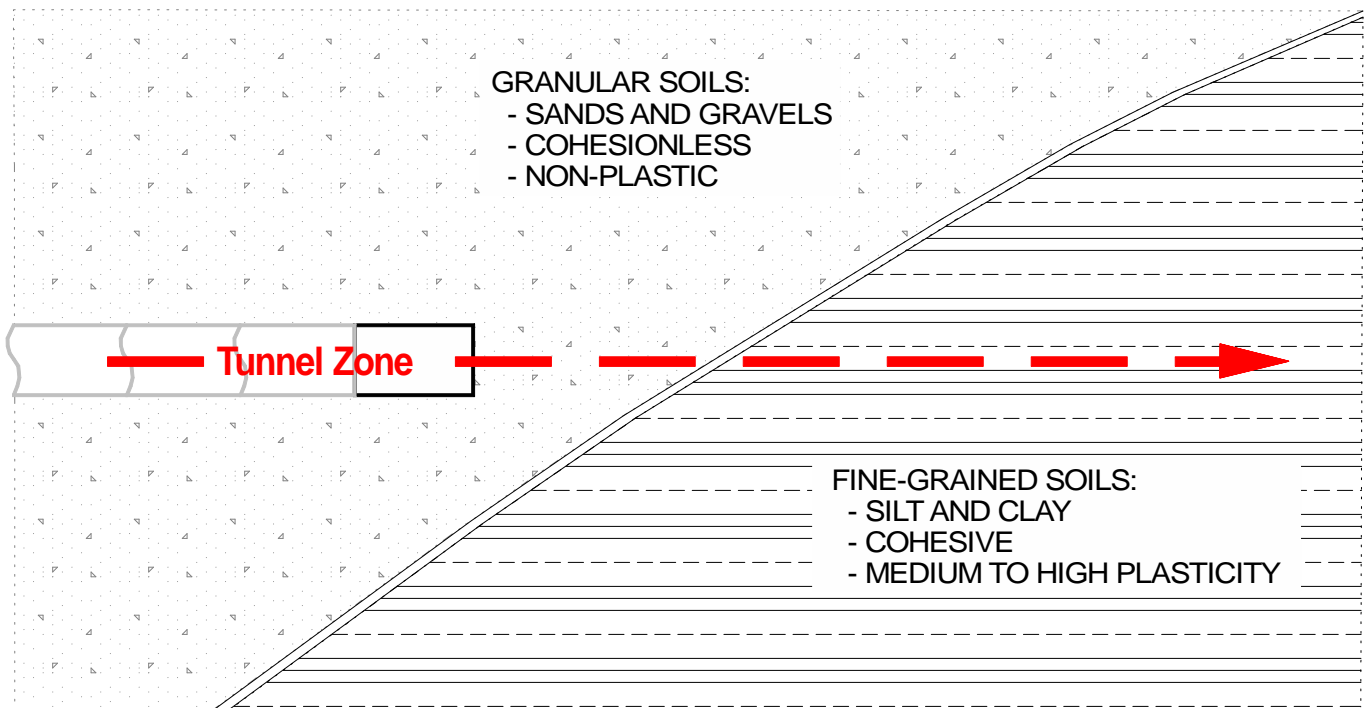
20

Schematic Test Boring Profile - Shoreway Road

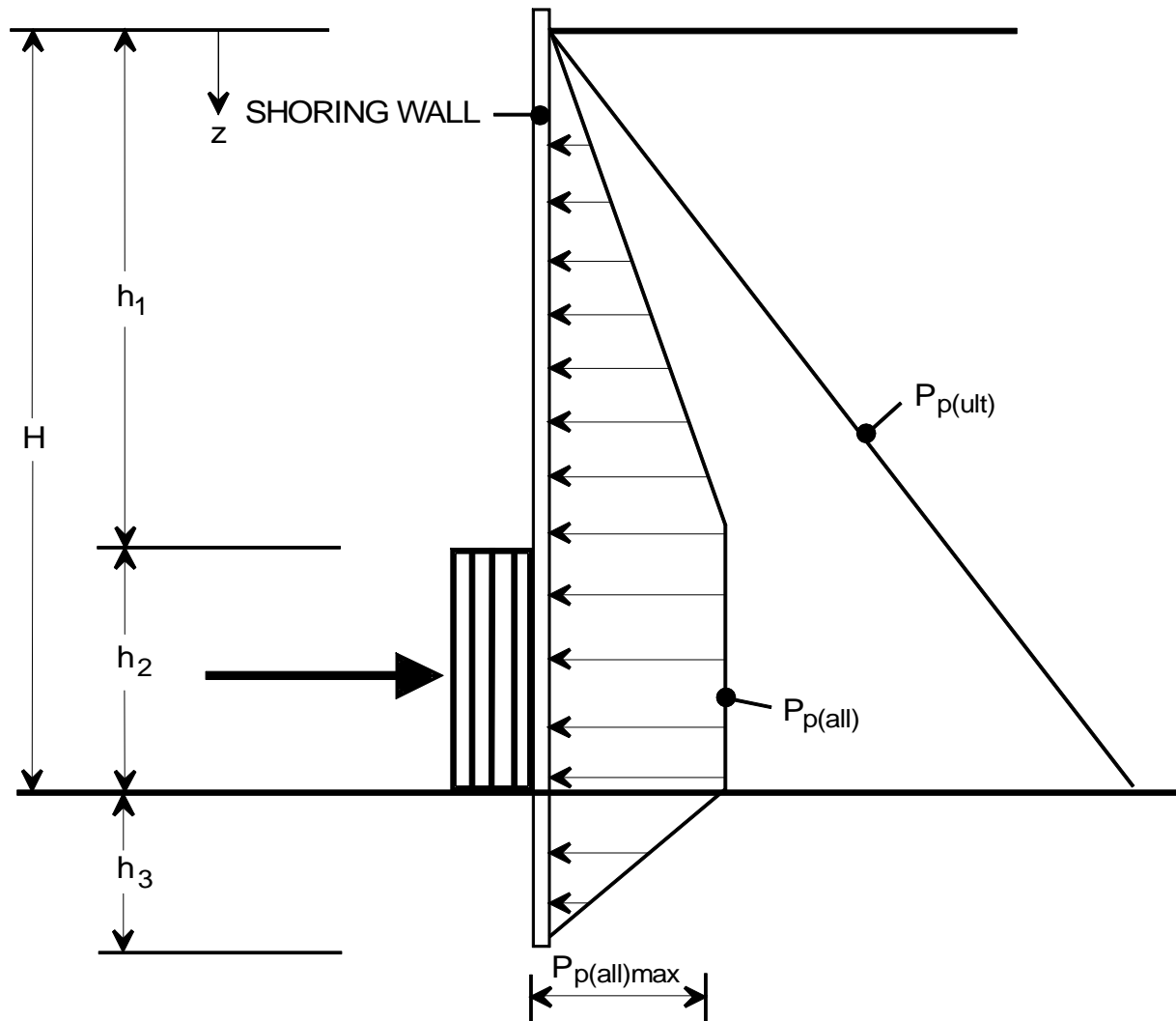
EXAMPLE OF A MIXED-FACE GROUND CONDITION



EXAMPLE OF A CHANGE-IN-REACH GROUND CONDITION



NOT TO SCALE - SCHEMATIC ONLY



H = excavation height

h_1 = depth to abutment

h_2 = height of abutment

h_3 = depth of shoring penetration below excavation bottom

z = depth

γ = unit weight of soil

$P_{p(ult)}^* = \text{ULTIMATE PASSIVE PRESSURE} = K_p \gamma z$

$P_{p(all)}^* = \text{ALLOWABLE PASSIVE PRESSURE} = P_{p(ult)} / SF$

$P_{p(all)max}^* = P_{p(ult)}[@z=h_1] / SF$

* To be determined by the contractor based on the final shaft type, location, and depth.

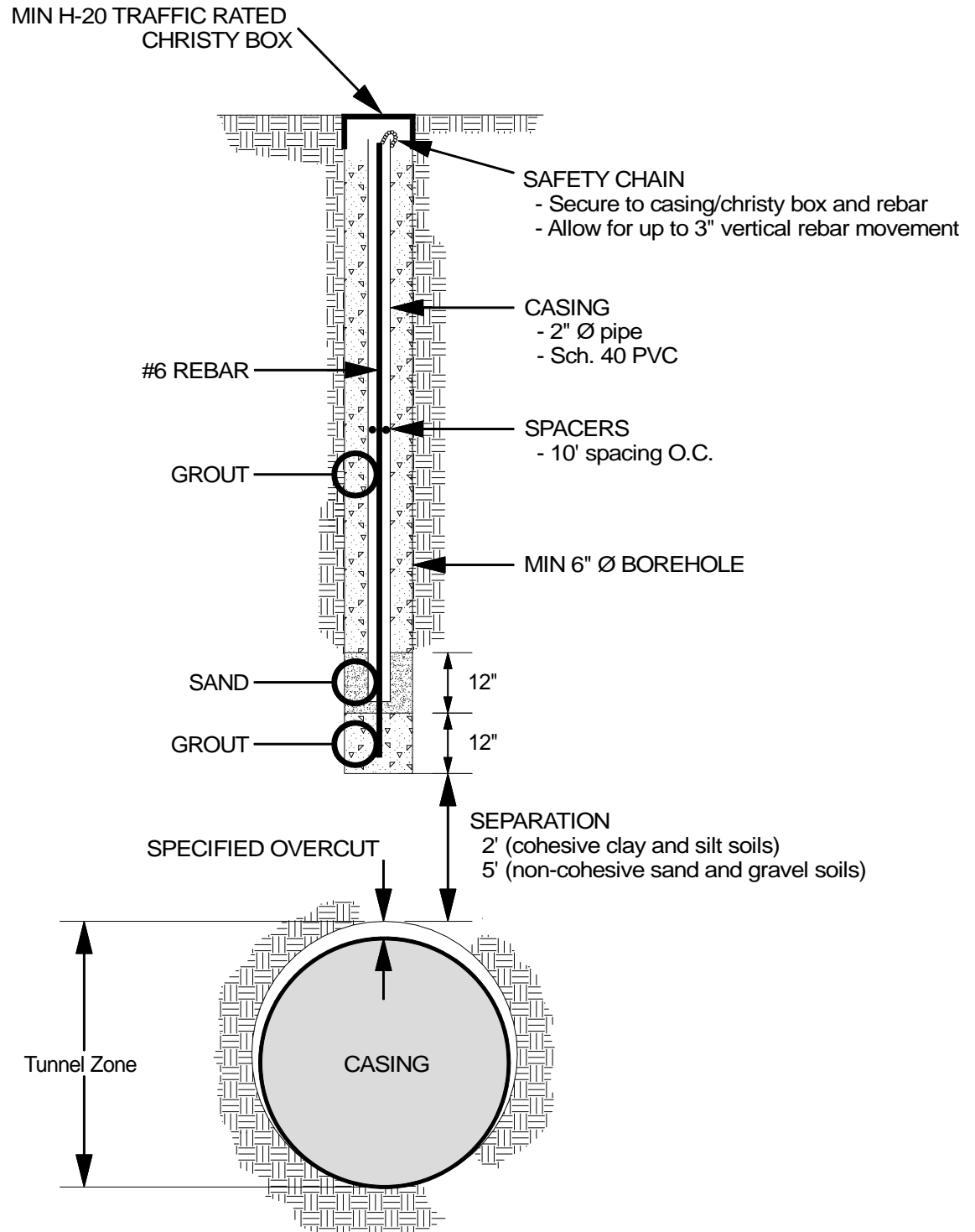


West Yost Associates

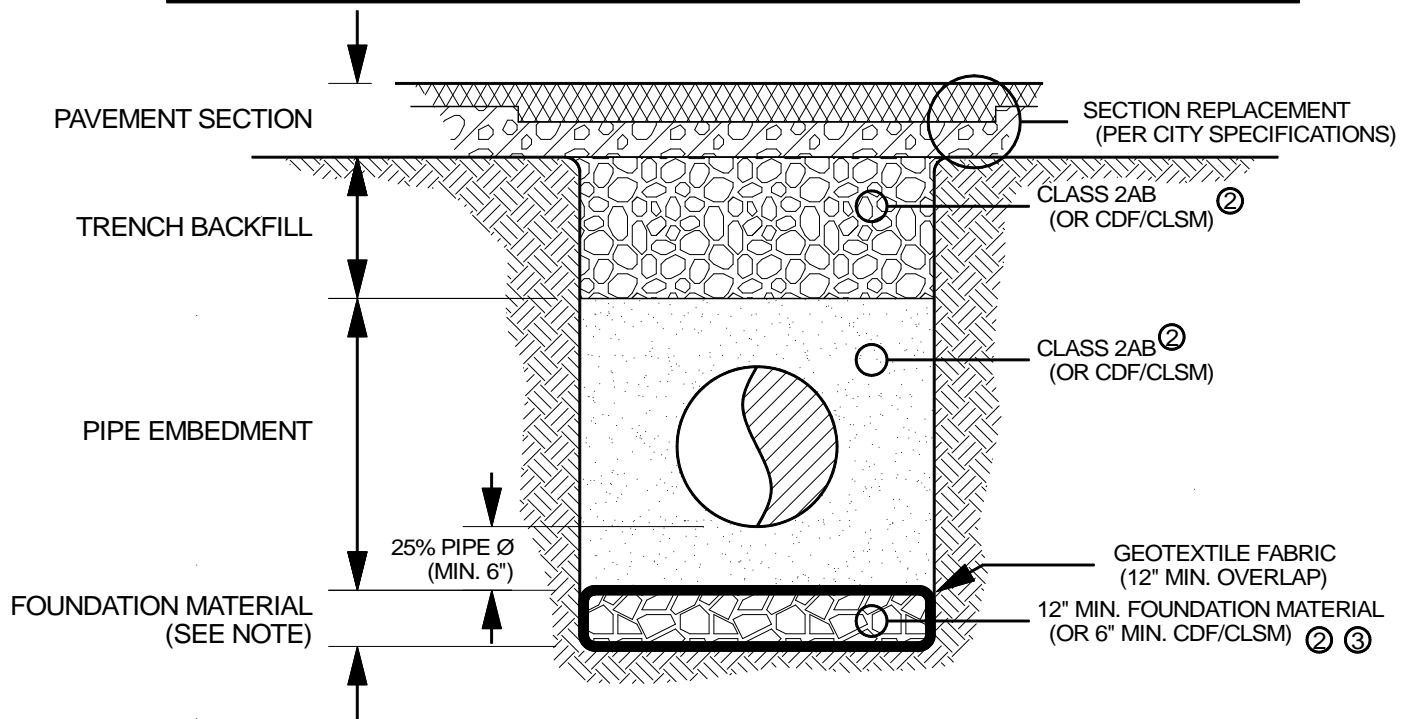
Mid-Peninsula Water District
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Figure

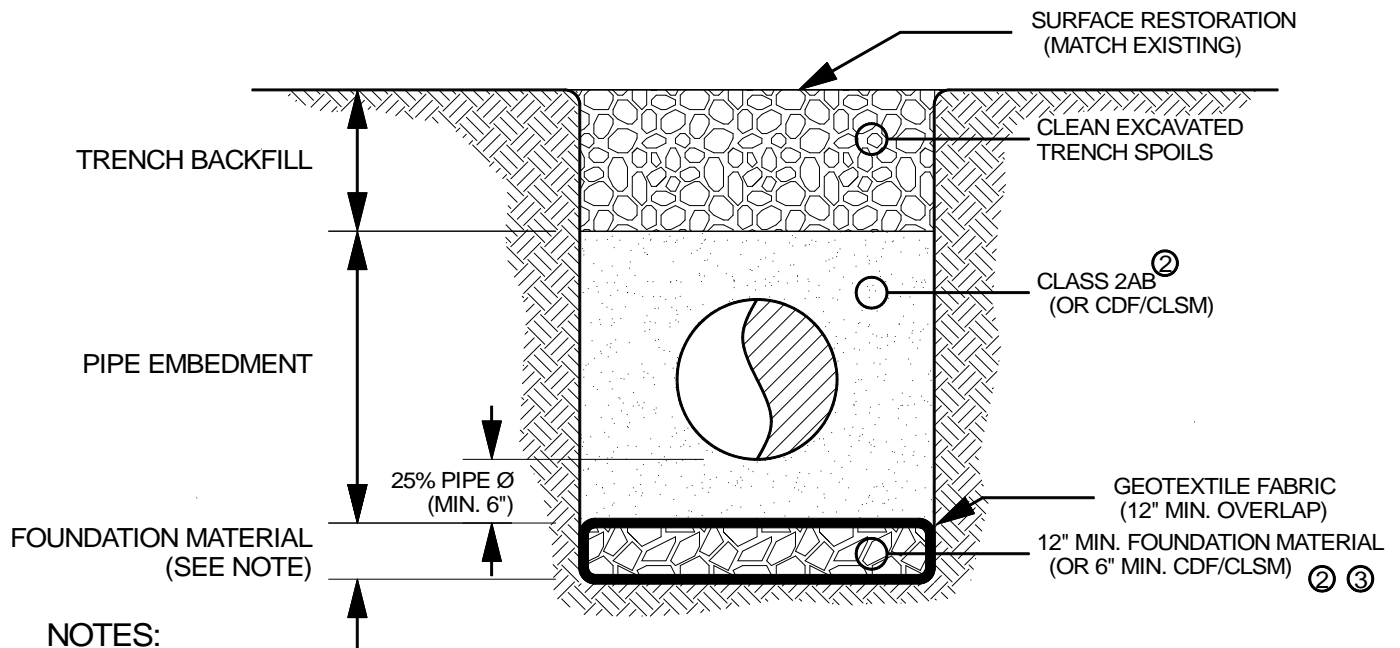
22



EXCAVATION BACKFILL^① BELOW ROADWAYS & PAVED AREAS



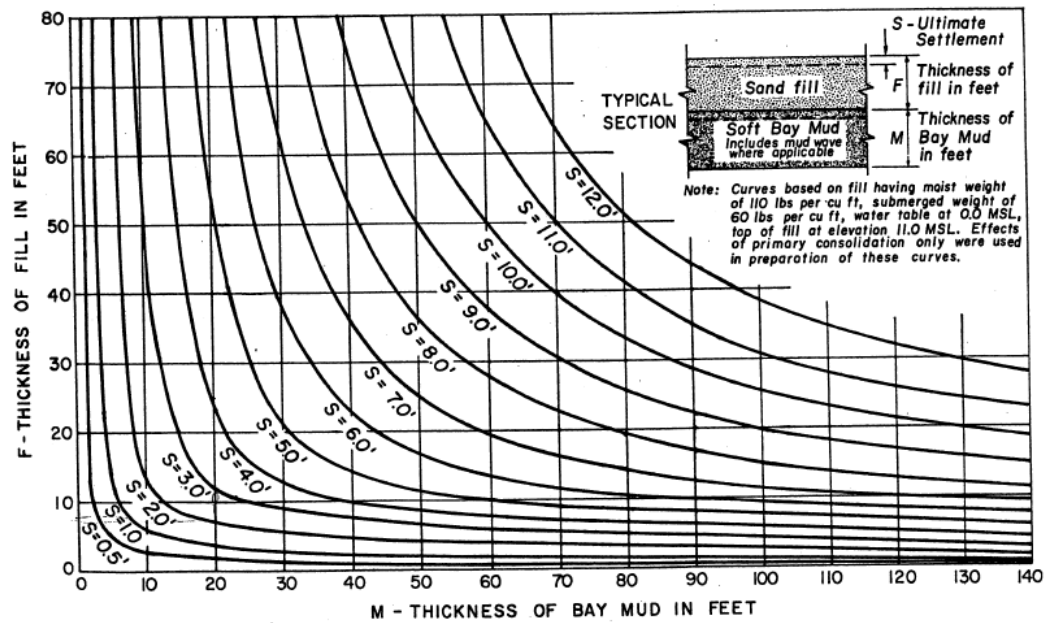
EXCAVATION BACKFILL^① BELOW AREAS OTHER THAN ROADWAYS & PAVED AREAS



NOTES:

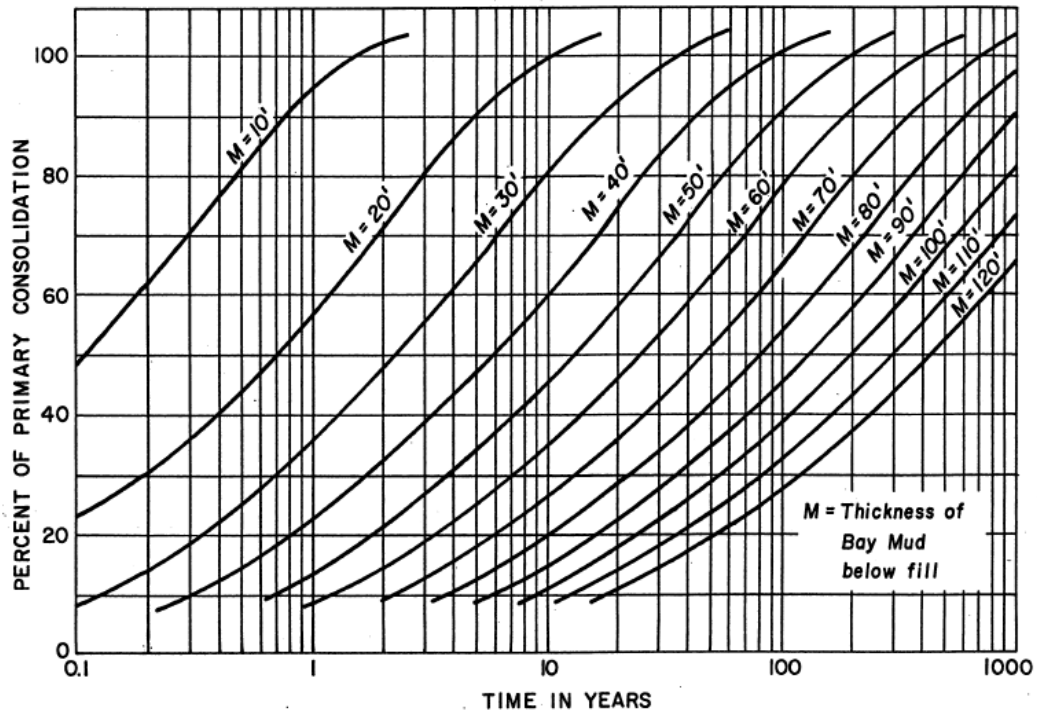
1. Not to Scale. See report text for material recommendations and compaction requirements.
2. Use lightweight material where excavation backfill is on Young Bay Mud.
3. Foundation material is required where trench bottoms are unstable or where disturbed by construction activity.

ULTIMATE SETTLEMENT

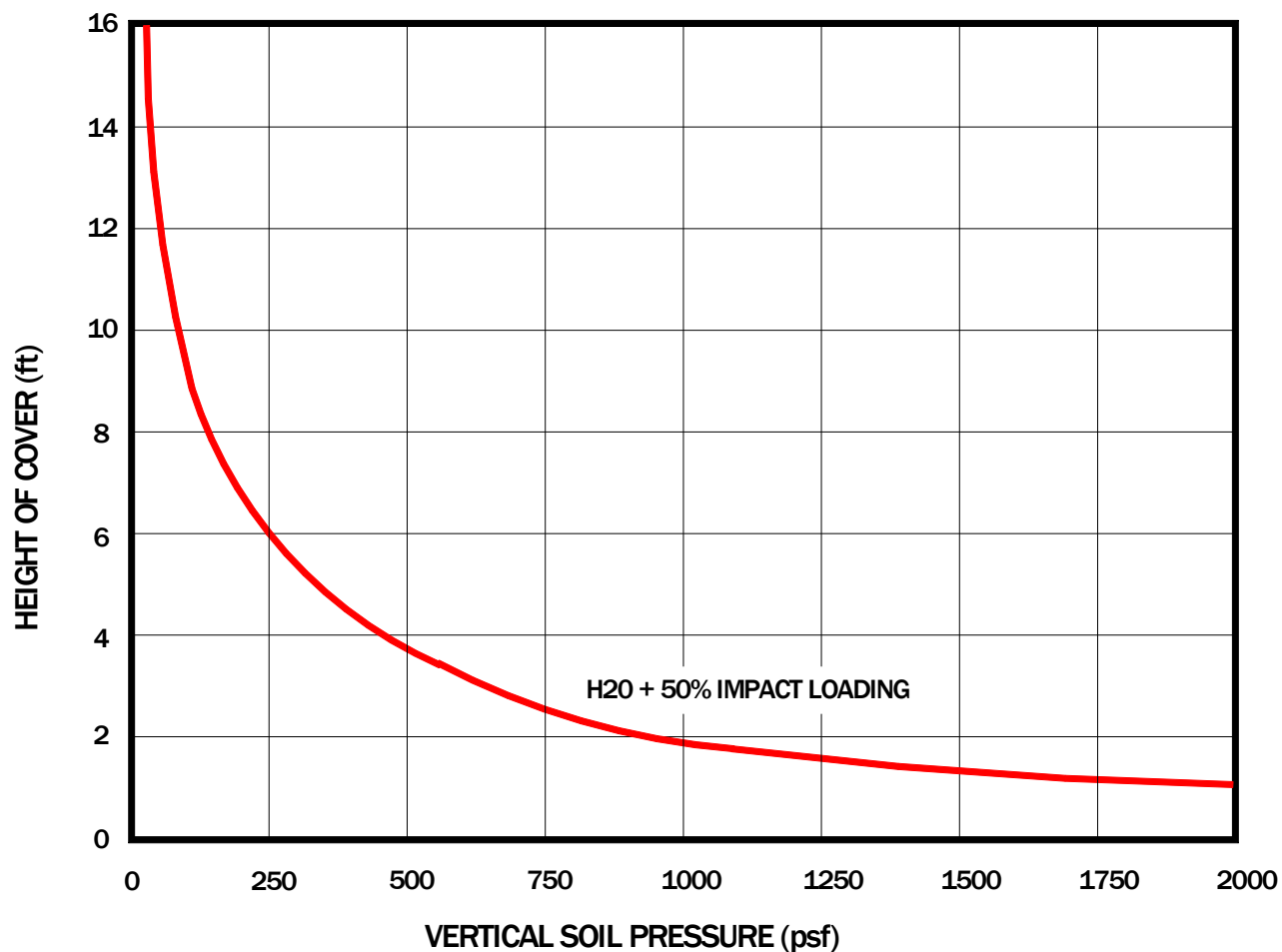


Modified from CDMG (1969)

SETTLEMENT OVER TIME



Modified from CDMG (1969)



NOTES:

1. Apply vertical soil pressure to diameter of pipeline (horizontal projection) to calculate vertical pipe load.
2. H2O + 50% IMPACT LOADING: Simulates a highway load of a 20-ton truck with a 50% impact factor to account for the dynamic effects of traffic.
3. Modified from (Moser and Folkman, 2008).



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Figure

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Appendix A

KEY TO TEST BORING LOGS IN APPENDIX B



Grab sample



2.5" I.D./3" O.D. Modified California sampler (MCS) with steel liners



2" I.D./2.5" O.D. Split spoon sampler (SSS)



1.4" I.D./2" O.D. Standard Penetration Test (ASTM D1586) sampler (SPT)



Depth of free groundwater first noted seeping into boring during drilling



Depth of free groundwater measured in boring after drilling

RELATIVE DENSITY		CONSISTENCY		
SANDS AND GRAVELS	SPT, N	SILTS AND CLAYS	SPT, N	UNCONFINED COMPRESSIVE STRENGTH, tsf
VERY LOOSE	0-4	VERY SOFT	0-2	0-0.25
LOOSE	4-10	SOFT	2-4	0.25-0.50
MEDIUM DENSE	10-30	MEDIUM STIFF	4-8	0.50-1.00
DENSE	30-50	STIFF	8-15	1.00-2.00
VERY DENSE	50+	VERY STIFF	15-30	2.00-4.00
		HARD	30+	>4.00

Reference: Terzaghi, K. and Peck, R., SOIL MECHANICS IN ENGINEERING PRACTICE, 2nd ed., John Wiley and Sons, New York, 1967. Page 341 Table 45.1 and pp. 347 Table 45.2.

CONSTITUENT DESCRIPTIONS

DESCRIPTION	CRITERIA
TRACE	less than 5%
FEW	5% to 10%
LITTLE	15% to 25%
SOME	30% to 45%
MOSTLY	50% to 100%

Reference: ASTM D2488, Note 15

MOISTURE CONDITION

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

Reference: ASTM D2488, Table 3 - Criteria for Describing Moisture Condition

GROUND BEHAVIOR	CLASSIFICATION
Ground that can be excavated without initial support to shallow depths (typically less than 10 feet) and where shoring can be installed before the ground starts to move. For example, unfissured hard clay when not highly overstressed.	Firm
Ground of which chunks or flakes begin to fall off excavation walls. If raveling starts within a few minutes of excavation then it is "fast" raveling; otherwise, it is "slow" raveling. Silts and sands with clay binder may be fast raveling. Stiff fissured clays may be slow or fast raveling depending upon the degree of overstress.	Raveling
Ground that squeezes or plastically extrudes into excavations without visible fracturing. Can occur at shallow to medium depth in very soft to medium stiff clay, and can occur in stiff to hard clay under high overstress.	Squeezing
Ground consisting of clean dry granular material (e.g., sand and gravel) that moves by gravity to its angle of repose.	Running
Ground in a fluid-like condition (e.g., a disturbed mixture of predominantly silt, sand and/or gravel with water), that flows across pressure gradients.	Flowing
Ground that expands in volume due to the absorption of water (e.g., clays).	Swelling

Reference: Modified from Heuer, R.E., 1974, Important ground parameters in soft ground tunneling, Subsurface exploration for underground excavation and heavy construction, New England College, Henniker, New Hampshire, American Society of Civil Engineers, New York, P. 41-55.

NOTES:

- Boring locations are approximate.
- Borings were made with a Mobile B-24 drill rig using 5-inch diameter continuous flight solid stem augers, a Fraste Multidrill XL drill rig using 6-inch diameter tricone bit and rotary wash procedure, and a Deeprock DR5K drill rig using 7-inch diameter hollow stem auger, as indicated in each log.
- Lines separating strata in the logs represent approximate boundaries and are dashed where strata change depth is less certain. Strata change may be gradual. See figures in Appendix C for grain size definitions and nomenclature.
- Penetration Resistance (blows/ft.) are the last 12" of an 18" drive using a 140-pound hammer falling 30 inches per blow unless noted otherwise. The Penetration Resistance values noted on the logs are actual blows per foot of penetration for the respective sampler type (i.e., MCS and SSS sampler penetration resistance blow counts have not been reduced to SPT sampler "N" values).
- Where noted on the logs, slough is defined as material from the bore hole walls which ravel, runs, or flows into and partially fills the bore hole on removal of solid stem augers for sampling. The presence of slough within the bore hole has an effect on blow counts and in such cases the blow counts are not representative of undisturbed in-situ ground. Bore hole sloughing and uncased bore hole behavior in terms of stability is not the same as unshored trench wall behavior. Typically, trench wall instability will occur more readily and at much shallower depths than bore hole instability.



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Boring Log Legend

Figure

A-1

(1 of 2)

KEY TO TEST BORING LOGS IN APPENDIX B (Cont'd)

CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES ^A				SOIL CLASSIFICATION	
				GROUP SYMBOL	GROUP NAME ^B
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels < 5% fines ^C	$Cu \geq 4$ and $1 \leq Cc \leq 3$ ^E	GW	Well-graded gravel ^F
			$Cu < 4$ and/or $1 > Cc > 3$ ^E	GP	Poorly graded gravel ^F
		Gravels with Fines > 12% fines ^C	Fines classify as ML or MH	GM	Silty gravel ^{F,G,H}
			Fines classify as CL or CH	GC	Clayey gravel ^{F,G,H}
	SANDS 50% or more of coarse fraction passes No. 4 sieve	Clean Sands < 5% fines ^D	$Cu \geq 6$ and $1 \leq Cc \leq 3$ ^E	SW	Well-graded sand ^I
			$Cu < 6$ and/or $1 > Cc > 3$ ^E	SP	Poorly graded sand ^I
		Sands with Fines > 12% fines ^D	Fines classify as ML or MH	SM	Silty sand ^{G,H,I}
			Fines classify as CL or CH	SC	Clayey sand ^{G,H,I}
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid limit ≤ 50	Inorganic	PI > 7 plots on or above "A" line ^J	CL	Lean clay ^{K,L,M}
			PI < 4 plots below "A" line ^J	ML	Silt ^{K,L,M}
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	OL	Organic Clay ^{K,L,M,N}
					Organic Silt ^{K,L,M,O}
	SILTS AND CLAYS Liquid limit > 50	Inorganic	PI plots on or above "A" line	CH	Fat clay ^{K,L,M}
			PI plots below "A" line	MH	Elastic silt ^{K,L,M}
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	OH	Organic Clay ^{K,L,M,P}
					Organic Silt ^{K,L,M,Q}
HIGHLY ORGANIC SOILS		Primarily organic matter, dark color and organic odor		PT	Peat

NOTES:

A Based on the material passing the 3-in. (75mm) sieve.

B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.*

C Gravels with 5% to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

D Sands with 5% to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

$$E \quad Cu = \frac{D_{60}}{D_{10}} \quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$$

F If soil contains $\geq 15\%$ sand, add "with sand" to group name.

G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

H If fines are organic, add "with organic fines" to group name.

I If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

J If Atterberg limits plot in hatched area, soil is a CL-ML (silty clay).

K If soil contains 15% to 29% plus No. 200, add "with sand" or "with gravel", whichever is predominant.

L If soil contains $\geq 30\%$ plus No.200, predominantly sand, add "sandy" to group name.

M If soil contains $\geq 30\%$ plus No.200, predominantly gravel, add "gravelly" to group name.

N PI ≥ 4 and plots on or above "A" line.

O PI < 4 or plots below "A" line.

P PI plots on or above "A" line.

Q PI plots below "A" line.

*See figures in Appendix C for grain size definitions and nomenclature. The largest particle that could have been sampled from the test borings is a function of the diameter of the boring, drill bit, and sampler. Intact cobble- and boulder-size particles, if any, are too large to have been able to retrieve from the test borings. Therefore, there may have been larger particles (e.g., cobble- and boulder-size) in the soils than were observed in samples and drill cuttings from the borings. Consequently, cobbles logged in the test borings, if any are also inferred from the drill-rig behavior during drilling and from observations of freshly-broken gravel-size particles in samples and cuttings.

PLASTICITY			
Term	PI	Dry Strength	Field Test
Nonplastic	0-3	Very low	Falls apart easily
Slightly plastic	3-15	Slight	Easily crushed with fingers
Medium plastic	15-30	Medium	Difficult to crush
Highly plastic	30 or more	High	Impossible to crush with fingers
Reference: Sowers, George F., Introductory Soil Mechanics and Foundations: Geotechnical Engineering, 4th ed., Macmillan Publishing Co., Inc., New York, 1979, Page 83 Table 2:10.			



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Boring Log Legend

Figure

A-1

(2 of 2)

Appendix B

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORING B-1 ^①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					LOCATION: 100' northeast of Industrial Rd & Taylor Wy 15' southeast of fenceline at 301 Industrial Rd (see Figure 1)					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
					DESCRIPTION ②										
					Landscaping Top Soil										
1		⊗			CLAYEY SAND WITH GRAVEL (SC) - FILL - dark brown - dry - few silt										
2		■	31		SILTY CLAYEY SAND WITH GRAVEL (SM/SC) - FILL - brown - dry - little silt - gravel to at least 2" dimension - medium dense	13				17	48	35			
3		■	15												
5					SILTY FAT CLAY WITH SAND (CH/MH) - YOUNG BAY MUD - dark gray - very soft - few organics - moist - highly plastic										
4		■	4			75	55						1.0		
10		■	3		SILTY FAT ORGANIC CLAY WITH SAND (CH/MH/OH) - YOUNG BAY MUD - dark gray with black mottling - moist to wet - highly plastic - sulfurous odor - very soft										
6		■	2												
15					SANDY LEAN CLAY (CL) - gray - medium stiff to stiff - trace silt - wet - medium plastic										
7		■	13												
8		■	7												
9		■	9												
20					BOTTOM OF BORING AT 20 FEET										
25															

NOTES

- ① Drilled 8/28/2017, using a Mobile B-24 with 5" diameter solid stem augers and a 3-wrap rope cathead hammer system.
See notes in Figure A-1, Appendix A.
② See report text and figures in Appendices A and C for definitions, lab test results, and additional soil descriptions.
③ Free groundwater was encountered during drilling at a depth of 15' and measured at 12' prior to boring backfilling on 8/28/2017.



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Log of Boring B-1

Figure

B-1

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORING B-2W ①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSION STRENGTH kips/ft. ²	DIRECT SHEAR	
					LOCATION: 730' northeast of Industrial Rd & Taylor Wy 30' southeast of fenceline at 301 Industrial Rd (see Figure 1)					Gravel >#4 sieve %	Sand #4 to #200 sieve %	Fines <#200 sieve %		Cohesion p.s.f.	Internal Friction Angle
					DESCRIPTION ②										
					Landscaping Top Soil										
1		X			SANDY LEAN TO FAT CLAY WITH GRAVEL (CL/CH) - FILL - dark brown - medium plastic - few silt, organics - dry										
2			31		CLAYEY SANDY GRAVEL (GC) - FILL - brown - moist - medium dense - gravel to at least 1.5" dimension										
5			15												
3					SILTY FAT CLAY (CH/MH) - YOUNG BAY MUD - black and dark gray - highly plastic - few organics - very soft - trace sand - wet										
4		X													
10			0		ELASTIC SILT WITH SAND (MH) and FAT ORGANIC CLAY WITH SAND (CH/OH) - YOUNG BAY MUD - dark gray with black mottling - very soft - little organics - wet - highly plastic - sulfurous odor	107	42							200	13°
5			0												
6			0					98	52						
7			0			92	48						0.9		
15			0												
8												17	83		
9			15		SILTY FAT CLAY (CH/MH) - dark gray - wet - highly plastic - few thin sand lenses - stiff	21	107			FINES 31% Silt 52% Clay			2.5		
10			10												
11			32		SILTY CLAYEY SAND (SM/SC) - light brown - medium dense - trace gravel - wet	15	120			3	52	45	7.1		
20															
12			15		LEAN CLAY (CL) - light brown - stiff - few silt and sand - wet - medium plastic					FINES 20% Silt 25% Clay					
25			7		LEAN CLAY WITH SAND (CL) - gray and light brown - medium plastic with few black flecks - medium stiff - few silt - wet	33	89						2.0		
13			6												
14					BORING CONTINUES AT 28 FEET ON FIGURE B-2W (2 of 2)										

NOTES

- ① Drilled 8/24/2017, using a Fraste Multidrill XL with a 6" diameter tricone bit and rotary wash method and an automatic trip hammer system. See notes in Figure A-1, Appendix A.
- ② See report text and figures in Appendices A and C for definitions, lab test results, and additional soil descriptions.
- ③ Completed as a 40' deep groundwater level monitoring well. See text of report for well construction details.
- ④ Free groundwater was encountered during drilling at a depth of 5.5' and measured at 5' on 8/28/2017.



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Log of Boring B-2W

Figure

B-2W

(1 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	LOG OF BORING B-2W ^①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					DESCRIPTION					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
14			6		BORING CONTINUED FROM 28 FEET ON FIGURE B-2W (1 of 2)										
					LEAN CLAY (CL) - gray and light brown with few black flecks - few silt and sand - medium plastic - medium stiff - wet										
30															
15			16		FAT CLAY WITH SAND (CH) - dark gray - little silt - trace gravel and organics - highly plastic - medium stiff - wet	32	91								
16			6												
35															
17			48			18	116								
18			22												
40					SILTY SAND (SM) - gray - few clay - medium dense - rapid dilatancy - wet										
					BOTTOM OF BORING AT 40 FEET										
45															
50															
55															

NOTES

① See notes on Figure B-2W (1 of 2)



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Log of Boring B-2W

Figure

B-2W

(2 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORING B-3 ^①		MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSION STRENGTH kips/ft. ²	DIRECT SHEAR	
					LOCATION: 5' northeast of SR 101 north fenceline 110' southeast of 333 Shoreway Rd north entrance (see Figure 1)						Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % ($< \#200$ sieve)		Cohesion p.s.f.	Internal Friction Angle
DESCRIPTION ②																
					Shoreway Rd: 12 inches asphaltic concrete 12 inches aggregate base rock (GM)											
					SANDY LEAN TO FAT CLAY WITH GRAVEL (CL/CH) - FILL - brown - medium plastic - little silt - moist											
1 2 5					ELASTIC SILT (MH) and FAT CLAY (CH) - YOUNG BAY MUD - black and dark gray - highly plastic - few organics - very soft - trace sand - moist to wet											
3									75	36						
10			2		SILTY FAT ORGANIC CLAY WITH SAND (CH/MH/OH) - YOUNG BAY MUD - dark gray with black mottling - wet - highly plastic - sulfurous to petroliferous odor - very soft		94	47						0.5		
5			2		- silty sand lense to at least 3" thick							24	76			
6			2		- silty sand lense to at least 3" thick							FINES 18% Silt 58% Clay				
7			20		SANDY SILTY LEAN CLAY (CL/ML) - olive brown - stiff - trace gravel - wet - medium plastic		18	111				4	39	57	1175	18°
8			9		SANDY SILTY LEAN CLAY (CL/ML) - brown - medium stiff to stiff - medium plastic - moist							FINES 29% Silt 28% Clay				
20			8									41	59			
25			14		LEAN CLAY (CL) - light brown - stiff to medium stiff - little silt - wet - medium plastic		30	93						3.5		
			6		LEAN CLAY WITH SAND (CL) - light brown - medium stiff - little silt - wet - medium plastic											
					BORING CONTINUES AT 28 FEET ON FIGURE B-3 (2 of 2)											

NOTES

- ① Drilled 8/28/2017, using a Mobile B-24 with 5" diameter solid stem augers and a 3-wrap rope cathead hammer system. See notes in Figure A-1, Appendix A.
- ② See report text and figures in Appendices A and C for definitions, lab test results, and additional soil descriptions.
- ③ Free groundwater was encountered during drilling at a depth of 15.5' and measured at 5' prior to boring backfilling on 8/28/2017.



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Log of Boring B-3

Figure

B-3

(1 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	LOG OF BORING B-3 ①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					DESCRIPTION					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
11			6		BORING CONTINUED FROM 28 FEET ON FIGURE B-3 (1 of 2) LEAN CLAY WITH SAND (CL) - light brown - medium stiff - little silt - wet - medium plastic										
12			5												
30															
35					FAT CLAY WITH SAND (CH) - dark gray - highly plastic - little silt - stiff - trace gravel - wet	25	102								
13			15												
14			13												
15			8		- silty sand lense to at least 3" thick										
40					BOTTOM OF BORING AT 40 FEET										
45															
50															
55															

NOTES

① See notes on Figure B-3 (1 of 2)



File No. 5701.0

June 2020

West Yost Associates

Mid-Peninsula Water District
 SR101 Crossing at PAMF
 San Carlos, California

Log of Boring B-3

Figure

B-3

(2 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORING B-4 ^①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					LOCATION: 30' northeast of SR 101 north fenceline 85' southeast of 125 Shoreway Rd south entrance (see Figure 1)					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
					DESCRIPTION ②										
					Shoreway Rd: 12 inches asphaltic concrete 12 inches aggregate base rock (GM)										
					CLAYEY SANDY GRAVEL (GC) - FILL - brown - moist - little silt										
1		X			SILTY FAT CLAY (CL/CH) - YOUNG BAY MUD - dark gray - very soft - few sand and organics - moist - highly plastic	73	55						0.9		
5			3												
2															
3			2		ELASTIC SILT WITH SAND (MH) and FAT ORGANIC CLAY WITH SAND (CH/OH) - YOUNG BAY MUD - dark gray with black mottling - moist to wet - highly plastic - sulfurous odor - very soft			148	65						
10															
4			3			177	28						1.0		
5			1												
15															
					SANDY LEAN CLAY (CL) - gray - medium plastic - little silt - very stiff - few gravel - wet	18	115								
6			25												
7			17												
20					CLAYEY SANDY GRAVEL (GC) - brown - medium dense - little silt - wet										
					BOTTOM OF BORING AT 20 FEET										
25															

NOTES

- ① Drilled 8/28/2017, using a Mobile B-24 with 5" diameter solid stem augers and a 3-wrap rope cathead hammer system. See notes in Figure A-1, Appendix A.
- ② See report text and figures in Appendices A and C for definitions, lab test results, and additional soil descriptions.
- ③ Free groundwater was encountered during drilling at a depth of 15' and measured at 12' prior to boring backfilling on 8/28/2017.



File No. 5701.0

June 2020

West Yost Associates

Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Log of Boring B-4

Figure

B-4

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORING B-5 ^①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					LOCATION: 6.5' west of east Shoreway Rd curb 45' north of Gate 4 entrance to 225 Shoreway Rd (see Figure 1)					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
					Shoreway Rd: 6 inches asphaltic concrete 24 inches base rock (GM and SC with gravel)										
5	1		0		ELASTIC SILT WITH SAND (MH) and FAT ORGANIC CLAY WITH SAND (CH/OH) - YOUNG BAY MUD - dark gray - soft at 2' becoming very soft by 5' - highly plastic - moist to wet	94	48								
	2		0												
10	3		0			144	33						0.7		
	4		0												
15	5		10		SANDY SILTY LEAN CLAY (CL/ML) and SILTY LEAN CLAY WITH SAND (CL/ML) - yellowish brown - stiff - few fine gravel - moist to wet - slightly plastic and medium plastic	19	110								
	6		10					28	12	3	40	57			
20	7		3		SANDY LEAN CLAY WITH GRAVEL (CL) - light yellowish brown - soft - little silt - wet - slightly to medium plastic	30	94								
	8		4								7	93	1.6		
25	9		5		SANDY SILTY LEAN CLAY (CL/ML) and SILTY LEAN CLAY WITH SAND (CL/ML) - yellowish brown - soft - trace and few fine gravel - wet - medium plastic	32	91								
	10		3												
					BORING CONTINUES AT 28 FEET ON FIGURE B-5 (2 of 2)										

NOTES

- ① Drilled 8/14/2018 as West Yost Associates environmental test boring B1, using a Deeprock DR5K with 7-inch diameter hollow stem augers and an automatic trip hammer. See notes in Figure A-1, Appendix A.
- ② See report text and figures in Appendices A and C for definitions, lab test results, and additional soil descriptions.
- ③ Free groundwater was encountered during drilling at a depth of 18' and measured at 8' prior to boring backfilling on 8/14/2018.
- ④ There was no ground flowing into the hollow stem augers on removal of plug in preparation for sampling where below the groundwater level.



File No. 5701.0

June 2020

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Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Log of Boring B-5

Figure

B-5

(1 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	LOG OF BORING B-5 ^①	MOISTURE %	DRY DENSITY lbs./ft. ³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE			UNCONFINED COMPRESSIVE STRENGTH kips/ft. ²	DIRECT SHEAR	
					DESCRIPTION					Gravel % (>#4 sieve)	Sand % (#4 to #200 sieve)	Fines % (<#200 sieve)		Cohesion p.s.f.	Internal Friction Angle
30	11		6		BORING CONTINUED FROM 28 FEET ON FIGURE B-5 (1 of 2) SANDY SILTY LEAN CLAY (CL/ML) and SILTY LEAN CLAY WITH SAND (CL/ML) - yellowish brown - few fine gravel - medium plastic - SOFT - moist to wet	30	94						1.9		
35	12		10		LEAN TO FAT CLAY WITH SAND (CL/CH) - gray - few silt - medium to highly plastic - stiff - wet										
35	13		7			21	109								
40	14		9												
40	15		10			31	92								
45					BOTTOM OF BORING AT 41.5 FEET										
50															
55															

NOTES

① See notes on Figure B-5 (1 of 2)



File No. 5701.0

June 2020

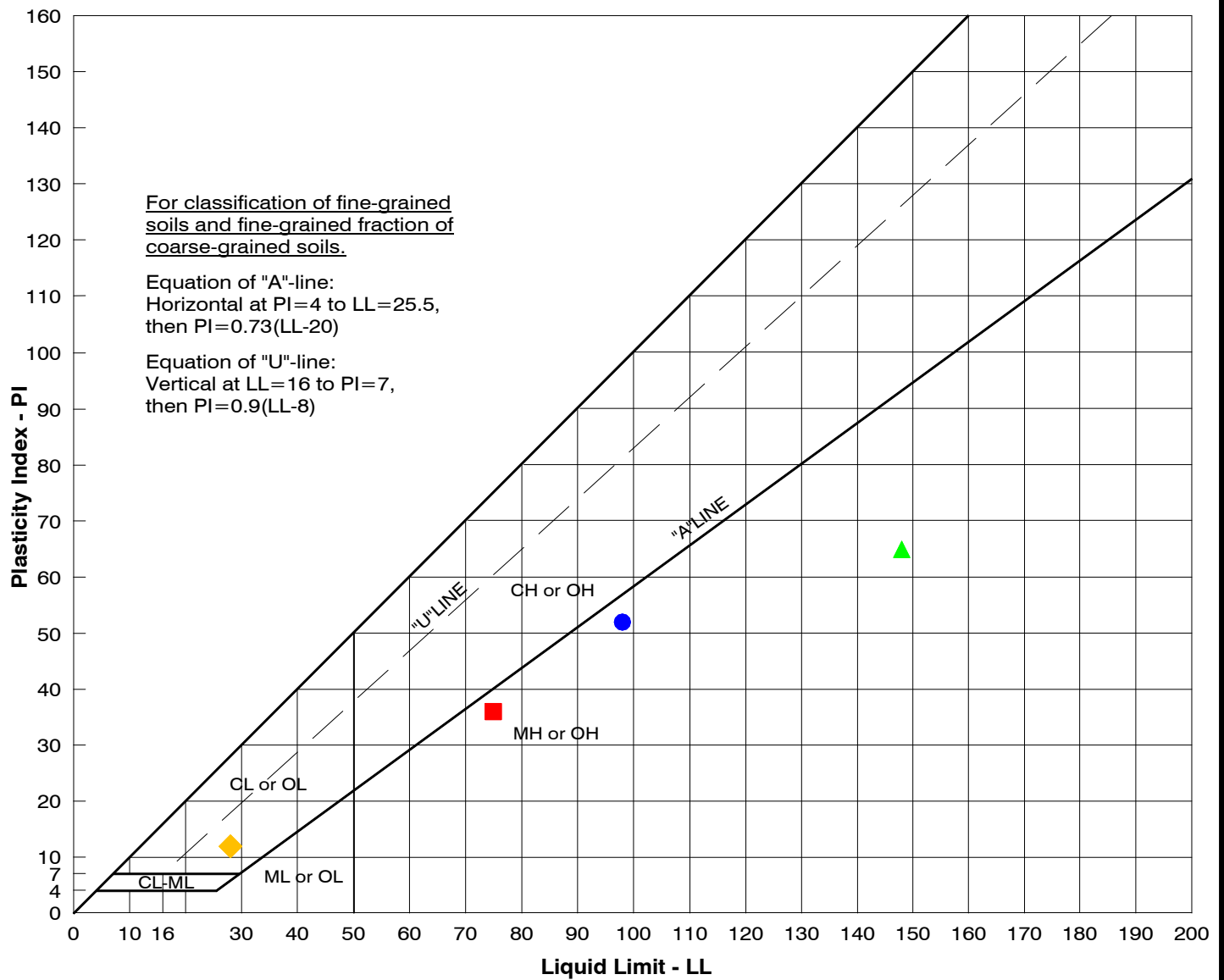
West Yost Associates
 Mid-Peninsula Water District
 SR101 Crossing at PAMF
 San Carlos, California
Log of Boring B-5

Figure

B-5

(2 of 2)

Appendix C



TEST SYMBOL	SAMPLE NO.	DEPTH (ft)	LIQUID LIMIT - LL	PLASTICITY INDEX - PI	USCS GROUP SYMBOL*
●	B-2W-6	11½-13	98	52	MH
■	B-3-3	7-7½	75	36	MH
▲	B-4-3	7-8	148	65	MH
◆	B-5-6	16½-18	28	12	CL

* Classification of fines < 0.425mm



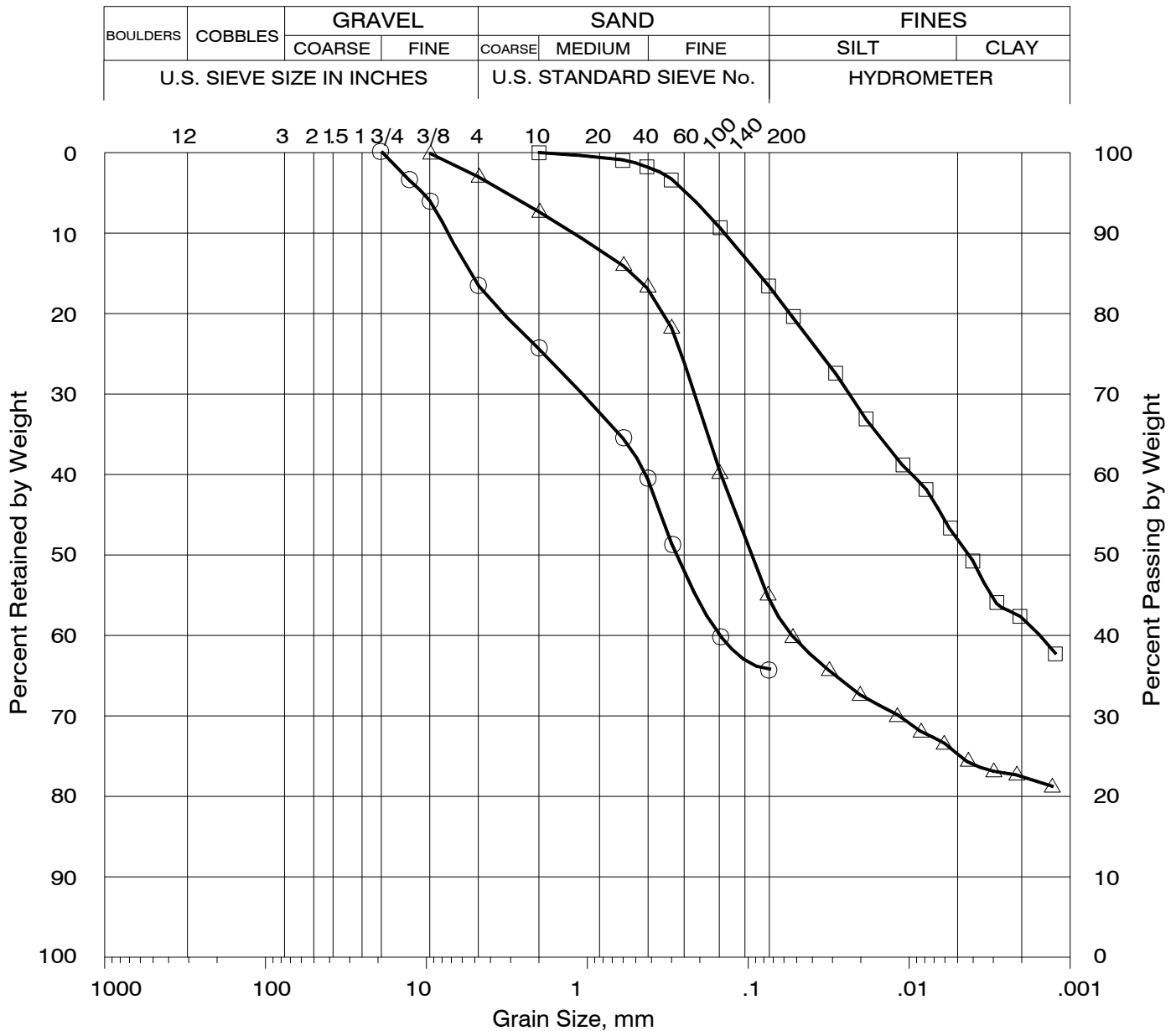
West Yost Associates

Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Plasticity Index

Figure

C-1



NOTE: The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Figure A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.



West Yost Associates

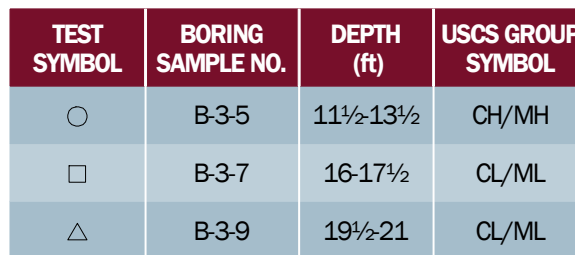
Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Grain Size

Figure

C-2

(1 of 3)



McMILLEN
JACOBS
ASSOCIATES

West Yost Associates

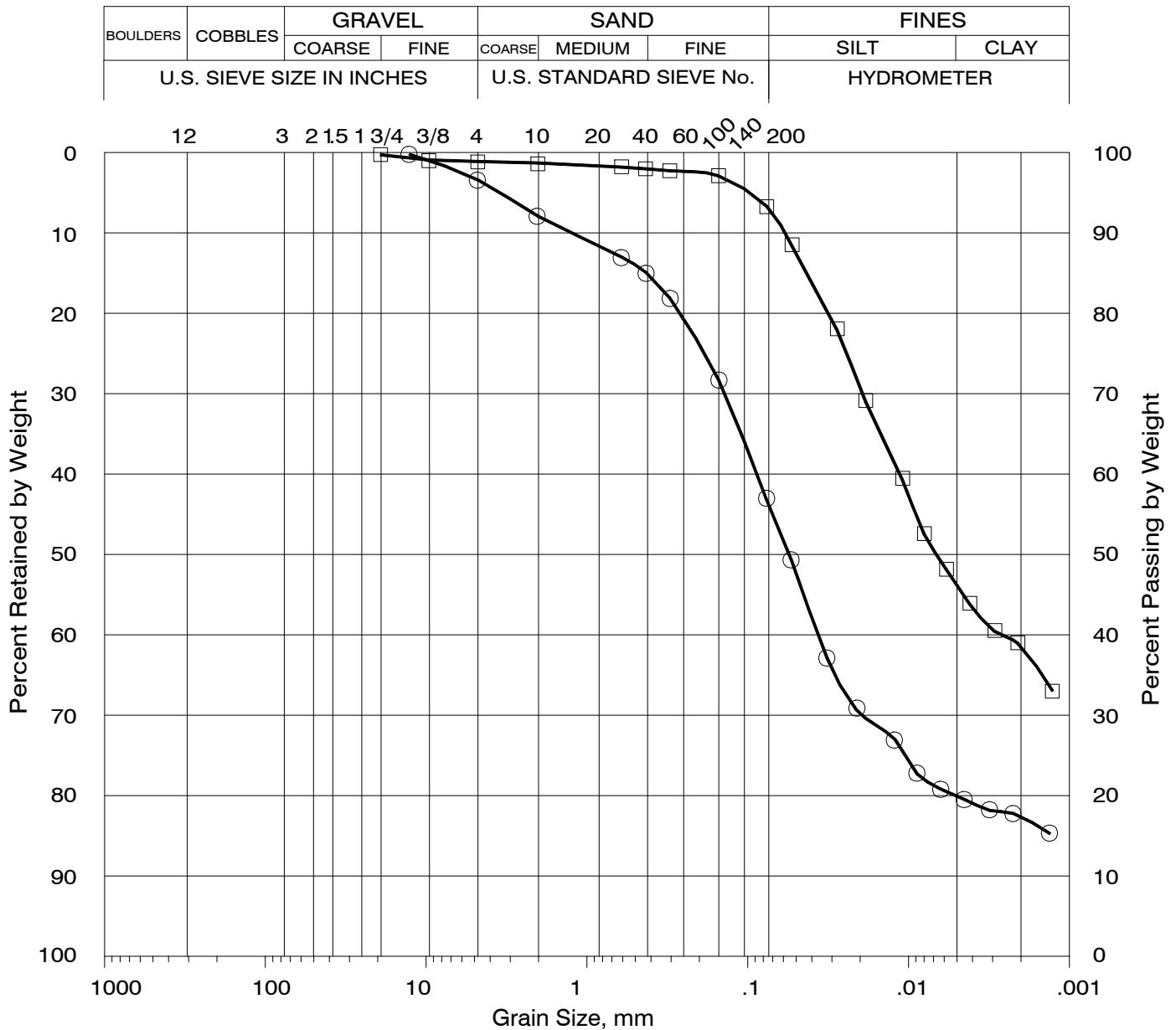
**Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California**

Grain Size

Figure

C-2

(2 of 3)



NOTE: The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Figure A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.



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San Carlos, California

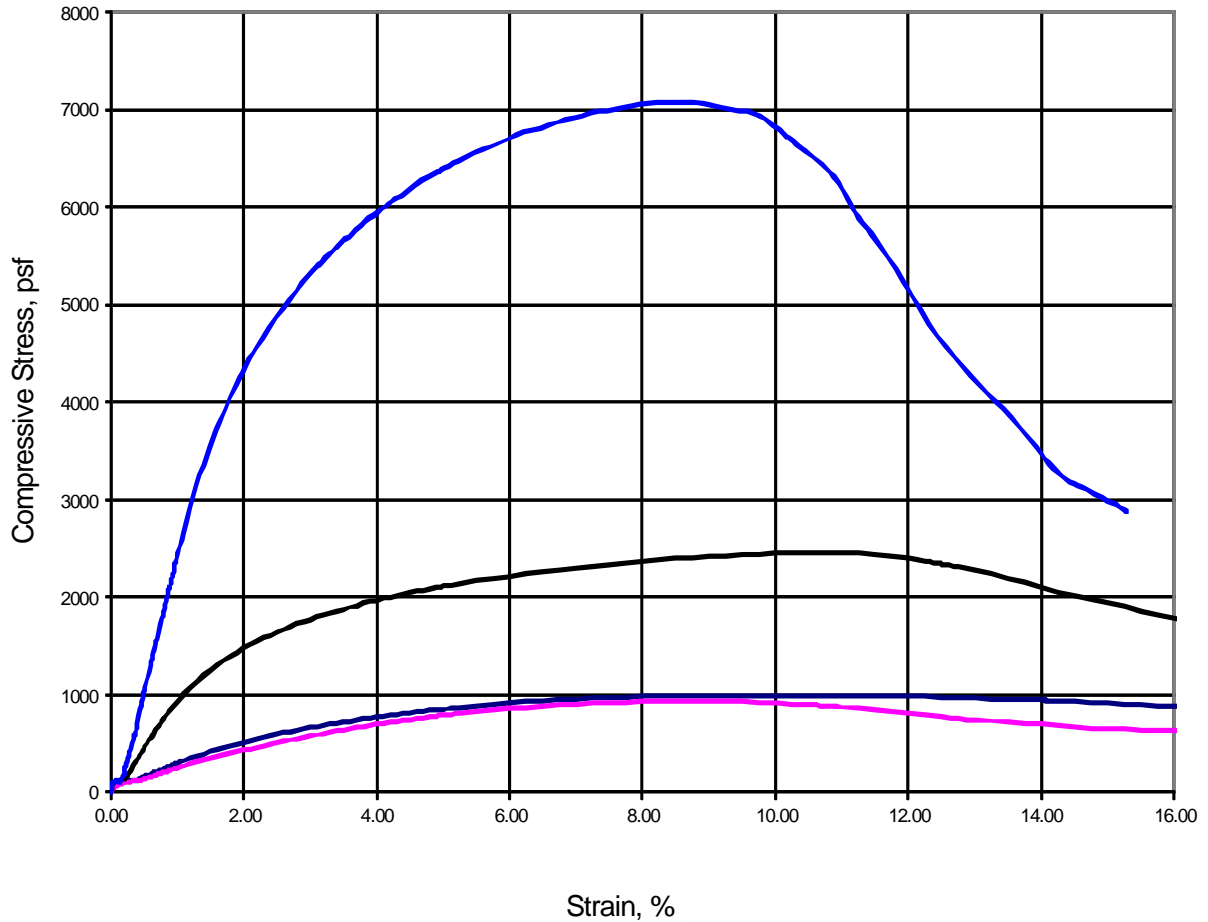
Grain Size

Figure

C-2

(3 of 3)

Unconfined Compressive Strength ASTM D2166



BORING SAMPLE NO.	B-1-4	B-2W-7	B-2W-9	B-2W-11
MAXIMUM UNCONFINED STRESS, psf	1001	940	2465	7079
%STRAIN @ PEAK STRESS	10	9.0	11	8.2
DEPTH, ft.	8-9½	13-14½	16-17½	19-20½
WATER CONTENT, %	75	92	21	15
DRY DENSITY, pcf	55	48	107	120
SATURATION, %	98	98	100	100



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June 2020

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SR101 Crossing at PAMF
San Carlos, California

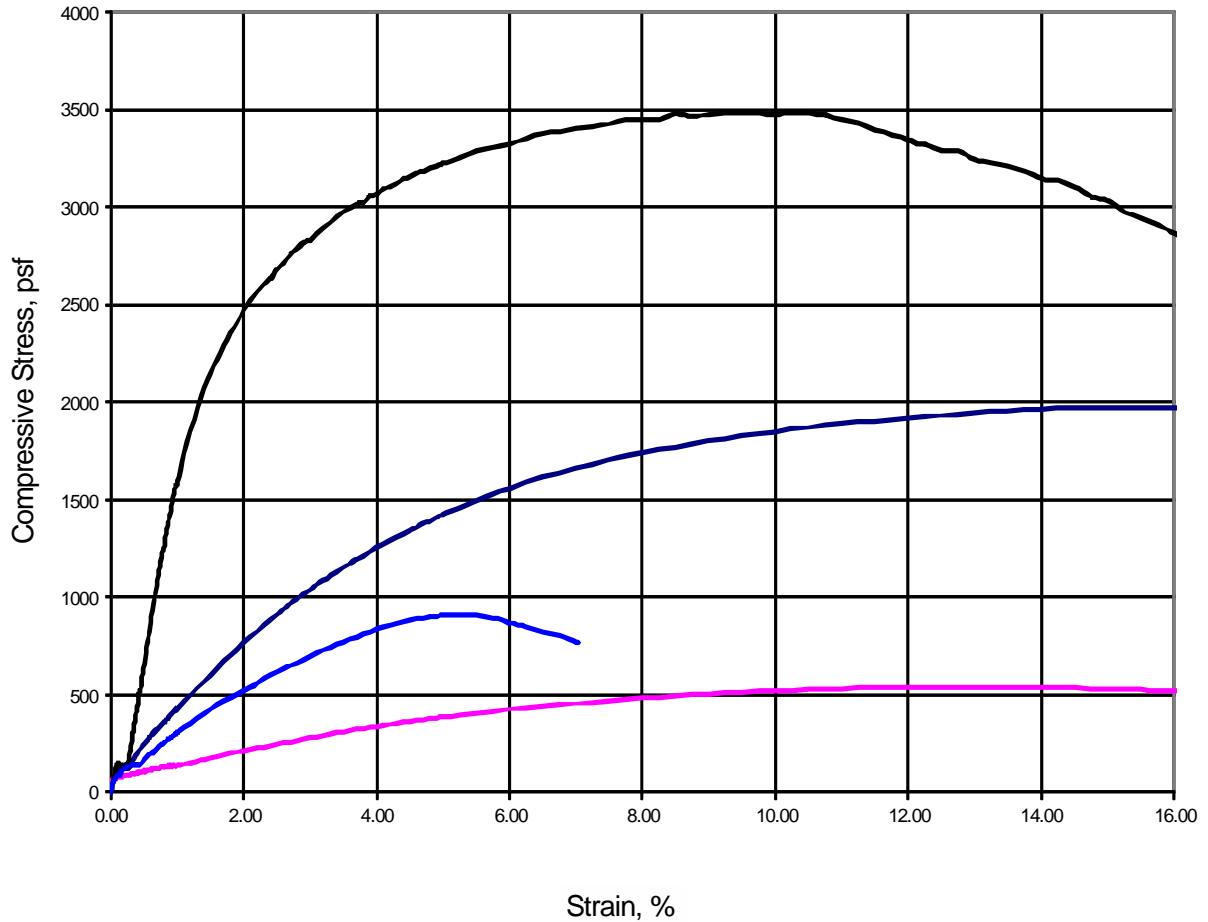
Unconfined Compression

Figure

C-3

(1 of 3)

Unconfined Compressive Strength ASTM D2166



BORING SAMPLE NO.	B-2W-13	B-3-4	B-3-10	B-4-2
MAXIMUM UNCONFINED STRESS, psf	1974	544	3486	915
%STRAIN @ PEAK STRESS	15	13	10	5
DEPTH, ft.	25-26½	10-11½	25-26½	5-6½
WATER CONTENT, %	33	94	30	73
DRY DENSITY, pcf	89	47	93	55
SATURATION, %	100	98	99	94



File No. 5701.0

June 2020

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SR101 Crossing at PAMF
San Carlos, California

Unconfined Compression

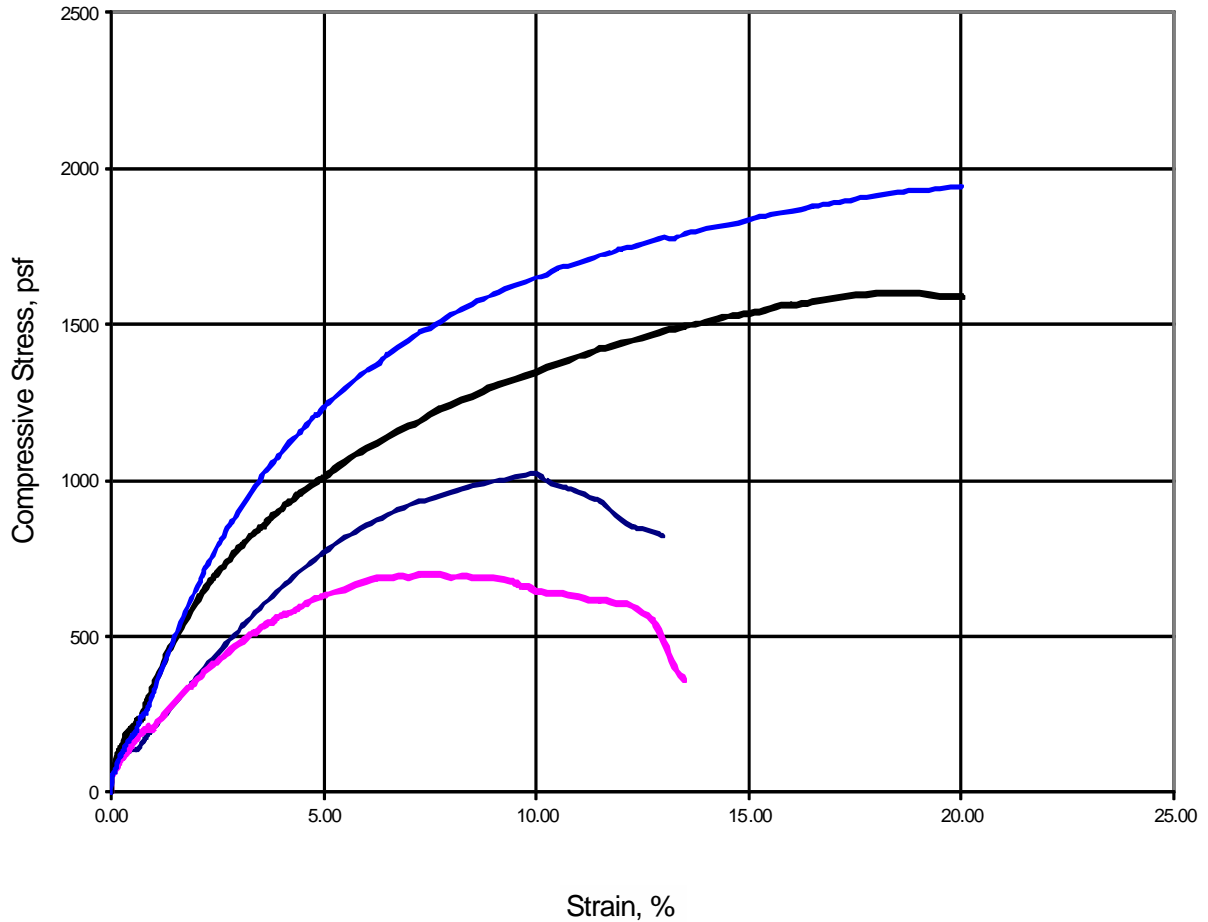
Figure

C-3

(2 of 3)

Unconfined Compressive Strength

ASTM D2166



— B-4-4 — B-5-3 — B-5-7 — B-5-11

BORING SAMPLE NO.	B-4-4	B-5-3	B-5-7	B-5-11
MAXIMUM UNCONFINED STRESS, psf	1021	698	1602	1942
%STRAIN @ PEAK STRESS	10	7	18	20
DEPTH, ft.	11-12½	10-11½	20-21½	30-31½
WATER CONTENT, %	177	144	30	30
DRY DENSITY, pcf	28	33	94	94
SATURATION, %	94	95	99	99



File No. 5701.0

June 2020

West Yost Associates

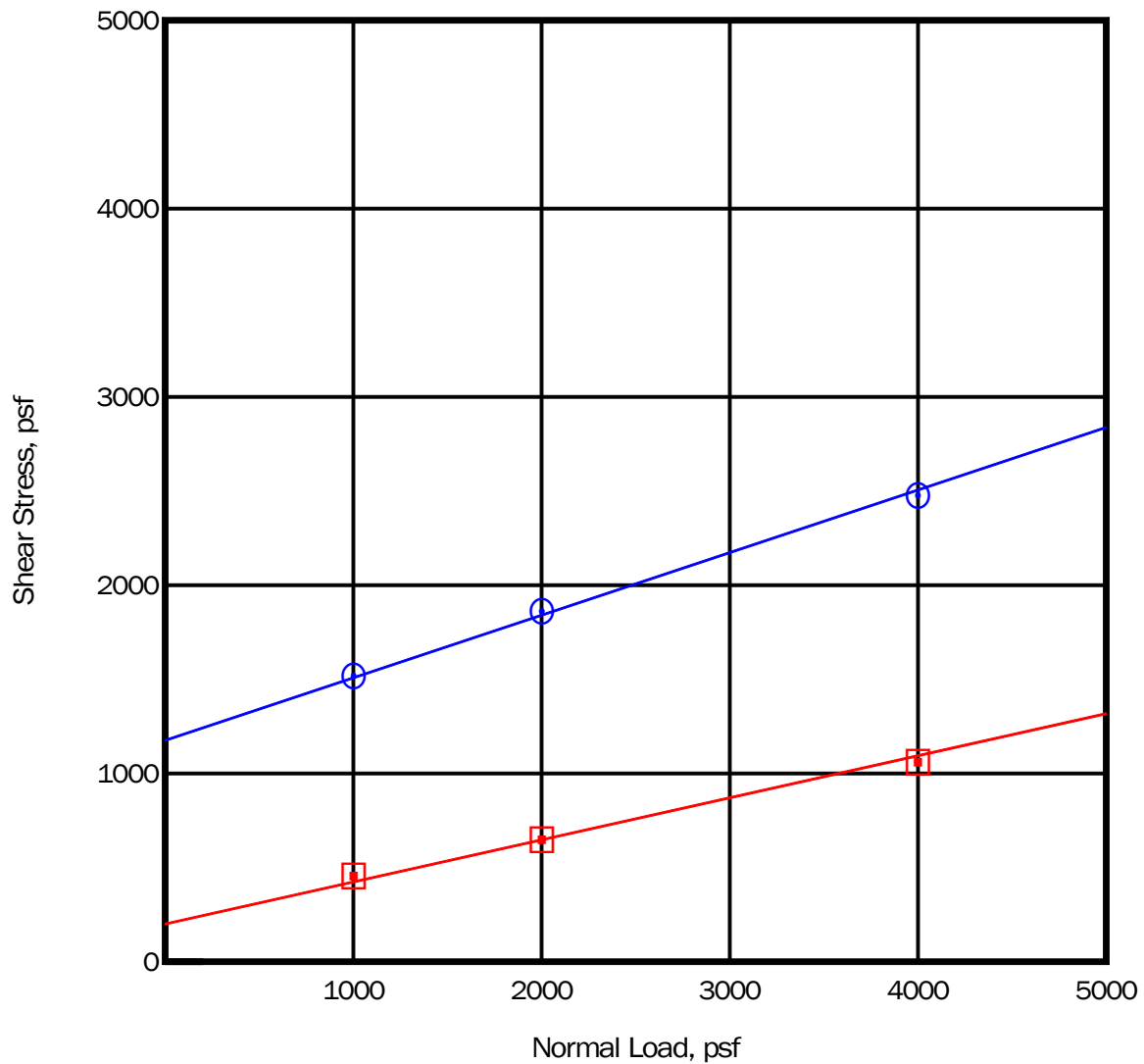
Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Unconfined Compression

Figure

C-3

(3 of 3)



TEST SYMBOL	GRAPH LINE	BORING SAMPLE NO.	DEPTH (ft)	APPARENT COHESION (p.s.f.)	INTERNAL FRICTION ANGLE (degrees)	AVE. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	
						BEFORE TEST	AFTER TEST
■	—	B-2W-5	10-11½	200	13	42/107	47/94
○	—	B-3-7	16-17½	1175	18	111/18	119/17



West Yost Associates

Mid-Peninsula Water District
SR101 Crossing at PAMF
San Carlos, California

Direct Shear

Figure

C-4

Appendix D



Utility locating Electronic Depth
Estimate REPORT BTL 2-6032

SPECIALLY PREPARED FOR



PROJECT SITE:

Shoreway Road
San Carlos, Ca

TABLE OF CONTENTS

1. PROJECT DESCRIPTION
2. PROJECT MAP
3. TABULATION
4. RECORD OF TEST HOLE DATASHEETS

Bess Testlab Inc
2463 Tripaldi Way
Hayward, CA. 94545

Project Manager: Joseph Bohorquez

Ofc: (408) 988-0101

Cell: (408) 515-2556

Email: Joseph@besstestlab.com



Hayward (Corporate) | Fresno | Los Angeles | T. (408) 988-0101 | F. (408) 988-0103
Utility Locating - Ground Penetrating Radar (GPR) - Electromagnetic Pipe Locators
Structural Concrete Scanning - Potholing Vacuum Excavation - CCTV Pipe Inspection
Mobile LiDAR Scanning - 3D Scanning - 3D Utility Mapping - www.besstestlab.com

January 19, 2018

Attention: Lindsay Olsen

Reference: Mid- Peninsula, San Carlos, Ca

Project Summary

BESS performed Thirteen (13) vacuum Excavation potholes and One (1) Electronic Pothole in Shoreway Road at predetermined locations. Please see attached Data sheets for details.

BESS Crew

SUE Foreman: Lupe Bernal

Apprentice: Tima A.

Vacuum Excavation Technical Approach

Vacuum excavation is done by using air/hydro-vacuum excavation at predetermined locations over USA marks, to document the precise horizontal and vertical position of existing utilities within the investigation area. Data collected as a result of potholing activities were presented this Portable Document Format (PDF) report that will include: utility type, size, material, depth and pictures of the exposed utility. Pothole locations (in the field) were marked with wooden lath and ribbon marked with the pothole number, utility size and depth or MAG nail with pertinent utility data annotated on the ground surface. Once the utility data has been collected the potholes were restored to its previous condition using native backfill and the appropriate surface restoration materials.

Electronic Pothole/Probing (EP) Technical Approach

An electronic pothole (EP) investigation is an electronic depth estimate done by using industry acceptable methods (i.e., electronic pipe and cable locating equipment, Ground Penetrating Radar (GPR), Pipeline Current Mapper (PCM), etc.) to determine the approximate horizontal position and count of existing utilities within the areas designated. BESS field crews will use a combination of water-based paint and pin flags (in the appropriate APWA color) to mark the results of our investigation on the ground surface. BESS will compare any available utility record information (supplied by client) with the results of field investigation services to ensure all utilities have been accounted for. Pictures of investigation are also taken and reported.

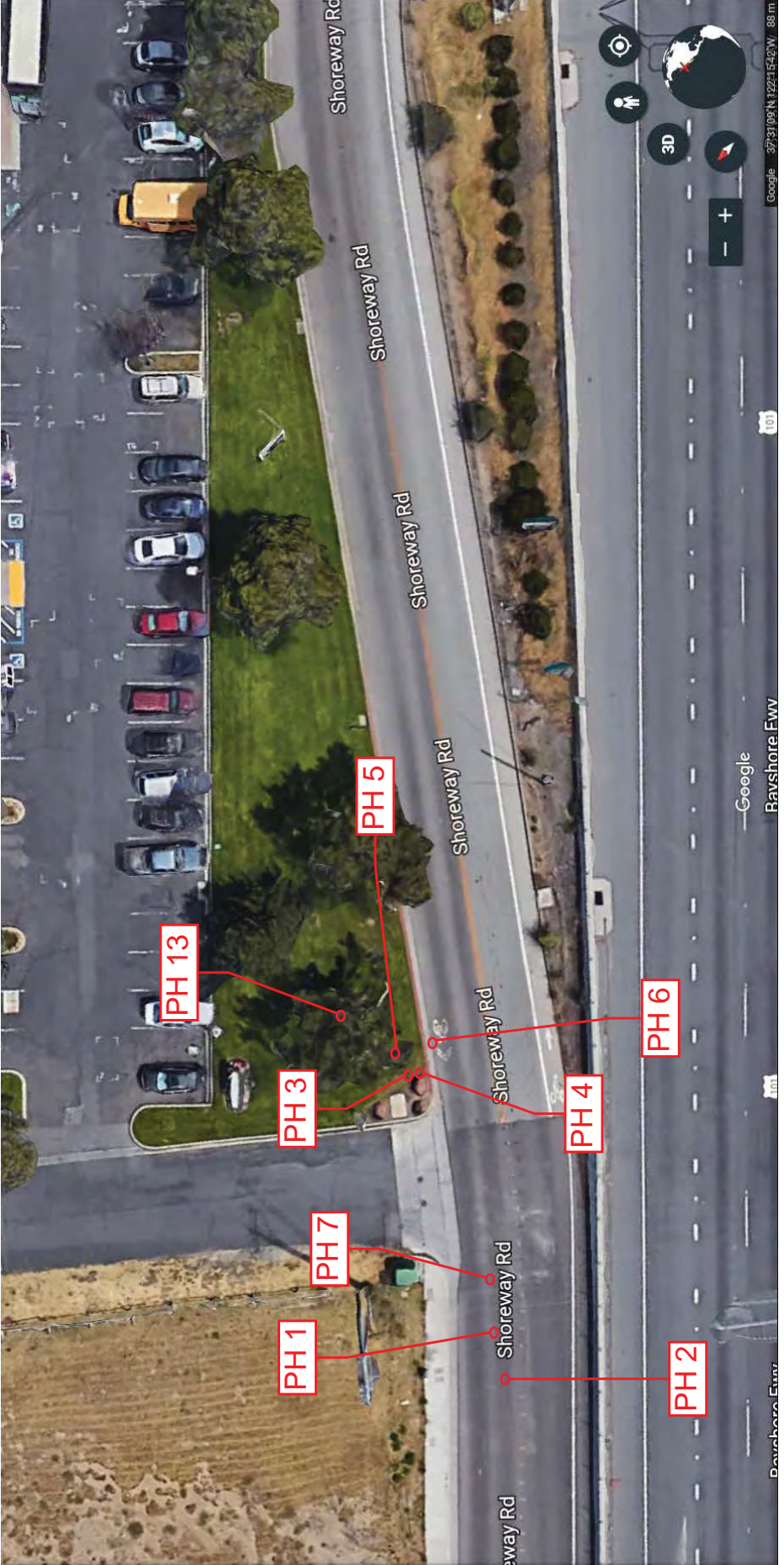
If you have any questions or need additional information, please feel free to contact me.

Respectfully,

A handwritten signature in black ink, appearing to read "J. Bohorquez".

Joseph Bohorquez
General Manager
Bess Testlab, Inc.
Joseph Bohorquez
(408) 515-2556

PROJECT SITE MAP -PROJECT: San Carlos, Ca



DEPICTION OF WORK IS APPROXIMATE

PROJECT SITE MAP -PROJECT:San Carlos, Ca



DEPICTION OF WORK IS APPROXIMATE

POTHOLE TABULATION SHEET FOR San Carlos, Ca

Methods (PH - Pothole) (GPR - Ground Penetrating Radar) (EP - Electronic Probing via Radio / RF Detection, Magnetic Detection, PCM, etc.)

Pothole #	Method	Utility	Material	Diameter	Soil	Paving	Thickness	Depth	Notes
1	PH	Gas	Steel	3"	Sand	Asphalt	5"	41"	While excavating we encountered a 3" Steel Gas line at a depth of 41" deep.
2	PH	Sewer	Steel	24"	Dirt	Asphalt	5"	51"	While excavating we encountered a 24" Steel Sewer Force Main at a depth of 51" deep.
3	PH	Gas	Steel	2"	Dirt	Dirt	N/A	35"	While excavating we encountered a 2" Steel Gas Line at a depth of 35" deep.
4	PH	Gas	PVC	4"	Dirt	Dirt	N/A	44"	While excavating we encountered a 4" Plastic Gas Line at a depth of 44" deep.
5	PH	Water	Unknown	12"	Sand	Dirt	N/A	57"	While excavating we encountered a 12" Unknown Water Line at a depth of 57" deep.
6	PH	Fiber Optic	PVC	4"	Sand	Asphalt	9"	32"	While excavating we encountered a 4" Plastic Fiber Optic Line at a depth of 32" deep.
7	PH	Sewer	Concrete	54"	Sand	Asphalt	5"	60"	While excavating we encountered a 54" Reinforced Concrete Sewer Line at a depth of 60" deep.
8	PH	Sewer	Concrete	20"	Sand	Asphalt	10"	58"	While excavating we encountered a 20" concrete sewer line at a depth of 58" deep.
9	PH	Storm Drain	Concrete	39"	Dirt	Asphalt	7"	21"	While excavating we encountered a 39" concrete storm drain line at a depth of 21" deep.
10	PH	Storm Drain	Concrete	39"	N/A	Asphalt	7"	7"	While excavating we encountered concrete at a depth of 7" deep.
11	PH	Sewer	Concrete	54"	Sand	Asphalt	12"	65"	While excavating we encountered a 54" concrete storm drain line at a depth of 65" deep.
12	PH	Sewer	Concrete	54"	Sand	Asphalt	12"	65"	While excavating we encountered a 54" concrete sewer line at a depth of 65" deep.
13	PH	Sewer	Unknown	Unknown	Dirt	Dirt	N/A	48"	While excavating we encountered concrete at a depth of 48".
1	EP	Gas	Steel	4"	Dirt	Concrete	N/A	38"	Got an electronic depth of 38".

Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519708	
Longitude	-122.262162	
Date	01/16/18	
Utility Data	Test hole No.	PH. 1
	Utility Type	Gas
	Material	Steel
	Soil	Native - Sand
	Pavement Thickness	5" of Asphalt
	Diameter	3"
	Ground to top of Utility	41"
	Swing Tie 1	99" SW from Face of Curb
	Swing Tie 2	298" NE from Freeway Wall
	Swing Tie 3	
	Notes	Found a 3" Steel Gas Line at a depth of 41" traveling NE to SW. In front of Address 75 Shoreway.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519979	
Longitude	-122.262768	
Date	01/16/18	
Utility Data	Test hole No.	PH. 2
	Utility Type	Sewer FM
	Material	Steel
	Soil	Native
	Pavement Thickness	5" of Asphalt
	Diameter	24"
	Ground to top of Utility	51"
	Swing Tie 1	101" SW from Face of Curb
	Swing Tie 2	298" NE from Frewway Wall
	Swing Tie 3	
	Notes	Found a 24" Steel Sewer FM Line at a depth of 51" traveling NE to SW, hit Ground Water once we found Line. In front of Address 75 Shoreway.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519768	
Longitude	-122.262754	
Date	01/16/18	
Utility Data	Test hole No.	PH. 3
	Utility Type	Gas
	Material	Steel
	Soil	Dirt
	Pavement Thickness	All Dirt
	Diameter	2"
	Ground to top of Utility	35"
	Swing Tie 1	41" NE from Face of Curb
	Swing Tie 2	120" SE from Water Vault
	Swing Tie 3	
	Notes	Found a 2"Steel Gas Line at a depth of 35" traveling NW to SE, hit Ground Water when Pipe was found also. In front of Address 75 Shoreway.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519768	
Longitude	-122.262072	
Date	01/16/18	
Utility Data	Test hole No.	PH. 4
	Utility Type	Gas
	Material	Plastic
	Soil	Dirt
	Pavement Thickness	All Dirt
	Diameter	4"
	Ground to top of Utility	44"
	Swing Tie 1	16" NE from Face of Curb
	Swing Tie 2	132" SE from Water Vault
	Swing Tie 3	
	Notes	Found a 4" Plastic Gas Line at a depth of 44" traveling NW to SE, hit Ground Water around Sam time we found Line. In front of Address 75 Shoreway.



Form	<i>BESS Utility Solutions -Test Hole Data</i>	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519678	
Longitude	-122.262388	
Date	01/16/18	
Utility Data	Test hole No.	PH. 5
	Utility Type	Water
	Material	Unknown
	Soil	Dirt - Sand
	Pavement Thickness	All Dirt
	Diameter	12"
	Ground to top of Utility	57"
	Swing Tie 1	107" NE from Face of Curb
	Swing Tie 2	104" SE from Water Vault
	Swing Tie 3	
	Notes	Found a 12" Unknown Water Line at a depth of 57" traveling NW to SE, unable to expose due to Ground Water and Soil caving in. Also found a 3/4" Plastic Gas Line at a depth of 38" traveling NE to SW. In front of Address 75 Shoreway.



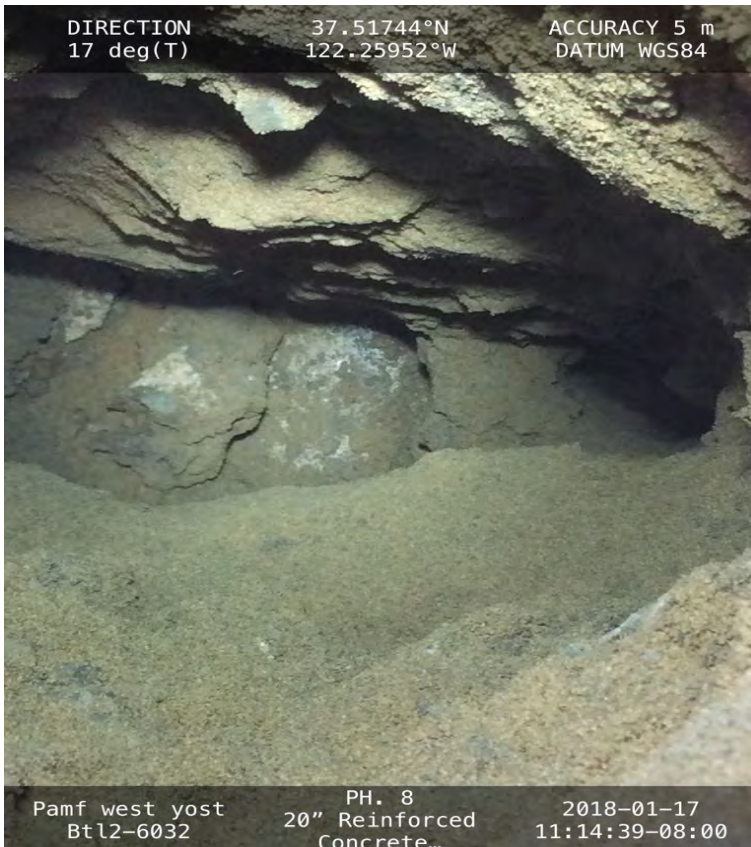
Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519595	
Longitude	-122.262014	
Date	01/16/18	
Utility Data	Test hole No.	PH. 6
	Utility Type	F/O
	Material	PVC
	Soil	Dirt - Sand
	Pavement Thickness	9" of Asphalt
	Diameter	4"
	Ground to top of Utility	32"
	Swing Tie 1	25" SW from Face of Curb
	Swing Tie 2	429" NE from Freeway Wall
	Swing Tie 3	
	Notes	Found a 4" PVC F/O at a depth of 32" traveling NW to SE. In front of Address 75 Shoreway.



Form	<i>BESS Utility Solutions -Test Hole Data</i>	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#3-6032	
Site	Plans	
Creator	Lupe Bernal	
Latitude	37.519946	
Longitude	-122.262157	
Date	01/16/18	
Utility Data	Test hole No.	PH. 7
	Utility Type	Sewer FM
	Material	Reinforced Concrete
	Soil	Dirt - Sand
	Pavement Thickness	5" of Asphalt
	Diameter	54"
	Ground to top of Utility	60"
	Swing Tie 1	204" SE from Power Box
	Swing Tie 2	320" NE from Freeway Wall
	Swing Tie 3	
	Notes	Found a 54" Reinforced Concrete Sewer FM at a depth of 60" traveling NE to SW, unable to expose Pipe due to Ground Water and Soil caving in. In front of Address 75 Shoreway.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.518011	
Longitude	-122.260518	
Date	01/17/18	
Utility Data	Test hole No.	PH. 8
	Utility Type	Sewer FM
	Material	Reinforced Concrete
	Soil	Dirt - Sand
	Pavement Thickness	10" of Asphalt
	Diameter	20"
	Ground to top of Utility	58"
	Swing Tie 1	132" NE from Face of Curb (Freeway)
	Swing Tie 2	248" SW from Face of Curb (Sidewalk)
	Swing Tie 3	
	Notes	Found a 20" Reinforced Concrete Sewer FM at a depth of 58" traveling NW to SE. In front of Address 225 Shoreway (Recology Waste Center).



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.518072	
Longitude	-122.260663	
Date	01/17/18	
Utility Data	Test hole No.	PH. 9
	Utility Type	Storm Drain
	Material	Reinforced Concrete
	Soil	Dirt
	Pavement Thickness	7" of Asphalt
	Diameter	39"
	Ground to top of Utility	21"
	Swing Tie 1	84" SW from Face of Curb (Sidewalk)
	Swing Tie 2	248" NE from Face of Curb (Freeway)
	Swing Tie 3	
	Notes	Found a 39" Reinforced Concrete Storm Drain at a depth of 21" traveling NE to SW. In front of Public Storage Building.



Form	<i>BESS Utility Solutions -Test Hole Data</i>	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.518147	
Longitude	-122.260823	
Date	01/17/18	
Utility Data	Test hole No.	PH. 10
	Utility Type	Storm Drain
	Material	Reinforced Concrete
	Soil	N/A
	Pavement Thickness	7" of Asphalt
	Diameter	39"
	Ground to top of Utility	Hit Concrete @ 7"
	Swing Tie 1	131" SW from Face of Curb (Sidewalk)
	Swing Tie 2	254" NE from Face of Curb (Freeway)
	Swing Tie 3	
	Notes	Dug on USA Marks to try and find 39" Reinforced Concrete Storm Drain, hit Concrete at a depth of 7", Pipe traveling NW to SE. Got Inverts from NE MH at 61" (Bottom) and SW MH at 28 (Top) and 63" (Bottom). In front of Public Storage Building.



Form	<i>BESS Utility Solutions -Test Hole Data</i>	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.517972	
Longitude	-122.260432	
Date	01/17/18	
Utility Data	Test hole No.	PH. 11
	Utility Type	Edge of 54" Sewer FM
	Material	Reinforced Concrete
	Soil	Dirt - Sand
	Pavement Thickness	12" of Asphalt
	Diameter	54"
	Ground to top of Utility	65"
	Swing Tie 1	132" SW from Face of Curb (Sidewalk)
	Swing Tie 2	234" W from Sewer MH
	Swing Tie 3	
	Notes	Found the Edge of 54" Sewer FM, refer to Swing Ties. In front of Recology Center.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.517412	
Longitude	-122.259609	
Date	01/17/18	
Utility Data	Test hole No.	PH. 12
	Utility Type	Sewer FM
	Material	Reinforced Concrete
	Soil	Dirt -Sand
	Pavement Thickness	12" of Asphalt
	Diameter	54"
	Ground to top of Utility	65"
	Swing Tie 1	157" SW from Face of Curb (Sidewalk)
	Swing Tie 2	233" NE from Face of Curb (Freeway)
	Swing Tie 3	
	Notes	Found a 54" Reinforced Concrete Sewer FM at a depth of 65" traveling NW to SE, unable to expose due to Ground Water and Soil caving in. In front of Recology Center.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/18/18	
Creator	Lupe Bernal	
Latitude	37.519703	
Longitude	-122.262456	
Date	01/18/18	
Utility Data	Test hole No.	PH. 13
	Utility Type	Sewer
	Material	Unknown
	Soil	Dirt
	Pavement Thickness	All Dirt
	Diameter	
	Ground to top of Utility	
	Swing Tie 1	208" E from Water Vault
	Swing Tie 2	214" SW from Face of Curb (Sidewalk)
	Swing Tie 3	
	Notes	Dug on USA Marks to try and find Sewer Line, hit Concrete at a depth of 48". In front of Address 75 Shoreway.



Form	BESS Utility Solutions -Test Hole Data	
Version	4	
Project	SR101 Crossing at PAMF West Yost San Carlos BTL#2-6032	
Site	01/17/18	
Creator	Lupe Bernal	
Latitude	37.518016	
Longitude	-122.260528	
Date	01/17/18	
Utility Data	Test hole No.	EP. 1
	Utility Type	Gas
	Material	Steel
	Soil	N/A
	Pavement Thickness	Concrete
	Diameter	4"
	Ground to top of Utility	EP @ 38"
	Swing Tie 1	13" NE from Face of Curb (Sidewalk)
	Swing Tie 2	134" SW from Sewer MH
	Swing Tie 3	
	Notes	Got an EP for the 4" Steel Gas Line at 38" traveling NW to SE.

