**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

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**PROJECT PLANS**

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**

# NOTICE AND INSTRUCTIONS TO BIDDERS

**FOR**

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**
**NOTICE TO BIDDERS**

Sealed proposals will be received at the office of the County Clerk, 1055 Monterey Street, Room D-120, San Luis Obispo, California 93408 until 3:00 P.M. on Thursday, _____, 20__, which bids will then be opened and declared at 3:15 o'clock P.M. on the above mentioned date at a public meeting at 1055 Monterey Street, Room D-120, by the County Clerk, for the following Public Works Project:

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

Any bid received at the Office of the Clerk of the Board of Supervisors of the County of San Luis Obispo after 3:00 P.M. on the date specified above shall not be considered, and shall be returned to the bidder unopened. A bid received one second after 3:00 P.M. shall be considered late.

Bids are required for the entire work described herein.

An official bound copy of a reduced size set of the Project Plans, the Agreement, the Special Provisions, and blank forms suitable for use in bidding on said work may be obtained from the Department of Public Works, Room 206, County Government Center, San Luis Obispo, CA 93408 and may be purchased therefrom for $ , (tax included), per bound copy, said purchase cost not to be refunded. Such documents must be purchased from the Department of Public Works in order to be recognized as an official planholder. No bid will be considered which is not on the forms herein provided. A full size set of the Project Plans and cross sections, if available, are charged separately at the department's current rates and will be provided only upon request.

Pursuant to the provisions of Section 1773 of the California Labor Code, the Board of Supervisors of the County of San Luis Obispo has obtained from the Director of the California Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work for the locality in which the work is to be performed for each needed craft, classification, or type of workman. Copies of said prevailing rate of per diem wages are on file in the Office of the Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District (District) and available at the California Department of Industrial Relations' web site address at: www.dir.ca.gov/DLSR/PWD.

Bidders are advised that any contractor who is awarded a public works project and intends to use a craft or classification not shown on the general prevailing wage determination may be required to pay the wage rate of that craft or classification most closely related to it as shown in the general determinations effective at the time of the call for bids.

Travel and Subsistence Payments shall be in accordance with Section 1773.1 of the Labor Code. Wage rates for holiday and overtime work shall be in accordance with Section 1773 of the Labor Code. Attention is directed to the provisions in Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor. Attention is directed to the provisions in Section 1776 of the Labor Code concerning payroll records.

Attention is directed to the provisions in Sections 1810 – 1815 of the Labor Code concerning work hours.

Attention is directed to the provisions of Section 2-1.02, "Required Listing of Proposed Subcontractors," of the Special Provisions regarding the requirement that proposed subcontractors be listed in the bidder's proposal. A "DESIGNATION OF SUBCONTRACTORS" form for listing subcontractors, as required, is included in the section titled "Bid Proposal and Forms" of the Contract Documents. This form must be completed and submitted with bidder's bid proposal.

All bonds and endorsements thereto to be submitted pursuant to this contract shall be written by a company authorized to do surety business in the State of California.

Each bid must be accompanied by a form of bidder's security, namely cash, certified check, cashier's check, or bidder's bond, in the amount of ten percent (10%) of the total of the bid.

All addenda issued before the time in which to submit bids expires shall form a part of the Contract Documents which are the subject of the bid. Any such addendum issued before the time in which to submit bids expires shall be e-mailed to each planholder on the County's official planholder list, at the e-mail address provided to the County at the time bid documents were purchased from the Department of Public Works. An informational electronic copy of such addenda will also be posted to the County's website for the Bidder's convenience at the following web address:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm

All bidders are required to acknowledge and confirm receipt of each and every addendum in their bid proposal.

Within ten (10) calendar days, not including Saturdays, Sundays, and legal holidays, after receipt of notice that the contract has been awarded, the successful bidder, shall execute a written contract with the District in the form prescribed herein.

At the time of execution of the contract, the successful bidder shall submit the certificates of insurance stipulated in Article 7 of the Agreement, and, in addition thereto, shall furnish a "Performance Bond" in the sum of one hundred percent (100%) of the contract bid to guarantee the performance of the contract, and a "Payment Bond" in the sum of one hundred percent (100%) of the contract bid. The bond forms are included in the section titled "Agreement" of the Contract Documents.

Attention is directed to the provisions of Section 5-1.07, "Measurement and Payment," of the Special Provisions permitting the substitution of equivalent securities for any moneys withheld to ensure performance of this contract. Said Section 5-1.07 is incorporated by reference in this invitation for bid as if fully set forth at length.

Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be listed on the bid proposal for this public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be awarded this public works contract unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, pursuant to Labor Code Section 1771.4.

The Board of Supervisors reserves the right to reject any or all bids, and to waive discrepancies, irregularities, informalities or any other errors in the bids or bidding, if to do so seems to best serve the public interest. The right of Board of Supervisors to waive errors applies even if the Contract Documents state that a discrepancy, irregularity, informality or other error makes a bid nonresponsive, so long as the error does not constitute a material error.

The successful bidder must be licensed to perform the work in accordance with the laws of the State of California. Accordingly, the successful bidder shall possess a Class A general engineering contractor's license at the time this contract is awarded. In the alternative, the successful bidder shall possess a specialty contractor's license that permits the successful bidder to perform with his or her own organization contract work amounting to not less than 30% of the original total contract price and to subcontract the remaining work in accordance with Section 5-1.055, "Subcontracting," of the Amendments to the Standard Specifications. Failure of the bidder to be properly and adequately licensed shall constitute a failure to execute the contract and shall result in the forfeiture of the bidder's security.

Bidders must satisfy themselves by personal examination of the location of the proposed work and by such other means as they prefer as to the actual conditions and requirements of the work, and shall not at any time after submission of the bid dispute, complain, or assert that there was any misunderstanding in regard to the nature or amount of work to be done.

By order of the Board of Supervisors of the San Luis Obispo Flood Control and Water Conservation District made this _____day of _, 20__.

County Clerk and Ex-officio Clerk
of the Board of Supervisors

By _____
Deputy Clerk

## BID PROTESTS AND OTHER CHALLENGES TO AWARDS OF CONSTRUCTION CONTRACTS

Bid protests and any other challenges to the award of this construction contract must comply with the requirements described in the "Rules Governing Bid Protests and Other Challenges to Awards of Construction Contracts" ("Rules"), a copy of which is attached to this contract. In addition to the requirements described in the Rules, any bid protest must be submitted in writing to the Department of Public Works, Room 206, County Government Center, 976 Osos Street, San Luis Obispo, CA 93408; Attention: Design Engineer.

## SPECIAL INSTRUCTIONS TO BIDDERS

All bidder Requests for Information must be submitted no later than 3 days prior to the bid opening date. Requests submitted after said date may not be considered. Bidders should submit Requests for Information to the County during the bid period at the following website:

http://www.slocounty.ca.gov/PW/Design_Division/Projects_Out_To_Bid.htm

Attention is directed to Paragraphs 1.04.A and 1.04.B of Section 40 50 00, "Qualifications and Responsibility of Contractor" of the Technical Specifications regarding required experience qualifications of the PLC system supplier, and requirement for the Contractor to furnish to the Owner, prior to commencement of the work, written evidence of such qualification, as well as notification of the system supplier assuming unit responsibility. The Certificate of Contractor's Experience and Qualifications is on the pages following Section 40 50 00 of the Technical Specifications.

Attention is directed to Section 4-1.03, "Contract Submittals," of the Special Provisions regarding the time period to submit the listed items upon receipt of the fully executed contract.

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**

**BID PROPOSAL AND FORMS**

**FOR**

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

# BID PROPOSAL

TO: THE BOARD OF SUPERVISORS OF THE SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, STATE OF CALIFORNIA:

Pursuant to and in compliance with your Notice to Bidders, the undersigned, as bidder, declares that the only person or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; that he/she is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self insurance in accordance with the provisions of that code, and he/she will comply with such provisions before commencing the performance of the work of this contract; that he/she has carefully examined the location of the proposed work, the annexed proposed form of contract, and he/she proposes, and agrees if this proposal is accepted, that he/she will contract with the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus and other equipment needed, and to do all of the work and furnish all the materials specified in the contract, in the manner and the time therein prescribed, and according to the requirements of the Department of Public Works and Transportation as therein set forth, and that he/she will take in full payment therefor the following unit prices, to-wit:

**SEE NEXT PAGE FOR BID PROPOSAL FORM**

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**
**BID PROPOSAL**

| ITEM NO. | CODE NO. | DESCRIPTION OF ITEM | APPROX. QUANTITY | UNIT OF MEASURE | UNIT PRICE (IN FIGURES) DOLLARS. CENTS | TOTAL AMOUNT DOLLARS. CENTS |
|---|---|---|---|---|---|---|
| 1 | | MOBILIZATION / DEMOBILIZATION | 1 | LS | LUMP SUM | |
| 2 | | SHEETING AND SHORING FOR WORKER PROTECTION | 1 | LS | LUMP SUM | |
| 3 | 120100 | TRAFFIC CONTROL SYSTEM | 1 | LS | LUMP SUM | |
| 4 | | CSA 16 - SWP TURNOUT CONNECTION | 1 | LS | LUMP SUM | |
| | | | | | **TOTAL** | |

Bidder's Name: _____

Bidder represents that he/she has hereinabove set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Total" column is the extension of the unit price bid on the basis of the approximate quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, provided, however, if the amount set forth as a unit price is ambiguous, unintelligible, or uncertain for any cause, or is omitted, or is the same amount as the entry in the "Total" column, then the amount set forth in the "Total" column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price.

Proposals in which the prices are mathematically or materially unbalanced may be rejected. A bid is mathematically unbalanced if the bid is structured on the basis of nominal prices for some work and inflated prices for other work; that is, each element of the bid must carry its proportionate share of the total cost of the work plus profits. A bid is materially unbalanced if there is reasonable doubt that award to the bidder submitting the mathematically unbalanced bid will result in the lowest ultimate cost to the County.

Bidder shall execute and submit with their proposal, each of the following:

- BIDDERS INFORMATION LIST
- DESIGNATION OF SUBCONTRACTORS
- BIDDER'S NON-COLLUSION DECLARATION (STATE FORM)
- BIDDER'S BOND

Bidder declares that he/she has read, and agrees to, the Special Provisions, including, without limitation, the provisions of Sections 1, 2, 3, 4, and 5 thereof.

Bidder shall list the name and address of each subcontractor to whom the bidder proposes to directly subcontract portions of the work as required by the provisions in Section 2-1.02, "Required Listing of Proposed Subcontractors," of these Special Provisions. The list of subcontractors shall also set forth the portion of work that will be done by each subcontractor listed. The "DESIGNATION OF SUBCONTRACTORS" form for listing the subcontractors is included in the section titled "Bid Proposal and Forms" of the Contract Documents.

Accompanying this bid proposal is a bidder's bond, cash, cashier's check, or a certified check, payable to the San Luis Obispo County Flood Control and Water Conservation District, for the sum of _____ _____ Dollars ($_____), said amount being at least ten percent (10%) of the total of the bid. The proceeds thereof shall become the property of the San Luis Obispo County Flood Control and Water Conservation District if the proposal is withdrawn after the time fixed in the Notice to Bidders for the opening of bids, or if, in case this bid is accepted by said Board of Supervisors and such bidder has received notice that the contract has been awarded to him/her, the undersigned shall fail within ten (10) calendar days, not including Saturdays, Sundays, and legal holidays, thereafter to execute a contract with the District and furnish the certificates of insurance and Payment and Performance bonds required by the Contract Documents. Otherwise, said guarantee, except a bidder's bond, will be returned to the undersigned.

This bid proposal may be withdrawn, in writing, prior to the time fixed in the Notice to Bidders for the opening of bids. It is understood and agreed that this bid proposal will not be withdrawn after the time fixed in the Notice to Bidders for the opening of bids. Bidders further agree that the failure of the District to open bids for this project exactly at the time fixed in said Notice shall not extend the time within which bids may be withdrawn.

The undersigned bidder will sign and deliver to the San Luis Obispo County Flood Control and Water Conservation District the written contract, together with the certificates of insurance and bonds described in the Notice to Bidders, within ten (10) calendar days, not including Saturday, Sundays, and legal holidays, after the undersigned has received notice that the contract has been awarded to him/her.

The undersigned, as bidder, declares that he/she 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 will comply with such provisions before commencing the performance of the work of this contract.

The bidder's execution of the signature portion of this bid proposal shall also constitute an endorsement and execution of those certifications, questionnaires, and assurances which are a part of this proposal.

**ADDENDA:** The undersigned acknowledges and confirms the receipt of the following Addenda**:**

| Addenda Number | Date |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

and agrees that said addenda are covered in the bid proposal and shall form a part of the Contract Documents.

If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer, and manager thereof; if a partnership, state true name of firm, also names of all individual co-partners composing firm; if bidder or other interested person is an individual, state first and last names in full.

_____

_____

Bidder warrants and represents that he/she is licensed in accordance with an Act providing for the registration of Contractors, License No. _____, Class _____, License Expiration Date _____. (Note: The successful bidder must possess the license classification specified in the Notice to Bidders upon award of this contract.)

Name of Bidder_____

Signature of Bidder_____

Printed Name and Title_____

Business Address_____

Telephone Number_____

Date_____

DIR Registration No.*_____

NOTICE. . . . . .If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contract in behalf of the corporation; if bidder is a partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts in behalf of the partnership; and if the bidder is an individual, his or her signature shall be placed above. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the District prior to opening of bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

* Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be listed on the bid proposal for this public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

**RETURN THIS FORM WITH YOUR BID PROPOSAL**

# BIDDERS INFORMATION LIST

All bidders/proposers are required to provide the following information for all DBE and non-DBE contractors, who provided a proposal, bid, quote, or were contacted by the proposed prime contractor. This information is required from the proposed prime contractor and shall be submitted with their bid proposal. The Department of Public Works will use this information to maintain and update a "Bidder's List" to assist in the overall annual Disadvantaged Business Enterprise (DBE) availability goal setting process required for Federal-aid projects. This information is also being made available to other local agencies for the same purpose. *To the extent permitted by law, all information submitted will be held in strict confidence and will not be shared without your consent except as noted above.*

**Contractor:** ☐ Prime Contractor ☐ Subcontractor ☐ Supplier ☐ Other: _____

Firm Name: _____ Phone: _____

Business Address: _____ Fax: _____

_____

License No.
and Classification _____ Years in Business: _____

Contact Person: _____

Is the firm currently certified as a DBE by Caltrans? ☐ No ☐ Yes Cert. Number: _____

Gross Annual Receipts for last year:
☐ less than $1 million ☐ less than $5 million ☐ less than $10 million
☐ less than $15 million ☐ more than $15 million

Type of work/ services/ materials provided for this job:
☐ Contractor ☐ Supplier ☐ Manufacturer ☐ Trucking ☐ Broker
☐ Other (describe): _____

Contractor Specialty for this job:
☐ Roadway Construction (including signing, paving, and concrete) (237310)
☐ Roadway Painting/Striping (237310)
☐ Highway Lighting & Signal Installation (238210)
☐ Bridge Construction (237310)
☐ Tunnel Construction (237990)
☐ Water, Sewer, & Pipeline Construction (237110)
☐ Power & Communication Transmission Line (including conduit construction) (237130)
☐ Landscaping (561730)
☐ Irrigation (237110)
☐ Other Heavy Construction (including parks, reclamation, reservoir, water & sewer treatment facilities) (237990)
☐ Masonry (including retaining walls and foundations) (238140)
☐ Concrete Retaining Walls (238110)
☐ Building Construction (236210/236220)
☐ Other (describe): _____

- Copy sheet as needed
- None of the information requested on this form is material to the County's determination of which Bidder's Bid is the lowest responsive bid.

**RETURN THIS FORM WITH YOUR BID PROPOSAL**

## DESIGNATION OF SUBCONTRACTORS FORM

In compliance with the provisions of Sections 4100-4113 of the Public Contract Code of the State of California, and any amendments thereto, the undersigned bidder sets forth the following:

a. The name and location of the place of business of each subcontractor who will perform work or labor, or render service to the undersigned Prime Contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the Prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the undersigned Prime Contractor's total bid or in the case of bids for the construction of streets and highways, including bridges, in excess of one-half of one percent or ten thousand dollars ($10,000), whichever is greater.*

b. The portion of the work which will be done by each such subcontractor. Only one subcontractor shall be listed for each such portion. If the subcontractor is not performing all of the work under the bid item number(s) listed for that subcontractor, the bidder shall set forth the portion of the work relating to said bid item number(s) that will be done by the subcontractor.

| Bid Schedule Item No. | Description of Portion of Work (if applicable) | Subcontractor | License No. | DIR Reg. No.** | Address | Percent of Total Bid Price |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

By:

(Bidder's Signature/Printed Name and Title/Company Name)

NOTES: * When there is a failure to list a subcontractor, as required, the law provides that the Contractor agrees to do the work with his or her own forces. In such case, bidder must be authorized to perform said work. Any bid not complying with the provisions hereof may be rejected.

** Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be listed on the bid proposal for this public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

**RETURN THIS FORM WITH YOUR BID PROPOSAL**

## BIDDER'S NON-COLLUSION DECLARATION (STATE FORM)

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

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

_____
(Name of Company)

By: _____

_____
Printed Name

_____
Title

Date: _____

**RETURN THIS FORM WITH YOUR BID PROPOSAL**

**BIDDER'S BOND**

KNOW ALL BY THESE PRESENTS:

That we, _____

_____

as Principal, and _____

_____,

as Surety, are held and firmly bound unto the San Luis Obispo County Flood Control and Water Conservation District, State of California (hereinafter called "District") in the penal sum of Ten Percent (10%) of the total aggregate amount of the bid of the Principal above named, submitted by said Principal to the District for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents. In no case shall the liability of the Surety hereunder exceed the sum of _____

_____ ($_____).

THE CONDITION OF THIS OBLIGATION IS SUCH,

That whereas a bid to District for certain construction specifically described as follows, for which bids are to be opened on _____, 20____, has been submitted by Principal to District for:

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

NOW, THEREFORE, if the aforesaid Principal shall not withdraw said bid after the time fixed in the Notice to Bidders for the opening of the same, and shall within ten (10) calendar days, not including Saturdays, Sundays, and legal holidays, after receipt of written notice that the contract has been awarded to him/her, enter into a written contract with District, in the prescribed form, in accordance with the bid as accepted, and file with the District the certificates of insurance as stipulated in Article 7 of the Agreement and the two bonds, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall remain in full force and effect, and the penal sum guaranteed by this bond shall be forfeited to the District.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of said contract or to the work to be performed thereunder or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

In the event suit is brought upon said bond by District and judgment is recovered, the Surety shall pay all costs incurred by District in such suit, including a reasonable attorney's fee to be fixed by the court. Death of the Principal shall not relieve Surety of its obligations hereunder.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____

day

of_____, 20_____.

_____ (Seal)

_____ (Seal)

_____ (Seal)
Principal

_____ (Seal)

_____ (Seal)

_____ (Seal)
Surety

_____

_____
Address

NOTE:

Signatures of those executing for Surety must be properly acknowledged.

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**

# CONTRACT AGREEMENT

**FOR**

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**

# AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, between the San Luis Obispo County Flood Control and Water Conservation District, a political subdivision and County of the State of California, party of the first part, hereinafter called "District" and _____ the party of the second part, hereinafter called "Contractor".

WITNESSETH, that for and in consideration of the mutual covenants and agreements hereinafter contained, the parties hereto agree as follows:

## ARTICLE 1 – WORK

That the Contractor will, at its own proper cost and expense, do all the work and furnish all the equipment and materials necessary to construct and complete in good and workmanlike manner to the satisfaction of the Board of Supervisors of said District, for

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

all in strict accordance with the Contract Documents, including without limitation, the Project Plans, the Standard Specifications of the State of California, Department of Transportation, dated May 2006 (hereinafter called, "Standard Specifications"), the Standard Plans of the State of California, Department of Transportation, dated May 2006 (hereinafter called, "Standard Plans"), and the Special Provisions therefor, on file in the Department of Public Works and Transportation and the Office of the Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California.

## ARTICLE 2 – CONTRACT

This Agreement, together with the Notice and Instructions to Bidders, Bid Proposal and Forms, Standard Specifications, Standard Plans, the Special Provisions, including without limitation the Project Plans incorporated therein, and all addenda thereto, form the contract, and said documents by this reference become as fully a part of this Agreement as if set forth in full and are herein sometimes referred to as "Contract" or as "Contract Documents". The terms set forth below, when utilized in said documents, shall mean as follows:

> PUBLIC WORKS DIRECTOR: Means the Director of Public Works and Transportation (hereinafter, also the Department of Public Works) of the County of San Luis Obispo, State of California, acting either directly or through properly authorized agent(s), acting within the scope of the particular duties delegated to them, including registered engineers employed by the Department of Public Works and Transportation.
>
> COUNTY CLERK: Means the Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California.

ARTICLE 3 – CONTRACT TIMES

The Contractor shall begin work within ten (10) calendar days, not including Saturdays, Sundays, or legal holidays, from the date of receipt of the District's Notice to Contractor to Proceed, and the work to be accomplished under this contract shall be completed within the time limit provided in Section 4, "Prosecution and Progress of the Work", of the Special Provisions. Attention is directed to the provisions of said Section 4, "Prosecution and Progress of the Work", of the Special Provisions for the amount of liquidated damages.

ARTICLE 4 – CONTRACT PRICE

The total Contract price is the amount of the Contractor's bid as set forth in the award of the Contract approved by the District's Board of Supervisors. The Contractor will receive and accept and the District will pay the prices specified in the attached Bid Proposal, which is incorporated herein by reference, as full compensation for furnishing all labor, materials, and equipment for doing all the work contemplated and embraced in this Agreement. To the extent permitted by law, the Contractor assumes during the progress of the work and before its acceptance, any and all loss or damage arising out of the nature of the work aforesaid or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work until its acceptance by the District; and assumes any and all expenses incurred by or in consequence of the suspension or discontinuance of work, for well and faithfully completing the work, and the whole thereof, in the manner and to the requirements of the Plans, Special Provisions, Standard Specifications, Standard Plans, and the Public Works Director.

ARTICLE 5 – SUBCONTRACTING

The Contractor's attention is directed to the provisions of Section 2-1.02, "Required Listing of Proposed Subcontractors," of the Special Provisions and the requirements contained therein.

Additionally, the Contractor's attention is directed to the provisions of the "Subletting and Subcontracting Fair Practices Act" set forth in Sections 4100-4114 of the Public Contract Code.

ARTICLE 6

The Contractor agrees that the Public Works Director shall decide as to the meaning of the Standard Specifications, Standard Plans, and Special Provisions for the work, including without limitation the Project Plans incorporated therein, where the same may be found to be obscure or in dispute and the decision shall be final. The Public Works Director shall have the right to correct any errors or omissions therein when such corrections are necessary to the proper fulfillment of the intention of the Special Provisions, Standard Specifications and Standard Plans; the action of such corrections is to take effect from the time said Public Works Director gives notice thereof to the Contractor.

ARTICLE 7 - INSURANCE REQUIREMENTS

Contractor, at its sole cost, shall purchase and maintain the insurance policies set forth below on all of its operations under this Agreement. All of the insurance companies providing insurance for Contractor shall have, and provide evidence of, an A.M. Best & Co. rating of A:VII or above,

unless exception is granted by Risk Manager. Further, all policies shall be maintained for the full term of this Agreement and related warranty period if applicable.

In addition to other insurance provisions under this Contract, Contractor shall maintain and furnish to the District the following insurance on all operations under this Agreement, including throughout the period of construction within DWR's right-of-way and continuing until DWR's formal Statement of Acceptance has been issued.

7.01 SCOPE AND LIMITS OF REQUIRED INSURANCE POLICIES Contractor shall maintain and furnish to the District the following insurance throughout the period of construction within DWR's right-of-way and continuing until DWR's formal Statement of Acceptance has been issued. Such insurance coverage shall be in effect at all times from the filing of the notice of entry for construction to DWR's formal Statement of Acceptance, and Contractor shall be responsible for any premiums, deductibles or assessments on the policies. In the event such insurance coverage expires at any time prior to DWR's formal Statement of Acceptance, Contractor shall file with District for submittal to DWR at least forty-five (45) days prior to such date of expiration, a new certificate of insurance evidencing coverage as provided for herein. New certificates of insurance shall be subject to approval by DWR for compliance. Such approval shall be conclusively presumed in the absence of written objection by DWR. In the event insurance coverage lapses prior to DWR's formal Statement of Acceptance, DWR may, in addition to any other remedies it may have, halt construction.

A. COMMERCIAL GENERAL LIABILITY

Policy shall include coverage at least as broad as set forth in Insurance Services Office Commercial General Liability Coverage (CG 00 01) with policy limits of not less than $2 million dollars combined single limit per occurrence. Policy shall be endorsed with the following specific language or contain equivalent language in the policy:

i.) DWR, its officers and employees, and the County of San Luis Obispo, its officers, officials, employees, and volunteers are named as an additional insured for all liability arising out of the operations by or on behalf of the named insured in the performance of this Agreement. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance as least as broad as ISO Form CG 20 10 11 85 or if not available, through the addition of both CG 20 10 and CG 20 37 (if a later edition is used).

ii.) The insurance provided herein shall be considered primary coverage to the County of San Luis Obispo with respect to any insurance or self insured retention maintained by the County. Further, the County's insurance shall be considered excess insurance only and shall not be called upon to contribute to this insurance.

iii.) The policy shall not be cancelled or materially changed without first giving forty-five (45) days prior written notice to the County of San Luis Obispo, Department of Public Works.

iv.) Such policy/policies shall not contain any provision against cross liability between name insureds, but shall include a 45-day notice provision for termination by the insurer of such policy/policies. Contractor shall provide the additional insured endorsements for the liability and auto policies, and the worker's compensation waiver of subrogation endorsement, shall be provided with the certificates.

v.) Liability insurance policies with limits of not less than $5,000,000 for each occurrence and aggregate. The policies are to provide coverage for premises operations, products/completed operations, personal/advertising injury, and independent contractors. The required coverage and limits can be provided with a combination of general liability and umbrella/excess liability policies. Umbrella or excess liability policies shall contain a clause stating the coverage takes effect (drops down) in the event the primary limits are impaired or exhausted. The aggregate limits provided by the policies shall apply on a per location or per project basis.

B. BUSINESS AUTOMOBILE POLICY

Policy shall include coverage at least as broad as set forth in the liability section of Insurance Services Office Business Auto Coverage (CA 00 01) with policy limits of no less than $1 million dollars combined single limit for each occurrence. Said insurance shall include coverage for owned, non-owned, and hired vehicles. Policy shall be endorsed with the following specific language or contain equivalent language in the policy:

i.) DWR, its officers and employees, and the County of San Luis Obispo, its officers, officials, employees, and volunteers are named as an additional insured for all liability arising out of the operations by or on behalf of the named insured in the performance of this Agreement.

ii.) The policy shall not be cancelled or materially changed without first giving forty-five (45) days prior written notice to the County of San Luis Obispo, Department of Public Works.

C. WORKERS' COMPENSATION / EMPLOYERS' LIABILITY INSURANCE

i.) Workers' Compensation: policy shall provide statutory limits as required by State of California. Policy shall be endorsed with the following specific language or contain equivalent language in the policy:

a. Contractor and its insurer shall waive all rights of subrogation against the County, its officers and employees for workers' compensation losses arising out of this Agreement. The worker's compensation policy shall include a waiver of subrogation in favor of the State.

b. The policy shall not be cancelled or materially changed without first giving forty-five (45) days prior written notice to DWR and the County of San Luis Obispo, Department of Public Works.

ii.) Employer's Liability: policy shall provide $1 million dollars per accident for bodily injury or disease.

If the Contractor maintains higher limits than the minimum shown above, the County requires and shall be entitled to coverage for the higher limits maintained by the Contractor.

7.02 DEDUCTIBLES AND SELF-INSURANCE RETENTIONS

All deductibles and/or self-insured retentions which apply to the insurance policies required herein will be declared in writing and approved by DWR and the County prior to commencement of this Agreement.

7.03 DOCUMENTATION

Prior to commencement of work and annually thereafter for the term of this Agreement, Contractor will provide to the County of San Luis Obispo, Department of Public Works, Room 206, County Government Center, CA 93408, Attention Design Engineer, Contract No. 300463, properly executed certificates of insurance clearly evidencing the coverage, limits, and endorsements specified in this Agreement. Further, at the County's request, the Contractor shall provide certified copies of the insurance policies within thirty days of request.

Failure of the County to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of the County to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

7.04 ABSENCE OF INSURANCE COVERAGE

County may direct Contractor to immediately cease all activities with respect to this Agreement if it determines that Contractor fails to carry, in full force and effect, all insurance policies with coverage levels at or above the limits specified in this Agreement. Any delays or expense caused due to stopping of work and change of insurance shall be considered Contractor's delay and expense.

7.05 SPECIAL RISKS OR CIRCUMSTANCES

The County reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other special circumstances.

ARTICLE 8 – INDEMNIFICATION

8.01 A.1 GENERAL

To the fullest extent permitted by law, the Contractor assumes liability for and agrees, at the Contractor's sole cost and expense, to promptly and fully indemnify, protect, hold harmless and defend (even if the allegations are false, fraudulent, or groundless), the County, its Board and each member thereof, and their respective officials, officers, directors, employees, commission members, representatives, and agents ("Indemnitees"), from and against any and all claims, allegations, actions,

suits, arbitrations, administrative proceedings, regulatory proceedings, or other legal proceeds, causes of action, demands, costs, judgments, liens, stop payment notices, penalties, liabilities, damages, losses, anticipated losses of revenues, and expenses (including, but not limited to, any fees of accountants, attorneys, experts, or other professionals, or investigation expenses), or losses of any kind or nature whatsoever, whether actual, threatened, or alleged, arising out of, resulting from, or in any way (either directly or indirectly), related to the Work, the Project or any breach of the Contract by Contractor or any of its officers, agents, employees, Subcontractors, Sub-subcontractors, or any person performing any of the Work, pursuant to a direct or indirect contract with the Contractor ("Indemnity Claims"). Such Indemnity Claims include, but are not limited to, claims for:

1. Any activity on or use of the County's premises or facilities;
2. Any liability incurred due to Contractor acting outside the scope of its authority pursuant to the Contract, whether or not caused in part by an Indemnified Party;
3. The failure of Contractor or the Work to comply with any applicable law, permit, or orders;
4. Any misrepresentation, misstatement or omission with respect to any statement made in the Contract Documents or any document furnished by the Contractor in connection therewith;
5. Any breach of any duty, obligation or requirement under the Contract Documents, including, but not limited to any breach of Contractor's warranties, representations, or agreements set forth in the Contract Documents;
6. Any failure to coordinate the Work with the County's separate contractors;
7. Any failure to provide notice to any party as required under the Contract Documents;
8. Any failure to act in such a manner as to protect the Project from loss, cost, expense, or liability;
9. Bodily or personal injury, emotional injury, sickness or disease, or death at any time to any persons including without limitation employees of Contractor;
10. Damage or injury to real property or personal property, equipment and materials (including, but without limitation, property under the care and custody of the Contractor or the County) sustained by any person or persons (including, but not limited to, companies, corporations, utility company or property owner, Contractor and its employees or agents, and members of the general public);
11. Any liability imposed by applicable law including, but not limited to criminal or civil fines or penalties;
12. Any dangerous, hazardous, unsafe or defective condition of, in or on the site, of any nature whatsoever, which may exist by reason of any act, omission, neglect, or any use or occupation of the site by Contractor, its officers, agents, employees, or Subcontractors;

13. Any operation conducted upon or any use or occupation of the site by Contractor, its officers, agents, employees, or Subcontractors under or pursuant to the provisions of the Contract or otherwise;

14. Any acts, errors, omission or negligence of Contractor, its officers, agents, employees, or Subcontractors;

15. Infringement of any patent rights, licenses, copyrights or intellectual property which may be brought against the Contractor or the County arising out of Contractor's Work, for which the Contractor is responsible; and

16. Any and all claims against the County seeking compensation for labor performed or materials used or furnished to be used in the Work or alleged to have been furnished on the Project, including all incidental or consequential damages resulting to the County from such claims.

A.2 EFFECT OF INDEMNITEES' ACTIVE NEGLIGENCE

Contractor's obligations to indemnify and hold the Indemnitees harmless **exclude** only such portion of any Indemnity Claim which is attributable to the active negligence or willful misconduct of the Indemnitee, provided such active negligence or willful misconduct is determined by agreement of the parties or by findings of a court of competent jurisdiction. In instances where an Indemnitee's active negligence accounts for only a percentage of the liability for the Indemnity Claim involved, the obligation of Contractor will be for that entire percentage of liability for the Indemnity Claim not attributable to the active negligence or willful misconduct of the Indemnitee(s). Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Article 8 A. Subject to the limits set forth herein, the Contractor, at its own expense, shall satisfy any resulting judgment that may be rendered against any Indemnitee resulting from an Indemnity Claim. The Indemnitees shall be consulted with regard to any proposed settlement.

A.3 INDEPENDENT DEFENSE OBLIGATION

The duty of the Contractor to indemnify and hold harmless the Indemnitees includes the separate and independent duty to defend the Indemnitees, which duty arises immediately upon receipt by Contractor of the tender of any Indemnity Claim from an Indemnitee. The Contractor's obligation to defend the Indemnitee(s) shall be at Contractor's sole expense, and not be excused because of the Contractor's inability to evaluate liability or because the Contractor evaluates liability and determines that the Contractor is not liable. This duty to defend shall apply whether or not an Indemnity Claim has merit or is meritless, or which involves claims or allegations that any or all of the Indemnitees were actively, passively, or concurrently negligent, or which otherwise asserts that the Indemnitees are responsible, in whole or in part, for any Indemnity Claim. The Contractor shall respond within thirty (30) calendar days to the tender of any Indemnity Claim for defense and/or indemnity by an Indemnitee, unless the Indemnitee agrees in writing to an extension of this time. The defense provided to the Indemnitees by Contractor shall be by well qualified, adequately insured and experienced legal counsel

acceptable to the County.

A.4 INTENT OF PARTIES REGARDING SCOPE OF INDEMNITY

It is the intent of the parties that the Contractor and its Subcontractors of all tiers shall provide the Indemnitees with the broadest defense and indemnity permitted by Applicable Law. In the event that any of the defense, indemnity or hold harmless provisions in the Contract Documents are found to be ambiguous, or in conflict with one another, it is the parties' intent that the broadest and most expansive interpretation in favor of providing defense and/or indemnity to the Indemnitees be given effect.

A.5 WAIVER OF INDEMNITY RIGHT AGAINST INDEMNITEES

With respect to third party claims against the Contractor, to the fullest extent permitted by law, the Contractor waives any and all rights to any type of express or implied indemnity against the Indemnitees.

A.6 SUBCONTRACTOR REQUIREMENTS

In addition to the requirements set forth hereinabove, Contractor shall ensure, by written subcontract agreement, that each of Contractor's Subcontractors of every tier shall protect, defend, indemnify and hold harmless the Indemnitees with respect to Indemnity Claims arising out of, in connection with, or in any way related to each such Subcontractors' Work on the Project in the same manner in which Contractor is required to protect, defend, indemnify and hold the Indemnitees harmless. In the event Contractor fails to obtain such defense and indemnity obligations from others as required herein, Contractor agrees to be fully responsible to the Indemnitees according to the terms of this Article 8 A.

A.7 NO LIMITATION OR WAIVER OF RIGHTS

Contractor's obligations under this Article 8 A are in addition to any other rights or remedies which the Indemnitees may have under the law or under the Contract Documents. Contractor's indemnification and defense obligations set forth in this Article 8 A are separate and independent from the insurance provisions set forth in the Contract Documents, and do not limit, in any way, the applicability, scope, or obligations set forth in such insurance provisions. The purchase of insurance by the Contractor with respect to the obligations required herein shall in no event be construed as fulfillment or discharge of such obligations. In any and all claims against the Indemnitees by any employee of the Contractor, any Subcontractor, any supplier of the Contractor or Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the obligations under this Article 8 A shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor or any supplier of either of them, under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts. Failure of the County to monitor compliance with these requirements imposes no additional obligations on the County and will in no way act as a waiver of any

rights hereunder.

A.8 WITHHOLDING TO SECURE OBLIGATION

In the event an Indemnity Claim arises prior to final payment to Contractor, the County may, in its sole discretion, reserve, retain or apply any monies due Contractor for the purpose of resolving such Indemnity Claims; provided, however, the County may release such funds if the Contractor provides the County with reasonable assurances of protection of the Indemnitees' interests. The County shall, in its sole discretion, determine whether such assurances are reasonable.

A.9 SURVIVAL OF INDEMNITY OBLIGATIONS

Contractor's obligations under this Article 8 A are binding on Contractor's and its Subcontractors' successors, heirs and assigns and shall survive the completion of the Work or termination of the Contractor's performance of the Work.

B.01 RESPONSIBILITY TO OTHER ENTITIES

You are responsible for any liability imposed by law and for injuries to or death of any person, including workers and the public, or damage to property. Indemnify and save harmless any county, city or district and its officers and employees connected with the work, within the limits of which county, city, or district the work is being performed, all in the same manner and to the same extent specified for the protection of the State.

ARTICLE 9 – FINAL PAYMENT

It is mutually agreed between the parties hereto, that no certificate given or payments made under this contract, except the final payment, shall be evidence of the performance of this contract, either wholly or in part, against any claim of the Contractor. Final payment for the work performed under this contract shall not be made until the lapse of thirty-five (35) calendar days after the notice of completion of said work has been filed for record and no payment shall be construed to be an acceptance of any defective work or improper materials. The Contractor further agrees that acceptance by the Contractor of the final payment due under this contract, and the adjustment and payment of his/her bill rendered for any work done in accordance with any amendments of this Contract, shall be and shall operate as a release to the San Luis Obispo County Flood Control and Water Conservation District from any and all claims or liabilities on account of work performed under this Contract except claims or liabilities for which written notice of claim or protest has been filed with the Public Works Director. Besides guarantees required elsewhere, the Contractor shall and does hereby guarantee all workmanship and material for a period of one year from and after both the date of acceptance of the work and the recordation of the notice of completion by the District and shall repair or replace any or all work and material, together with any other portions of the work which may be displaced in so doing, that in the opinion of the District is or becomes defective during the period of said guarantee without expense whatsoever to the District.

ARTICLE 10 – CONTRACTOR'S REPRESENTATIONS

The Contractor hereby declares that he/she has read the Contract Documents pertaining to the work to be accomplished hereunder, has carefully examined the plans and detail drawings of the work to be performed and fully understands the intent and meaning of the same.

It is further stipulated and agreed that the Contractor shall keep himself/herself fully informed of all laws, ordinances, and regulations which do or may affect the conduct of the work, the materials used therein or persons engaged or employed thereupon and all such orders of bodies and tribunals having any jurisdiction over the same. If it be found that the Special Provisions or Standard Specifications for the work conflict with any such law, ordinance or regulation the Contractor shall immediately report same to the Public Works Director in writing. The Contractor shall at all times observe and comply with and shall cause all his/her agents, employees, and independent contractors hired by the Contractor to observe and comply with all such existing and future laws, ordinances, regulations, or decrees.

ARTICLE 11 – APPRENTICES

Attention is directed to the provisions in Sections 1777.5, 1777.6, and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or any subcontractor.

The Contractor and any subcontractor shall comply with the requirements of Sections 1777.5, 1777.6, and 1777.7 of the Labor Code in the employment of apprentices.

To insure compliance and complete understanding of the law relating to apprentices, and specifically the required ratio thereunder, each contractor or subcontractor should, where some question exists, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, California, or one of its branch offices prior to commencement of work on this contract. Responsibility for compliance with said Labor Code Sections lies with the prime contractor.

ARTICLE 12 – PAYROLL RECORDS

Attention is directed to the provisions in Section 1776 of the Labor Code concerning Contractor and subcontractor payroll records.

The Contractor and any subcontractor shall comply with the requirements of Section 1776 of the Labor Code.

ARTICLE 13 – EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, Contractor agrees to comply with all of the Equal Employment Opportunity provisions of Executive Order No. 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 CFR Chapter 60), including the following:

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

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

3. The Contractor will send to each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Department of Public Works, advising the said labor union or worker's representative of the Contractor's commitments under this Article 14 and shall post copies of the Notice in conspicuous places available to employees and applicants for employment.

4. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations (41 CFR, Part 60) and relevant orders of the Secretary of Labor.

5. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the District and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

7. The Contractor will include the provisions of this Article in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Public Works Director or the Secretary of Labor may direct as a means of enforcing such provisions including sanctions for noncompliance: provided, however, that in the event a contractor becomes involved in, or is threatened with litigation with a subcontractor or vendor as a result of such direction by the Secretary of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

## ARTICLE 14 - SAFETY

All work conducted by the Contractor and/or subcontractors in the execution of this contract shall be in accordance with current CAL OSHA requirements. Full compensation for compliance with the provisions of this Article shall be considered as included in the other items of work and no additional compensation will be allowed therefor.

ARTICLE 15 – BONDS

Contractor agrees that the Payment Bond and Performance Bond attached to this Agreement are for reference purposes only, and shall not be considered a part of this Agreement or any other Contract Document. Contractor further agrees that said bonds are separate obligations of the Contractor and its surety, and that any attorney's fee provision contained in any payment bond or performance bond shall not apply to any legal action between Contractor and County to enforce any provision of the Contract Documents.

ARTICLE 16 – ATTORNEYS FEES

No provisions of the Contract Documents provide either the Contractor or the County the right to be awarded any attorney's fees and/or costs under Civil Code section 1717 in any legal action brought by either party to enforce any provision of the Contract Documents against the other party. The parties agree that any references to attorney's fees in language describing indemnification obligations do not constitute a contractual provision that would provide either the Contractor or the County the right to be awarded any attorney's fees and/or costs under Civil Code section 1717 in any legal action brought by either party to enforce any provision of the Contract Documents against the other party. Any other language in the Contract Documents providing for a recovery of attorney's fees shall be strictly construed as not including the recovery of any attorney's fees incurred by either Contractor or County in any legal action brought by either party to enforce any provision of the Contract Documents against the other party.

The parties agree that the Contract Documents contain no provisions that would allow either the Contractor or the County to be awarded attorney's fees and/or costs under Civil Code section 1717. Nothing in this Article affects any right by Contractor or County to recover attorney's fees or costs by operation of any law other than Civil Code section 1717.

In the event of any conflict between language in this Article and any other language in the Contract Documents, the language in this Article shall prevail.

IN WITNESS WHEREOF, the parties to these presents have hereunto set their hands the year and date first above written, being authorized thereto.

SAN LUIS OBISPO COUNTY
FLOOD CONTROL AND
WATER CONSERVATIN DISTRICT

By:_____
Chairperson of the Board of Supervisors

Date:_____

ATTEST:
CLERK OF THE BOARD OF
SUPERVISORS

By:_____
Deputy Clerk

Date:_____

APPROVAL RECOMMENDED
WADE HORTON

By:_____
Director of Public Works

Date: 06 OCTOBER 2015

APPROVED AS TO FORM AND
LEGAL EFFECT:

RITA L. NEAL
County Counsel

By:_____

Date: 10/2/15

CONTRACTOR

_____

By:_____

Date:_____

_____
Printed Name and Title
(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign)

By:_____

_____
(Printed Name and Title)

Date:_____

Address for giving notices:

_____

_____

_____

# PERFORMANCE BOND

KNOW ALL BY THESE PRESENTS: That

WHEREAS, the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California, has awarded to _____

_____

(hereinafter designated as "Principal") a contract for _____

_____

_____

_____; and

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

NOW, THEREFORE, we, the Principal and _____

_____, as Surety, are held and firmly bound unto the San Luis Obispo County Flood and Water Conservation District, (hereinafter called "District"), in the penal sum of _____

($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the above bounded Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the said contract and any alteration thereof made as therein provided, on his/her or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless District, its officers, agents, and employees, as

therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force virtue and effect.

And the said Surety, for value received, hereby stipulates and 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 accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or additions to the terms of the contract or to the work or to the specifications.

In the event suit is brought upon this bond by District and judgment is recovered, Surety shall pay all costs incurred by District in such suit, including a reasonable attorney's fee to be fixed by the Court.

Death of the Principal shall not relieve Surety of its obligations hereunder.

IN WITNESS WHEREOF, one identical counterpart of this instrument, which shall for all purposes be deemed an original thereof, has been duly executed by Principal and Surety above named, on the _____ day of_____, 20_____.

_____ (Seal)

_____ (Seal)

_____ (Seal)
Principal

_____ (Seal)

_____ (Seal)

_____ (Seal)
Surety

_____

_____
Address

NOTE:

Signatures of those executing for Surety must be properly acknowledged.

# PAYMENT BOND

KNOW ALL BY THESE PRESENTS:

WHEREAS, the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District, State of California, and _____ _____ (hereinafter designated as "Principal") have entered into an agreement for _____

_____

_____

_____

which said Agreement, and all of the Contract Documents attached to or forming a part of said Agreement, are hereby referred to and made a part hereof; and

WHEREAS, pursuant to law, the Principal is required before entering upon the performance of the Work, to file a good and sufficient bond with the body by whom the contract is awarded, to secure claims to which reference is made in Sections 3247 through 3252, inclusive, of the Civil Code of California, and Sections 3181, 3110, 3111 and 3112 of the Civil Code of California,

NOW, THEREFORE, said Principal and the undersigned _____

_____

as corporate surety, are held and firmly bound unto the San Luis Obispo County Flood Control and Water Conservation District, and unto all laborers, materialmen, and other persons referred to in said statutes in the sum of _____ ($_____), lawful money of the United States for the payment of which sum well and truly made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally by these presents.

The condition of this obligation is such that if the said Principal, his/her or its heirs, executors, administrators, successors or assigns, or subcontractors, shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant, or any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and his/her subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, the said surety will pay a reasonable attorney's fee to be fixed by the court.

This bond shall inure to the benefit of any of the persons named in Civil Code Section 3181 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force, virtue, and effect.

And the said Surety, for value received, hereby stipulates and 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 accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration, or additions to the terms of the contract or to the work or to the specifications.

Death of the Principal shall not relieve Surety of its obligations hereunder.

IN WITNESS WHEREOF one identical counterpart of this instrument, which shall for all purposes be deemed an original thereof, has been duly executed by the Principal and Surety above named, on the _____ day of_____, 20____.

_____ (Seal)

_____ (Seal)

_____ (Seal)
Principal

_____ (Seal)

_____ (Seal)

_____ (Seal)
Surety

_____

_____
Address

NOTE:
Signatures of those executing for Surety must be properly acknowledged.

**SAN LUIS OBISPO COUNTY FLOOD CONTROL**
**AND WATER CONSERVATION DISTRICT**

**SPECIAL PROVISIONS**

**FOR**

**COUNTY SERVICE AREA NO. 16**
**STATE WATER PROJECT TURNOUT**
**SHANDON, CA**
**CONTRACT NO. 300463**

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**CONTRACT NO. 300463**

The Special Provisions contained herein have been prepared by or under the direction of the following registered engineer(s):

***PREPARED BY:***

REGISTERED PROFESSIONAL ENGINEER JEFFREY LEE No. C 51640 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER — DATE 10-6-2015

REGISTERED PROFESSIONAL ENGINEER JEFF B. WERST C 47971 EXP 12-31-15 CIVIL STATE OF CALIFORNIA

DESIGN ENGINEER — DATE 10/6/15

***RECOMMENDED FOR APPROVAL AND ADVERTISING BY:***

Dave Flynn

DEPUTY PUBLIC WORKS DIRECTOR — DATE 10/6/15

***APPROVED BY:***

PUBLIC WORKS DIRECTOR — DATE 06 OCT 2015

**CONTRACT NO. 300463**

The Special Provisions contained herein have been prepared by or under the direction of the following engineer(s):

***PREPARED BY:***

For Sections 01 11 00, 01 78 36, 02 01 30, 03 48 18, 05 50 00, 05 51 20, 05 53 00, 09 91 14, 13 34 23, 26 05 00, 26 05 19, 26 05 26, 26 05 34, 26 14 46, 26 24 10, 26 27 26, 31 10 00, 31 23 00, 31 23 33, 32 31 13, 33 10 00, 40 05 74, 40 23 19, 40 50 00, 40 50 10, 40 50 20, 40 50 40, 40 50 70, 40 50 80, and 40 91 15

__Maria Alvarez, PE_____ _9-17-15_____
Civil Engineer Date

## SECTION 1. SPECIFICATIONS AND PLANS

1-1.01 SPECIFICATIONS AND PLANS

The work embraced herein shall be done in accordance with the Standard Specifications of the State of California, Department of Transportation, dated May 2006 (hereinafter called, "Standard Specifications"), the Standard Plans of the State of California, Department of Transportation, dated May 2006 (hereinafter called, "Standard Plans"), insofar as they may apply and in accordance with these Contract Documents. Wherever State Agencies, Departments, or Officers are referred to in the above mentioned Standard Specifications and Standard Plans, the comparable County of San Luis Obispo Agency, Department, or Officer having jurisdiction shall be meant thereby for the purpose of these Contract Documents.

The District hereby elects under Public Contract Code § 20396 to have said applicable provisions of the Standard Specifications and Standard Plans referenced above, including those provisions modified by these Special Provisions, governed by the State Contract Act to the extent, and only to the extent, one or both of the following conditions is satisfied: (1) the applicable provisions of the Standard Specifications or Standard Plans expressly refer to the State Contract Act; or (2) the District would lack the authority to implement the applicable provisions of the Standard Specifications or Standard Plans absent the District's election to have the District's implementation of the provisions governed by the State Contract Act.

**No amendment by the Department of Transportation to the Standard Specifications shall apply to these Contract Documents unless the amendment is expressly set forth in these Special Provisions.**

In case of conflict between the Standard Specifications and the contract Special Provisions herein, the Special Provisions shall take precedence over such conflicting portions.

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## SECTION 2. PROPOSAL REQUIREMENTS AND CONDITIONS

2-1.01 PROPOSAL REQUIREMENTS AND CONDITIONS

Attention is directed to the provisions in Section 2, "Proposal Requirements and Conditions," of the Standard Specifications and these Special Provisions for the requirements and conditions which the bidder must observe in preparation and the submission of their bid.

Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be listed on the bid proposal for this public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

Pursuant to Labor Code Section 1771.1, no contractor or subcontractor may be awarded this public works contract unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations, pursuant to Labor Code Section 1771.4.

The bidder's bond shall conform to the bond form in the section titled "Bid Proposal and Forms" of the Contract Documents and shall be properly filled out and executed. The bidder's bond form included in the Contract Documents may be used.

The following provisions for Section 2, "Proposal Requirements and Conditions," of the Standard Specifications are hereby modified as set forth hereafter.

Section 2-1.03, "Examination of Plans, Specifications, Contract, and Site of Work," of the Standard Specifications is hereby amended by modifying the first sentence of the 5th paragraph to read: "Inspection of such records may be made at the Department of Public Works and Transportation of the County of San Luis Obispo."

Section 2-1.05, "Proposal Forms" of the Standard Specifications, is hereby amended by substituting the words, "General and Special Provisions" for the words, "Proposal and Contract" in the first sentence of the 2nd paragraph and by substituting the words, "Notice to Bidders" for the words, "Notice to Contractors" in the first sentence of the 3rd paragraph. The 4th paragraph is hereby amended to read: "Proposal forms shall be obtained from the Department of Public Works and Transportation, County Government Center, San Luis Obispo, CA. 93408." The 5th paragraph is hereby deleted.

Section 2-1.07, "Proposal Guaranty" of the Standard Specifications, is hereby amended by substituting the words, "made payable to the San Luis Obispo County Flood Control and Water Conservation District" for the words, "made payable to the Director of Transportation" in the first paragraph. The 2nd paragraph is hereby amended by adding the following sentence, "The provisions of the Public Contract Code § 10181 are applicable to this contract."

The first sentence of the last paragraph is hereby amended by substituting the words, "General and Special Provisions" for the words, "Proposal and Contract". The last sentence of the last paragraph is hereby deleted.

Section 2-1.08, "Withdrawal of Proposals" of the Standard Specifications, is hereby amended by substituting the words, "Office of the Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District" for the words, "Office Engineer, Division of Construction" in the first sentence. The last sentence is hereby amended by modifying it to read: "Any bid received at the Office of the Clerk of the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District after the date and time specified in the Notice to Bidders shall not be considered and shall be returned to the bidder unopened nor may any bid be withdrawn after the time fixed in the public notice for the opening of bids."

Section 2-1.105, "Previous Disqualification, Removal or Other Prevention of Bidding", of the Standard Specifications, is hereby amended by deleting the first paragraph.

Section 2-1.108, "Compliance with Orders of the National Labor Relations Board", of the Standard Specifications, is hereby amended by modifying the last paragraph to read: "The statement required by said Section 10232 is included in the section titled "Bid Proposal and Forms" of the Contract Documents."

Section 2-1.11, "Ineligibility to Contract", of the Standard Specifications is hereby amended by modifying the last paragraph to read: "A form for the statement required by Section 10285.1 is included in the section titled "Bid Proposal and Forms" of the Contract Documents."

2-1.02 REQUIRED LISTING OF PROPOSED SUBCONTRACTORS

The designated subcontractors listed in the bidder's proposal shall list therein the name and address of all subcontractors to whom the bidder proposes to subcontract portions of the work in an amount in excess of 1/2 of one percent of the total bid, or in the case of bids for the construction of streets and highways, including bridges, in excess of 1/2 of the one percent or $10,000, whichever is greater, in accordance with the Subletting and Subcontracting Fair Practices Act commencing with Section 4100 of the Public Contract Code. The bidder's attention is invited to other provisions of said Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

The "DESIGNATION OF SUBCONTRACTORS" form for the designation of subcontractors, as required herein, is included in the section titled "Bid Proposal and Forms" of the Contract Documents and shall be completely filled out, signed by the bidder, and submitted with the bid proposal.

## SECTION 3. AWARD AND EXECUTION OF CONTRACT

### 3-1.01 AWARD OF CONTRACT

Attention is directed to the provisions of Section 3, "Award and Execution of Contract," of the Standard Specifications and these Special Provisions for the requirements and conditions concerning award and execution of the contract.

The award of contract, if it be awarded, will be to the lowest responsible bidder whose proposal complies with all of the requirements prescribed. Such award, if made, will be made within 45 calendar days after the opening of proposals.

If the lowest responsible bidder refuses or fails to execute the contract, the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District may award the contract to the second lowest responsible bidder. Such award, if made, will be made within 75 calendar days after the opening of proposals. If the second lowest responsible bidder refuses or fails to execute the contract, the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District may award the contract to the third lowest responsible bidder. Such award, if made, will be made within 105 calendar days after the opening of proposals. The periods of time specified above within which the award of contract may be made shall be subject to extension for such further period as may be agreed upon in writing between the San Luis Obispo County Flood Control and Water Conservation District and the bidder concerned.

### 3-1.02 CONTRACT BONDS

The successful bidder shall furnish two (2) bonds:

1. The Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the contract. This bond shall be equal to one hundred percent (100%) of the total contract bid.
2. The Performance bond to guarantee the faithful performance of the contract. This bond shall be equal to one hundred percent (100%) of the total contract bid.

Forms for the two (2) required bonds are included in the section titled "Bid Proposal and Forms" of the Contract Documents.

Surety on said bonds must agree that death of the Contractor shall not relieve the surety of its obligation hereunder. The said surety, for the value received, must stipulate and agree that all alterations, extension of time, extra and additional work, and other changes authorized by these Specifications or any part of the contract may be made without securing consent of the surety on the contract bonds, and such actions shall not in any way affect the obligations of the surety on the bonds.

Attention is directed to the provisions in Section 6-1.075, "Guarantee," of the Amendments to the Standard Specifications.

3-1.03 EXECUTION OF CONTRACT

The contract shall be signed by the successful bidder and returned, together with the contract bonds, copy of insurance policies, and Certificates of Insurance, with documents to verify any self insurance coverage within ten (10) calendar days, not including Saturdays, Sundays, and legal holidays, after the bidder has received the contract for execution.

The contract shall not be deemed executed by the successful bidder unless all of the above documents are received by the District with the signed contract within said time period. The bidder's security may be forfeited for failure to execute the contract within the time specified.

## SECTION 4. PROSECUTION AND PROGRESS OF THE WORK

4-1.01 GENERAL

Attention is directed to the provisions in Section 8, "Prosecution and Progress," of the Standard Specifications and these Special Provisions.

The Contractor shall begin work within ten (10) working days from the date of receipt of the District's "Notice to Proceed."

This work shall be diligently prosecuted to completion before the expiration of 90 WORKING DAYS from the date of receipt of the District's "Notice to Proceed." The Contractor shall not begin work in advance of receiving the District's "Notice to Proceed."

4-1.02 LIQUIDATED DAMAGES

Attention is directed to Section 8-1.07, "Liquidated Damages," of the Standard Specifications and these Special Provisions.

It is agreed by the parties to the contract that in the case all the work called for under the contract in all parts and requirements is not finished or completed within the number of working days as set forth in these Special Provisions, damage will be sustained by the San Luis Obispo County Flood Control and Water Conservation District, and that it is and will be impractical and extremely difficult to ascertain and determine the actual damage which the District will sustain in the event of and by reason of such delay; and it is therefore agreed that the Contractor will pay to the San Luis Obispo County Flood Control and Water Conservation District the sum of ONE THOUSAND EIGHT HUNDRED DOLLARS ($1,800) per day for each and every calendar days delay in finishing the work in excess of the number of working days prescribed above as liquidated and agreed damages; and the Contractor agrees to pay said liquidated damages herein provided for, and further agrees that the District may deduct the amount thereof from any moneys due or that may become due the Contractor under the contract.

The language in Sections 10253 through 10260 of the Public Contract Code are incorporated herein by reference as though fully set forth herein (with the word "Director" therein construed to mean the Public Works Director); provided, however, that prequalification of bidders shall not be required, and any references in said sections to prequalification of bidders are hereby deleted.

4-1.03 CONTRACT SUBMITTALS

The Contractor shall submit the following to the Engineer within ten (10) calendar days, not including Saturdays, Sundays, and legal holidays, of the Contractor's receipt of the fully executed contract:

- Storm Water Pollution Prevention Plan or Water Pollution Control Plan – 3 copies

- Recycling Plan
- Proposed Progress Schedule
- Identity of Project Safety Officer
- Written evidence of PLC system supplier qualification, as well as notification of the system supplier assuming unit responsibility, in accordance with Paragraphs 1.04.A and 1.04.B of Section 40 50 00, Qualifications and Responsibility of Contractor" of the Technical Specifications.

The Contractor shall allow ten (10) days, not including Saturdays, Sundays, and legal holidays, for the Engineer's review. The Contractor shall revise and resubmit the submittal within five (5) days, not including Saturdays, Sundays, and legal holidays, of receipt of the Engineer's comments. No claim will be allowed for damages or extensions of time because of delays in work resulting from rejection of the submittals or from revisions and resubmittal of the submittals. The number of working days within which the Contractor must complete the work under this contract shall be reduced by 1 working day for each day the Contractor fails to submit or resubmit the required submittal to the Engineer within the prescribed time allowances.

The Engineer's review and approval shall not waive any contract requirements and shall not relieve the Contractor from complying with Federal, State, and local laws, regulations, and requirements. No claim will be allowed for damages or extensions of time because of delays in work resulting from any documents submitted by Contractor to any federal, state, or local agency that are determined by such agency to be incomplete or not in compliance with any applicable laws, regulations, or requirements.

4-1.04 MANDATORY PRE-CONSTRUCTION CONFERENCE

Prior to the issuance of the "Notice to Proceed" a mandatory pre-construction conference will be held at the office of the Construction Engineer for the purpose of discussing with the Contractor the scope of work, contract drawings, specifications, existing conditions, materials to be ordered, equipment to be used, and all essential matters pertaining to the prosecution and the satisfactory completion of the project as required. The Contractor's representatives at this conference shall include major superintendents and shall include major subcontractors' representatives. So long as the District provides the Contractor at least 5 calendar days advance notice of the date and time of said conference. The number of working days within which the Contractor must complete the work under this contract shall be reduced by 1 working day for each day said conference is delayed by the Contractor's failure to attend the conference with the appropriate representatives.

A written record of attendance and items discussed will be made by the Engineer and a copy of the record kept in the Engineer's files. If for any reason

a pre-construction conference is not held the Engineer will notify the Contractor in writing.

## SECTION 5. GENERAL AND MISCELLANEOUS

5-1.01 DEFINITIONS AND TERMS

Attention is directed to the provisions in Section 1, "Definitions and Terms," of the Standard Specifications with the modifications as set forth hereafter.

Section 1-1.13, "Department," of the Standard Specifications is hereby amended to read: "The San Luis Obispo County Flood Control and Water Conservation District acting by and through its Department of Public Works and Transportation of the County of San Luis Obispo as the ex officio Public Works Department of the District."

Section 1-1.15, "Director," of the Standard Specifications is hereby amended to read: "The Director of the Department of Public Works and Transportation of the County of San Luis Obispo as the ex officio Public Works Director of the District."

Section 1-1.18, "Engineer," of the Standard Specifications is hereby amended to read: "Any duly authorized representative either employed by or contracting with the San Luis Obispo County Flood Control and Water Conservation District acting within the scope of the particular duties delegated to them."

Section 1-1.19, "Engineer's Estimate," of the Standard Specifications is hereby amended to read: "The contract bid form indicating the approximate quantities of work to be performed as contained in the Bid Proposal."

Section 1-1.26, "Liquidated Damages," of the Standard Specifications is hereby amended to read: "The amount prescribed in Section 4, "Prosecution and Progress of the Work," of the Special Provisions pursuant to Government Code Section 53069.85 to be paid to the District, or to be deducted from any payments due, or to become due, the Contractor for each day's delay in completing the whole or any specified portion of work beyond the time allowed in the Contract Documents."

Section 1-1.39, "State," of the Standard Specifications is hereby amended to read: "The State of California and its political subdivision, the San Luis Obispo County Flood Control and Water Conservation District."

Section 1-1.40, "State Contract Act," of the Standard Specifications is hereby amended to read: "Only those sections or provisions of Chapter 1 of Part 2 of Division 2 of the Public Contract Code (Section 10100 et seq.) which are specifically incorporated into this contract are applicable to this contract. All other sections and provisions of Chapter 1 of Part 2 of Division 2 of the Public Contract Code are not applicable to this contract and do not constitute a part hereof."

## 5-1.02 SCOPE OF WORK

Attention is directed to the provisions in Section 4, "Scope of Work," of the Standard Specifications with the modifications as set forth hereafter.

Section 4-1.03B(1), "Increases of More Than 25 Percent," of the Standard Specifications is amended by adding the following sentence to the last paragraph: "Additionally, such written request by the Contractor shall be accompanied by adequate, detailed data to support actual costs incurred."

Section 4-1.03B(2), "Decreases of More Than 25 Percent, " of the Standard Specifications is hereby amended by modifying the first sentence of the first paragraph to read: "Should the total pay quantity of any item of work required under the contract be less than 75 percent of the Engineer's Estimate therefor, the Engineer may reserve the right to make no adjustment in the corresponding unit price for that item if he/she so elects, except that an adjustment in compensation pursuant to this Section will be made if requested in writing by the Contractor. Additionally, such written request by the Contractor shall be accompanied by adequate, detailed data to support actual costs incurred."

Section 4-1.03D, "Extra Work," of the Standard Specifications is hereby amended by adding the following sentences to the 2nd paragraph: "All extra work shall be reported daily by the Contractor upon forms furnished by the Engineer, signed by both parties at the conclusion of each workday. Said daily extra work reports shall thereafter be considered the true record of the extra work performed and shall become the basis of payment therefor."

## 5-1.03 CONTROL OF WORK

The Engineer will not have control over, be in charge of, nor be responsible for construction means, methods, techniques, sequences, or procedures, or for the safety precautions and programs in connection with the work, since these are solely Contractor's responsibility, unless otherwise required by the Contract Documents.

Attention is directed to Section 5, "Control of Work," of the Standard Specifications with the modifications as set forth hereafter.

Section 5-1.07, "Lines and Grades," of the Standard Specifications is hereby amended to read: "Stakes or marks will be set by the Engineer as the Engineer determines to be necessary to establish the lines and grades required for the completion of the work specified in these specifications, on the plans, and in the Special Provisions.

When the Contractor requests stakes or marks to be set, the Contractor shall notify the Engineer of the request in writing no less than three (3) working days in advance of starting operations that require their use. The Contractor shall also submit to the Engineer for acceptance, a tentative schedule of all anticipated staking requests for the initial thirty (30) working days of the contract. The Engineer shall determine if the staking request schedule is reasonable before

recognizing any requests for stakes or marks to be set. Said schedule shall correlate with any order of work specified in the Contract Special Provisions. If any vegetation needs to be cleared or grubbed, as determined by the Engineer, before stakes or marks can be set, then the Contractor shall clear the obstructing vegetation for the proper placement of stakes or marks. The Engineer and the Contractor shall agree on the extent of vegetation removal necessary to prepare the work site for the setting of stakes or marks. Vegetation removal for the preparation of the work site for the setting of stakes or marks shall be considered as included in the various items of work involved and no additional compensation will be allowed therefor. The Contractor will not be entitled to any compensation for any perceived delay, nor entitled to an extension of time for any perceived delay without due cause for the period between when the work site is deemed cleared by the Engineer and when the stakes or marks are set for use by the Contractor.

Stakes and marks set by the Engineer shall be carefully preserved by the Contractor. In case the stakes and marks are destroyed or damaged, the stakes and marks will be replaced or restored at the Engineer's earliest convenience. The Contractor will be charged $875.00 for each stake or mark replaced or restored which in the judgment of the Engineer had been carelessly or willfully destroyed or damaged by the Contractor's operations. This charge will be deducted from any moneys due or to become due the Contractor."

Section 5-1.116, "Differing Site Conditions," of the Amendments to the Standard Specifications is hereby amended by including the following language from Section 7104 of the Public Contract Code: "7104. Any public works contract of a local public entity which involves digging trenches or other excavations that extend deeper than four feet below the surface shall contain a clause which provides the following: (a) That the contractor shall promptly, and before the following conditions are disturbed, notify the public entity, 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) That the public entity 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) That, in the event that a dispute arises between the public entity and the contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the contractor's cost of, or time required for, performance of any part of the work, the contractor shall not be excused from any scheduled completion date provided for by the contract, but shall proceed with all work to be performed under the contract. The contractor shall retain

any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties."

5-1.04 PREVAILING WAGE

Attention is directed to the provisions in Section 7-1.01A(2), "Prevailing Wage," of the Standard Specifications and these Special Provisions.

Pursuant to the provisions of Section 1773 of the California Labor Code, the Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District has obtained from the Director of the California Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work for the locality in which the work is to be performed for each needed craft, classification, or type of workman. Copies of said prevailing rate of per diem wages are on file in the Office of the Clerk of the Board of Supervisors and available at the California Department of Industrial Relations' web site at:

www.dir.ca.gov/DLSR/PWD.

The wage rates determined by the Director of Industrial Relations refer to expiration dates. Prevailing wage determinations with a single asterisk after the expiration date are in effect on the date of advertisement for bids and are good for the life of the contract. Prevailing wage determinations with double asterisks after the expiration date indicate that the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, the new rate shall be paid and incorporated in the contract. The Contractor shall contact the Department of Industrial Relations as indicated in the wage rate determinations to obtain predetermined wage changes.

Pursuant to Section 1773.2 of the Labor Code, a copy of said general prevailing rates shall be posted by the Contractor in a prominent place at the site of the work.

Additionally, the Director of Industrial Relations has reserved the right to issue corrected wage determinations for certain crafts contained in the prevailing wage determinations applicable to this contract. These corrected prevailing wage rates shall apply to this contract in the same manner as if they had been published in the prevailing wage determinations applicable to this contract. These revisions to the general prevailing wage rates are on file at the Office of the Clerk of the Board of Supervisors and available at the California Department of Industrial Relations' web site at:

www.dir.ca.gov/DLSR/PWD.

Additionally, changes in general prevailing wage determinations which conform to Labor Code Section 1773.6 and Title 8 California Code of Regulations Section 16204 shall apply to the contract when issued by the Director of Industrial Relations at least ten (10) calendar days prior to the date of the Notice to Bidders for the project. Changes, if any, to the general

prevailing wage rate will be on file at the Office of the Clerk of the Board of Supervisors and available at the California Department of Industrial Relations' web site at:

www.dir.ca.gov/DLSR/PWD.

5-1.05 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications is hereby amended by adding the following to the end of the second paragraph: "Pursuant to Section 8771(b) of the California Business and Professions Code, existing survey monuments that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide survey control that are within or adjacent to the Contractor's operations, shall be located and referenced by or under the direction of a licensed land surveyor or registered civil engineer prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated. In the event that any existing survey monument is disturbed in any way by the Contractor's operations as determined by a licensed land surveyor or registered civil engineer, they shall be reset accordingly and a corner record shall be filed with the county surveyor prior to the recording of a certificate of completion for the project. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in locating existing survey monuments by or under the direction of a licensed land surveyor or registered civil engineer, resetting any disturbed survey monument and filing a corner record, shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor."

5-1.06 PROGRESS SCHEDULE

Progress schedules will be required for this contract and shall conform to the provisions in Section 8-1.04, "Progress Schedules," of the Standard Specifications.

The Contractor shall submit to the Engineer a practicable progress schedule in conformance with the provisions in Section 4-1.03, "Contract Submittals," of these Special Provisions, and within 5 working days of the Engineer's written request at any other time.

5-1.07 MEASUREMENT AND PAYMENT

Attention is directed to the provisions in Section 9, "Measurement and Payment," of the Standard Specifications with the modifications as set forth hereafter.

The 13th paragraph of Section 9-1.01, "Measurement of Quantities," of the Standard Specifications shall be amended to read as follow: "Whenever pay quantities of materials are determined by weighting, the scales shall be operated

by a weighmaster licensed in accordance with provisions of the California Business and Professions Code, Division 5, Chapter 7. The Contractor shall furnish a Public Weighmaster's certificate, or a private Weighmaster's certificate (load slip) with each load and a Daily Record of Platform Scale Weights. The Weighmaster's certificates shall be numbered consecutively to correspond with the Daily Record of Platform Scale Weights. The Daily Record of Platform Scale Weights shall be prepared using a form supplied by the County and shall be delivered to the Engineer at the end of each day. Contractor shall provide the County sufficient advance notice so as to enable a representative of the County to be present to witness the Weighing and check the Daily Record of Platform Scale Weights.

Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications is hereby amended by adding the following: "Additionally, the written notice of potential claim shall be submitted on Caltrans form CEM-6201 and shall be certified with reference to the California False Claims Act, Government Code Sections 12650-12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice, the Contractor shall within 15 working days of submitting said notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. Said estimate of costs may be changed or updated by the Contractor when conditions have changed. When the affected work is completed, the Contractor shall submit substantiation of actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of said notice of potential claim.

Should the Contractor, in conjunction with or subsequent to the assertion of a potential claim, request inspection and copying of documents or records in the possession of the County that pertain to the potential claim, the Contractor shall make its records of the project, as deemed by the County to be pertinent to the potential claim, available to the County for inspection and copying."

Section 9-1.05, "Stop Notices," of the Standard Specifications is hereby amended by adding the following statement: "Stop notice information may be obtained from the Department of Public Works and Transportation."

Section 9-1.06 "Partial Payments," of the Standard Specifications is hereby amended by deleting the first sentence of the first paragraph and inserting the following at the beginning of the section:

**General**

Based upon Applications for Payment submitted to the Engineer by the Contractor, the County shall make progress payments to the Contractor as provided below and elsewhere in the Contract Documents. The pay period covered by each Application for Payment shall be one calendar month ending on the 20th day of the month. The Contractor shall submit each Application for Payment to the Engineer by the last day of each month.

Applications for Payment shall indicate the percentage of completion of each portion of the Work for which a lump sum price is specified as of the end of the period covered by the Application for Payment.

**Application for Payment**

Contractor shall submit to the Engineer an Application for Payment (on a form provided by the Engineer) for Work completed in accordance with the measurement of quantities. Such application shall be supported by such data substantiating the Contractor's right to payment as the Engineer may require.

Each Application for Payment shall be reviewed by the Engineer as soon as practicable after receipt for the purpose of determining that the Application for Payment is a "proper" payment request, accurately reflecting the value of Work completed. An Application for Payment shall be deemed "proper" only if it is properly completed and submitted on the proper forms. The Engineer shall have the right to adjust any estimate of quantity and to subsequently correct any error made in any Application for Payment.

The County shall make payment to the Contractor not later than thirty (30) calendar days after the Engineer's verification and approval that an Application for Payment is undisputed and properly submitted.

The Contractor may elect to allow an alternative procedure for processing monthly applications for payment whereby the Engineer prepares monthly progress payment estimates. To initiate such alternative procedure, the Contractor shall submit to the Engineer a written request (before the 10th day of the month) which authorizes the Engineer to prepare the monthly progress payment estimates for all remaining payments due under the Contract. Under such alternative procedure, the County, once in each month, shall cause an estimate in writing to be made by the Engineer, and the Contractor's signature approving the progress payment estimate shall be considered to be "receipt of an undisputed and properly submitted payment request" from the Contractor under Section 20104.50 of the California Public Contract Code, and the County shall make payment to the Contractor within thirty (30) calendar days after such receipt.

Applications for Payment shall include the following:

Contractor's Verification: Contractor has carefully prepared this entire document and hereby attests that the quantities and amounts stated herein accurately represent the total work that has been performed in compliance with the Contract Documents. Contractor will pay any released retainage to subcontractor due to accepted complete work of the Subcontractors portion of the work within 30 days of receipt of payment as required under 49 CFR Part 26 sub section 26.29(b)(3).

Under the alternative procedure described above, progress pay estimates prepared by the Engineer shall include the following:

> Contractor's Verification: Contractor has carefully reviewed this entire document and hereby attests that the quantities and amounts stated herein accurately represent the total work that has been performed in compliance with the Contract Documents. Contractor will pay any released retainage to subcontractor due to accepted complete work of the Subcontractors portion of the work within 30 days of receipt of payment as required under 49 CFR Part 26 sub section 26.29(b)(3).

Section 9-1.06, "Partial Payments," of the Standard Specifications is hereby amended by modifying the third paragraph to read, "In the event the County is withholding retainage for incremental portions of work pursuant to Section 5-1.17 "Prompt Payment of Funds Withheld to Subcontractors," of these Special Provisions, or for acceptable materials pursuant to the first paragraph of said Section 9-1.06: (1) The County shall retain 5 percent of the estimated value of the work done and/or 5 percent of the estimated value of materials eligible for partial payment that has been furnished and delivered and unused or furnished and stored in accordance with the provisions in the first paragraph of Section 9-1.06 as part security for the fulfillment of the contract by the Contractor from each progress payment made; and (2) the County shall pay respective retained amount(s) with subsequent payments upon acceptance of portions of the work, as determined by the Engineer."

Section 9-1.065, "Payment of Withheld Funds," of the Standard Specifications is hereby amended to read: "Attention is directed to Section 9-1.06, "Partial Payments," of the Standard Specifications, to these Special Provisions and in particular to the retention provisions therein.

Upon the Contractor's request, the County will make payment to the Contractor of funds withheld to ensure performance of this contract if the Contractor, in accordance with Public Contract Code Section 22300, deposits in escrow with the County, or with a state or federally chartered bank in California securities equivalent to the amount withheld. Securities eligible for investment under this section shall include bank or savings and loan certificates of deposit, the securities enumerated in Government Code Section 16430, interest bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the County. Upon satisfactory completion of the contract, the securities shall be returned to the Contractor. Alternatively, the Contractor may request that the County make payment of retention earned directly to the escrow agent as provided in subdivision (b) of Section 22300 of the Public Contract Code.

Each of the following conditions shall apply to the deposit of securities into escrow:

(a) The Contractor shall bear the expense of the County and the escrow agent (either the County or the bank) in connection with the escrow deposit made.

(b) Securities or certificates of deposit to be placed in escrow shall be of a value at least equivalent to the amounts of retention to be paid to the Contractor pursuant to this section.

(c) The value of any securities placed in escrow shall be based upon the market value of such securities as of the date the securities are deposited in escrow, and not upon the face value of the securities. Such securities shall be valued by the County, whose decision on valuation of the securities shall be final.

(d) The escrow agreement shall provide that the escrow agent must convert the securities deposited therein for cash, in whole or in part, to meet the defaults by the Contractor upon a unilateral demand for such conversion by the Public Works Director, and further that any amount so demanded shall be paid to the County upon said unilateral demand for payment.

(e) The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.

(f) The Contractor shall enter into an escrow agreement satisfactory to the County, which agreement shall be substantially similar to the form set forth in Public Contract Code Section 22300. The Contractor shall obtain the written consent of the surety to such agreement. The Public Works Director is authorized to sign such escrow agreements on behalf of the County.

Section 9-1.07B, "Final Payments and Claims," of the Standard Specifications is hereby amended by deleting the introductory phrase "After acceptance by the Director," and inserting in its place the phrase, "After the Engineer makes a formal recommendation to the Director that the Public Works Department initiates the internal procedures that would allow the Board to accept the work at a future Board meeting,"

5-1.08 CLAIMS

5-1.08A GENERAL

**5-1.08A(1) Mandatory Procedure and Condition Precedent**

(a) Any demand or assertion by the Contractor seeking an adjustment of Contract Price and/or Contract Times, or other relief, for any reason whatsoever, must be in strict compliance with the requirements of this Section 5-1.08. For purposes of this Section 5-1.08, any and all work relating to any such demand or assertion shall be referred to as "Disputed Work", regardless of whether the basis of the demand or assertion arises from an interpretation of the Contract Documents, an action or inaction of the Contractor, the Engineer, or the County, or any other event, issue, or circumstance. The Contractor shall bear all costs incurred in complying with the provisions of this Section 5-1.08.

(b) Compliance with these requirements is a condition precedent to the Contractor's ability to exercise any rights or remedies that may otherwise be available to Contractor under the Contract Documents or any applicable Laws

or Regulations relating to the Claim. No action or inaction by the Contractor or the Engineer to try to resolve any Claim(s) through agreement (including Change Order), mediation, settlement, or any other means shall excuse the Contractor from complying with the requirements of this Section 5-1.08.

(c) For Claims less than or equal to $375,000, Section 5-1.08 shall be interpreted in a manner consistent with Public Contract Code sections 20104 and 20104.2. The substance of Public Contract Code sections 20104 and 20104.2 have been incorporated into Section 5-1.08 in a manner that is consistent with the notice requirements provided herein. For purposes of Public Contract Code 20104 and 20104.2, a Claim shall not be deemed submitted until a Notice of Final Claim is properly submitted.

(d) In the event of any conflict between Section 5-1.08 and any other language in the Contract Documents, the provisions of Section 5-1.08 shall take precedence over any such conflicting language.

**5-1.08A(2) Contractor's Continuing Obligations.**

(a) At all times during the processing of the Contractor's potential Claim, the Contractor shall diligently proceed with the performance of the Disputed Work and other Work, unless otherwise specified or directed by the Engineer.

(b) The Contractor shall provide the Engineer the opportunity to examine the site of the Disputed Work as soon as reasonably possible, and in no event later than five (5) days from the date of the Initial Notice of Potential Claim. Throughout the processing of the Contractor's potential Claim, the Contractor shall provide the Engineer a reasonable opportunity to examine the site of the Disputed Work within five (5) days of the date of Engineer's written request therefor.

(c) The Contractor shall promptly respond to any requests for further information or documentation regarding the Contractor's potential Claim. If the Contractor fails to provide an adequate written response to the Engineer within fifteen (15) days of the Engineer's written request for such further documentation or information, the Contractor shall be deemed to have waived its Claim. If the further documentation or information requested by the Engineer would, in the opinion of the Engineer, reasonably take the Contractor more than fifteen (15) days to comply with, the written request shall provide the Contractor a specific response deadline that is commensurate to a reasonable response time.

(d) Throughout the performance of the Disputed Work, the Contractor shall maintain records that provide a clear distinction between the incurred direct costs of Disputed Work and other Work. The Contractor shall allow the Engineer access to its Project records deemed necessary by the Engineer to evaluate the potential Claim within fifteen (15) days of the date of the Engineer's written request. The Contractor's failure to comply with the provision of this Section 5-1.08 shall constitute a waiver of the Contractor's Claim.

(e) All Subcontractor's and material supplier's claims of any type shall be brought only through Contractor pursuant to the provisions of this Section 5-1.08. Under no circumstances shall any Subcontractor or material supplier make any direct claim against County.

(f) Except where provided by law, or elsewhere in these Contract Documents, THE COUNTY SHALL NOT BE LIABLE FOR SPECIAL OR CONSEQUENTIAL DAMAGES AND THE CONTRACTOR SHALL NOT INCLUDE THEM IN ITS CLAIMS. Contractor shall be limited in its recovery on any Claim(s) to the adjustments allowed in the Contract Documents.

(g) During each step in the processing of the Contractor's Claim, each notice shall be accompanied by the Contractor's written statement that the adjustment or relief claimed is the entire adjustment or relief to which the claimant believes it is entitled as a result of the event, issue, or circumstance giving rise to the Claim.

(h) The Contractor shall be responsible for providing written evidence of the date any of the notices referenced in Section 5-1.08 above were provided to Engineer, and shall provide Engineer a copy of such written evidence within five (5) days of a request thereof. Such evidence shall be either a written receipt of actual delivery from U.S. Postal Service or other reputable delivery service, or by the recipient's written acknowledgement of receipt.

(i) The rights of the Engineer to request further records, documents, or information from the Contractor regarding a Claim are for the sole benefit of the Engineer, and may be exercised at their sole discretion. Any failure by the Engineer to exercise its rights does not provide the Contractor any excuse for not providing all of the records, documents, and other information it is requested to provide under Section 5-1.08 or any other provision of the Contract Documents.

(j) Contractor's compliance with the provisions of this Section 5-1.08 shall not excuse Contractor's failure to comply with any additional requirements set forth in the Contract Documents, including but not limited to, any provisions relating to Contractor's obligation to provide any notice, information, documentation, inspections, site access, or any other requirements relating to any event, issue, or circumstance relating to the Contract.

(k) Contractor's compliance with the provisions of this Section 5-1.08 shall not excuse Contractor's failure to comply with any additional requirements set forth in the Contract Documents, including but not limited to, any provisions relating to contractor's obligation to provide any notice, information, documentation, inspections, site access, or any requirements relating to any event, issue, or circumstance relating to the Contract.

(l) Under no circumstances may the Contractor submit an Initial Notice of Potential Claim, Supplemental Notice of Potential Claim, or Notice of Final Claim after the date of final payment.

### 5-1.08A(3) Claim Identification Number

(a) The Contractor shall assign an exclusive identification number for each potential Claim, determined by chronological sequencing, based on the date of the potential Claim. The nature and circumstances involved in the dispute shall remain consistent throughout the processing of the Claim.

(b) The exclusive identification number for each Claim shall be used on the following corresponding documents:

i.. Initial Notice of Potential Claim.

ii. Supplemental Notice of Potential Claim.

iii. Notice of Final Claim.

iv. Contractor's written statement of Claims

### 5-1.08A(4) Initial Notice of Potential Claim

(a) Promptly upon becoming aware of any event, issue, or circumstance which the Contractor believes provides a basis for an adjustment of Contract Price and/or Contract Times, or other relief, Contractor shall provide a signed written Initial Notice of Potential Claim to the Engineer. The Initial Notice of Potential Claim shall be submitted before commencing any Disputed Work, or within five (5) days of the event, issue, or circumstance from which the Claim arises, whichever is earlier.

(b) The Initial Notice of Potential Claim shall clearly state the Contractor's grounds for seeking an adjustment in Contract Price and/or Contract Times or other relief, the nature and circumstances of the Disputed Work, the relief or adjustment sought by the Contractor for the Disputed Work. The Initial Notice of Potential Claim shall be submitted on a form furnished by the Engineer and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655.

(c) After reviewing the Initial Notice of Potential Claim, the Engineer may provide a written response thereto or may decide to delay providing a response until the Contractor provides further information regarding the potential Claim pursuant to the provisions of this Section 5-1.08.

### 5-1.08A(5) Supplemental Notice of Potential Claim

(a) Within fifteen (15) days of submitting the Initial Notice of Potential Claim, the Contractor shall submit a signed Supplemental Notice of Potential Claim to Engineer that provides the following information:

i. The complete nature and circumstances of the dispute which caused the potential Claim.

ii. The contract provisions that provide the basis of the potential Claim.

iii. The requested adjustment of Contract Price, if any, and the estimated cost of the potential Claim, including an itemized breakdown of individual costs and how each estimate was determined.

iv. The requested adjustment of Contract Time, if any, and a time impact analysis of the schedule that illustrates the effect on the scheduled completion date due to schedule changes or disruptions.

(b) The information provided by the Contractor shall provide the Contractor's complete reasoning for additional compensation or adjustments and shall be as complete as reasonably possible.

(c) The Supplemental Notice of Potential Claim shall be submitted on a form furnished by Engineer and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655. If at any time the estimated cost of the potential Claim or effect on the Progress Schedule changes, Contractor shall update information in items 3 and 4 above as soon as the change is recognized and submit this information to Engineer.

(d) If the Disputed Work is not completed within thirty (30) days, the Contractor shall, every thirty (30) days until the Disputed Work ceases, submit to the Engineer an updated Supplemental Notice of Potential Claim that shall update and quantify all of the information required in the Supplemental Notice of Potential Claim. The Contractor’s failure to so quantify costs and schedule impacts every thirty (30) days shall result in a waiver of the Claim for that 30-day period. Any supplemental notice or updated notice that states that the requested adjustment of Contract Price and/or Contract Time will be provided or determined at a later date, or that any damages, costs, schedule impacts, and/or any other analysis will be provided or determined at a later date, shall be deemed to be not in compliance with this Section 5-1.08, and shall result in the Contractor waiving its Claim.

(e) After reviewing the Supplemental Notice of Potential Claim or updated Supplemental Notice of Potential Claim, the Engineer may provide a written response thereto or may decide to delay providing a response until the Contractor provides further information regarding the potential Claim pursuant to the provisions of this Section 5-1.08.

**5-1.08A(6) Notice of Final Claim.**

As soon as reasonably practical upon completion of the Disputed Work, and no later than thirty (30) days after completion of the Disputed Work, the Contractor shall submit to the Engineer a Notice of Final Claim containing a full and final documentation of the Claim including, but not limited to, the following information:

(a) A detailed factual narration of events fully describing the nature and circumstances that caused the dispute, including, but not limited to, necessary dates, locations, and items of Work affected by the dispute.

(b) The specific provisions of the Contract that support the Claim and a statement of the reasons these provisions support and provide a basis for entitlement of the Claim.

(c) When additional monetary compensation is requested, the exact amount requested calculated in conformance with the Contract Documents and shall include an itemized breakdown of individual costs. These costs shall be segregated into the following cost categories:

i. Labor – A listing of individuals, classifications, regular hours and overtime hours worked, dates worked, hourly labor rates, and other pertinent information related to the requested reimbursement of labor costs.

ii. Materials – Invoices, purchase orders, location of materials either stored or incorporated into the work, dates materials were transported to the project or incorporated into the work, and other pertinent information related to the requested reimbursement of material costs.

iii. Equipment – Listing of detailed description (make, model, and serial number), hours of use, dates of use, and equipment rates. Equipment rates shall be at the applicable State rental rate as listed in the Department of Transportation publication entitled "Labor Surcharge and Equipment Rental Rates," in effect when the Disputed Work was performed.

iv. Other categories as specified by Contractor or Engineer.

(d) When an adjustment of Contract Time is requested the following information shall be provided:

i. The chronology of the specific dates for which Contract Time is being requested.

ii. The specific reasons for entitlement to a Contract Time adjustment.

iii. The specific provisions of the Contract that provide the basis for the requested Contract Time adjustment.

iv. A detailed time impact analysis of the schedule. The time impact analysis shall show the effect of changes or disruptions on the scheduled completion date to demonstrate entitlement to a Contract Time adjustment.

(e) The listing, identification, and production of copies of all documents the Contractor believes support its Claim and the date, time, circumstances, details and substance of any oral communications that the Contractor believes support the Claim.

The Notice of Final Claim shall be submitted on a form furnished by the Engineer and shall be certified under penalty of perjury with reference to the California False Claims Act, Government Code Sections 12650-12655.

Information submitted subsequent to the Notice of Final Claim will not be considered.

No Notice of Final Claim will be considered that does not have the same nature and circumstances, and basis of Claim as those specified on the Initial and Supplemental Notices of Potential Claim.

**5-1.08A(7) Response to Notice of Final Claim.**

(a) Date of Final Decision in Response to Final Claim

In the event a valid written decision is not provided to the Contractor within the time prescribed in this Section 5-1.08, the Claim shall be deemed denied on the last day a written response was due. The date upon which the Claim is approved or denied pursuant to the provisions of this Section 5-1.08, shall constitute the date of the final decision on the Claim under the provisions of this Section 5-1.08. The date of the final decision on a Claim can only be changed by a subsequent writing signed by Engineer and County that expressly states that the date of the final decision on the Claim has been changed to a new specific date."

(b) Public Contract Code Requirements for Claims Less Than or Equal to $375,000.

i. Written Response to Claims of less than $50,000.

For Claims of less than fifty thousand dollars ($50,000), the Engineer shall respond in writing to the Notice of Final Claim within forty-five (45) days of receipt thereof, or may request, in writing, within thirty (30) days of said receipt, any additional documentation relating to the Claim or any defenses to the Claim the County may have against the Contractor. The Contractor shall comply with the request within the reasonable time deadlines provided by the Engineer in the request. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the County and the Contractor. The written response to the Notice of Final Claim shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time no greater than that taken by the Contractor in producing the additional information, whichever is greater.

ii. Written Response to Claims Over $50,000 and Less Than or Equal to $375,000

For Claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the Engineer shall respond in writing to the Notice of Final Claim within sixty (60) days of receipt thereof, or may request, in writing, within thirty (30) days of said receipt, any additional documentation relating to the Claim or any defenses to the Claim the County may have against the Contractor. The Contractor shall comply with the request within the reasonable time deadlines provided by Engineer in the request. If additional information is thereafter required, it shall be requested and provided upon mutual agreement of the County and the Contractor. The written response to the Notice of Final Claim shall be submitted to the Contractor within thirty (30) days after receipt of the further documentation, or within a

period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

iii. Right to Meet and Confer For Claims Less Than or Equal to $375,000

For Claims less than or equal to $375,000, if the Contractor disputes the written response to the Claim, or if a written response is not submitted within the time prescribed above, the Contractor may so notify the Engineer and County, in writing, either within fifteen (15) days of receipt of the written response or within fifteen (15) days of the Engineer's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon such a timely demand by the Contractor, the Engineer shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute. Within thirty (30) days after such conference, a final written response to the Claim shall be issued which will serve as the new final decision on the Claim. Pursuant to Public Contract Code section 20104.6, the County shall not fail to pay money as to any portion of a Claim which is undisputed, except as otherwise provided in the Contract Documents.

(c) For Claims Greater Than $375,000

For Claims over three hundred seventy-five thousand dollars ($375,000), the Engineer shall respond in writing to the Notice of Final Claim within sixty (60) days of receipt thereof Claim, or may request, in writing, within forty-five (45) days of said receipt, any additional information or documentation relating to the Claim or any defenses to the Claim the County may have against the Contractor. The Contractor shall comply with the request within the reasonable time deadline provided by the Engineer in the request. If any additional information is thereafter requested by the Engineer, it shall likewise be provided by the Contractor within the reasonable time deadline provided by the Engineer in such follow-up request. The written response to the Notice of Final Claim shall be submitted to the Contractor within thirty (30) days after receipt of such further information and documentation, or within a period of time no greater than that taken by the Contractor in producing the additional information or documentation, whichever is greater. The Contractor may request an informal conference to meet and confer for settlement of the issues in dispute, but the Contractor shall have no right to demand such a conference. Neither the requesting of any such conference by the Contractor or the Engineer, nor the holding of such conference shall affect the date of the final decision on the Claim. No written communications of the Engineer and/or the County sent to the Contractor after any such conference will change the date of the final decision on the Claim unless the writing expressly states that the date of the final decision is being changed to a new specific date.

**5-1.08A(8) Exclusive Remedy**

The administration of a Claim as provided in this Section 5-1.08, including the Contractor's performance of its duties and obligations specified in this Section 5-1.08 is the Contractor's sole and exclusive remedy for disputes of all types pertaining to the payment of money, extension of time, the adjustment or

interpretation of the Contract Documents terms or other contractual or tort relief arising from the Contract Documents. This exclusive remedy and the limitation of liability (expressed herein and elsewhere throughout the Contract Documents) apply notwithstanding the completion, termination, suspension, cancellation, breach, or rescission of the Work or the Contract Documents, the negligence or strict liability of the County, its representatives, consultants, or agents, or the transfer of Work or the Project to the County for any reason whatsoever.

The Contractor waives and covenants not to raise any claims of waiver, estoppel, release, bar, or any other type of excuse for non-compliance with these Section 5-1.08 requirements. Compliance with the procedures described in this Section 5-1.08 is a condition precedent to the right to file a Government Code Claim, commence litigation, or commence any other legal action. Claim(s) or issue(s) not raised in a timely Claim submitted under this Section 5-1.08 may not be asserted in any subsequent Government Code Claim, litigation, or legal action. The County shall not be deemed to waive any provision under this Section 5-1.08, if at the County's sole discretion, a claim is administered in a manner not in accordance with this Section 5-1.08.

5-1.08B OTHER REQUIREMENTS RELATING TO CLAIMS

**5-1.08B(1) Government Code Claim Requirements**

For all Claims not resolved as a result of the Section 5-1.08A procedures, the Contractor must submit each Claim in a Government Code Section 910 form of claim for final investigation and consideration of its settlement prior to initiation of any litigation on any such Claim, as required by Government Code Section 945.4. Pursuant to Government Code Section 930.2, the one-year period in Government Code Section 911.2 is hereby reduced to 150 days. This time deadline is measured from the accrual date of each separate cause of action.

**5-1.08B(2) Tolling**

For each unresolved Claim properly processed by the Contractor in accordance with Section 5-1.08A, the running of the period of time within which a Government Code claim must be submitted shall be tolled during the time the Contractor is processing the Claim in compliance with Section 5-1.08A. Under no circumstances shall the time for submitting a Government Code Claim be extended beyond 150 days of the date of the final decision on the Claim under Section 5-1.08A. The Contractor waives the right to pursue or submit any Claims not processed in accordance with Section 5-1.08A.

Other than as expressly provided above, the time deadline for filing a Government Code claim shall not be tolled by any action or inaction by the Contractor, the Engineer, or the County, including but not limited to any action or inaction to try to resolve the Claim through negotiation, mediation, settlement, agreement (including Change Order), or by any other means, other than by a separate written tolling agreement expressly approved as to form (on the face of the agreement) by the County.

## 5-1.09 AUDIT OF RECORDS

The Contractor shall maintain and make available for examination and audit by the State Auditor General and/or duly authorized representatives of the State, District, or Federal Governments, all books, papers, accounting records, and other documents pertaining to the cost and performance of this contract.

The Contractor shall retain said books, papers, accounting records, and other documents for a period of three years after the date of final payment under this contract (Government Code Section 8546.7).

## 5-1.10 CONTRACTOR'S REPORTS

The Contractor shall complete a daily report indicating location worked, total manpower per construction trade for each task, major equipment on site, each subcontractor's manpower and equipment, weather conditions, and other related information involved in the performance of the work. The daily report shall be completed on forms furnished by the Engineer and shall be submitted to the Engineer at the conclusion of each workday. The report shall comment on the daily progress and status of the work within each major component of the work.

## 5-1.11 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

When the presence of asbestos or hazardous substances are not shown on the plans or indicated in the specifications and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe. The Contractor shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In conformance with Section 25914.1 of the Health and Safety Code, removal of asbestos or hazardous substances including exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

## 5-1.12 SUBCONTRACTING

No subcontract releases the Contractor from the contract or relieves the Contractor of their responsibility for a subcontractor's work.

If the Contractor violates Public Contract Code §4100 et seq., the District may exercise the remedies provided under Public Contract Code §4100. The District

may refer the violation to the Contractors State License Board as provided under Public Contract Code §4111.

The Contractor shall perform work equaling at least 30 percent of the value of the original total bid with the Contractor's own employees and equipment, owned or rented, with or without operators.

Each subcontract shall comply with the contract.

Each subcontractor shall have an active and valid State contractor's license with a classification appropriate for the work to be performed (Business and Professions Code, §7000 et seq.).

The Contractor shall submit copies of subcontracts upon request by the Engineer.

The Contractor shall submit a Subcontracting Request form prior to commencement of that portion of the work.

The Contractor shall not use a debarred subcontractor. Pursuant to the provisions in Section 1777.1 of the Labor Code, the Labor Commissioner publishes and distributes a list of contractors ineligible to perform work as a subcontractor on a public works project. This list of debarred contractors is available from the Department of Industrial Relations web site at:

http://www.dir.ca.gov/DLSE/Debar.html.

Upon request by the Engineer, the Contractor shall immediately remove and not again use a subcontractor who fails to prosecute the work satisfactorily.

5-1.13 CONSTRUCTION SUBMITTALS

Construction project submittals, including shop drawings and manufacturer's product specifications, shall be supplied for all material, equipment items, and for other items of work required by its contract documents. The Contractor shall supply 5 copies of manufacturer's scaled, dimensioned shop drawings complete with all information required to describe the item and demonstrate compliance with contract drawings and these specifications. Submittals will only be accepted from the Contractor (not sub-contractor or material supplier). Neither fabrication nor onsite preparation shall be started before receipt of written review from the County.

Each submittal shall be sequentially numbered, dated, and appropriately titled with the specification number and description.

The Contractor's responsibility for errors, omissions, and deviations from the requirements of the contract documents in submittals is not relieved by the County's review. The Contractor shall be responsible for confirming and correlating all quantities and dimensions, the compatibility of different components, selecting fabrication processes and techniques of construction, coordinating its work with that of other trades or other contractors at the site,

and performing its work in a safe and satisfactory manner. The County will require 10 working days for submittal review. No claim will be allowed for damages or extensions of time because of delays in work resulting from rejection of material or from revisions and resubmittal of shop drawings, project data, or samples.

Resubmittals will be reviewed and returned in the same review period as the original submittals. It is considered reasonable that the Contractor shall make a complete and acceptable submittal by the second submission. The Engineer reserves that right to withhold monies due to the Contractor to cover additional costs of any review beyond the second submittal. Full compensation for preparing submittals and shop drawings, as required, shall be considered as included in the contract items of work involved and no additional compensation will be allowed therefor.

5-1.14 LEGAL ADDRESS OF THE CONTRACTOR

Both the address given in the proposal and the Contractor's office in the vicinity of the work are hereby designated as places to either of which drawings, letters, notices, or other articles or communications to the Contractor may be mailed, transmitted electronically, or delivered. The mailing, electronic transmission, or delivery at either of these places shall be deemed sufficient notice thereof upon the Contractor.

Nothing herein contained shall be deemed to preclude the service of any drawing, letter, notice, article, or communication to, or upon, the Contractor or Contractor’s representative personally. The address named in the proposal may be changed at any time by written notice from the Contractor to the Engineer.

5-1.15 WEEKLY PROGRESS MEETINGS

Weekly meetings shall be held at the project site to review the progress of the work and to discuss any problems which may have occurred. Meeting shall include the Engineer, inspectors, and the Contractor’s foreman. The Contractor shall provide an updated schedule at the weekly meeting.

Full compensation for preparing updated schedules and attending the progress meetings, as required, shall be considered as included in the contract items of work involved and no additional compensation will be allowed therefor.

5-1.16 GOVERNMENT CODE CLAIM REQUIREMENTS

Nothing in these Contract Documents shall excuse a Contractor from fully complying with the requirements of Part 3 of division 3.6 of Title 1 of the Government Code (commencing with section 900). Said requirements must be complied with before filing any claim in any court of law, and are in addition to the other claims procedures set forth in the Contract Documents shall be considered a substitute or alternative procedure for complying with the requirements of Part 3 of Division 3.6 of Title 1 of the Government Code (commencing with section 900.)

5-1.17 SURFACE MINING AND RECLAMATION ACT

Imported borrow or aggregate material must come from a surface mine permitted under the Surface Mining and Reclamation Act of 1975 (SMARA), Pub Res Code § 2710, et seq., or from an exempt site.

The Department of Conservation, Office of Mine Reclamation maintains a list of permitted mine sites. For the list of permitted sites, go to:

http://www.conservation.ca.gov/omr/ab_3098_list

If Contractor obtains import borrow or aggregate material from a surface mine not on this list, Contractor shall submit written proof the mine is exempt from SMARA to the Engineer.

5-1.18 SUPPLEMENTAL WORK PAYMENTS

Certain extra work to be performed on this project has been designated in the bid proposal as a contract item of work. For bidding purposes, the Contractor shall deem the amount set forth in the "Total Amount" column for the designated item as the maximum amount allotted for said item of extra work.

The County reserves the right to increase, decrease or entirely eliminate any supplemental work item in this contract without penalty. Notwithstanding any other provision to the contrary (including but not limited to section 4-1.03B(3) of the Standard Specifications), the Contractor has no right to receive any payment(s) for Supplemental Work that is decreased or entirely eliminated by the County.

5-1.019 SOLID WASTE MANAGEMENT

The Contractor shall recycle at least 50% of the construction and demolition waste generated by the project.

The following is a list of IWMA-Certified Recycling Facilities:

| | |
|---|---|
| C&D Recycling Facility at Cold Canyon Landfill | 805-549-8332 |
| C&D Recycling Facility at Chicago Grade Landfill | 805-466-2985 |
| North SLO County Recycling | 805-434-0043 |
| API (roll-off/debris box company) | 805-928-8689 |
| R&R (a roll-off/debris box company) | 805-929-8000 |
| Recycling Facility at the Paso Robles Landfill | 805-238-2028 |
| Santa Maria Transfer Station | 805-922-9255 |
| Bedford Enterprises/SMART | 805-922-4977 |

The Contractor shall complete and sign the "RECYCLING PLAN" form in conformance with the provisions in Section 4-1.03, "Contract Submittals," of these Special Provisions. This form must be submitted and approved prior to receiving the Notice to Proceed.

This form must show how at least 50% of the project construction and demolition waste will be recycled.

The Contractor shall maintain receipts or other documentation for any facility or site that received waste from the project.

The Contractor shall submit a complete and accurate "DISPOSAL REPORT" form with original receipts and supporting documentation. This form must be submitted and approved prior to receiving the Notice of Completion.

If the Contractor fails to submit the required information showing the 50% recycling goal was met, the District could impose a penalty equal to 2 percent of the total contract amount.

Full compensation for complying with these requirements shall be considered as included in the prices paid for the various items of work generating such construction and demolition waste and no additional compensation will be allowed therefor.

The following are copies of the "RECYCLING PLAN" and "DISPOSAL REPORT" forms:

# RECYCLING PLAN FOR DISTRICT PROJECTS

| SECTION 1. PROJECT INFORMATION | | |
|---|---|---|
| Contract Title | Contractor Name | |
| | Contractor Phone | Contractor Fax |
| Contract Number | Street Address | |
| Total Contract Amount | City, State, Zip | |
| Print Name and Title | Signature | Date |

| SECTION 2. RECYCLING PLAN | | | | | |
|---|---|---|---|---|---|
| | Before Construction (estimated tons) | | | | |
| | Landfill | Recycling Facility | | Reuse | |
| **Materials** | (Tons) | (Tons) | Location | (Tons) | Location |
| Cleared Vegetation | | | | | |
| Asphalt Concrete | | | | | |
| Concrete | | | | | |
| Metals (including spent equipment) | | | | | |
| Lumber | | | | | |
| Drywall | | | | | |
| Mixed Recyclables | | | | | |
| Trash | | | | | |
| **Totals** | | | | | |
| **% Diversion** | | | | | |

| Official Use Only | | |
|---|---|---|
| Recycling Plan Approved ☐ | Recycling Plan Denied ☐ | |
| Information Required: | | |
| Print Name and Title | Signature | Date |

# DISPOSAL REPORT FOR DISTRICT PROJECTS

| SECTION 1. PROJECT INFORMATION | | |
|---|---|---|
| Contract Title | Contractor Name | |
| | Contractor Phone | Contractor Fax |
| Contract Number | Street Address | |
| Total Contract Amount | City, State, Zip | |

**Contractor Certification: I certify under penalty of perjury that the information provided in this form is complete and accurate.**

| Print Name and Title | Signature | Date |
|---|---|---|
| | | |

**SECTION 2. DISPOSAL REPORT**

| | After Construction (actual tons) | | | | |
|---|---|---|---|---|---|
| | Landfill | Recycling Facility | | Reuse | |
| **Materials** | (Tons) | (Tons) | Location | (Tons) | Location |
| Cleared Vegetation | | | | | |
| Asphalt Concrete | | | | | |
| Concrete | | | | | |
| Metals (including spent equipment) | | | | | |
| Lumber | | | | | |
| Drywall | | | | | |
| Mixed Recyclables | | | | | |
| Trash | | | | | |
| **Totals** | | | | | |
| **% Diversion** | | | | | |

**I have reviewed and approved the information submitted in this report for completeness**

| Resident Engineer's Name: | Signature: | Date: |
|---|---|---|

**Official Use Only**

| Disposal Report Approved ☐ | Disposal Report Denied ☐ |
|---|---|

Information Required

| Print Name and Title | Signature | Date |
|---|---|---|
| | | |

## SECTION 6. STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES (DWR) SUPPLEMENTAL PROVISIONS

### 6-1 DWR Supplemental Provisions

6-1.01 DWR SUBMITTALS:

During compliance with appropriate sections of the Contract pertaining to the construction schedule, submittals, shop drawings, manufacturer's catalogs, data, copies of certificates of compliance for construction workers requiring certificates, materials certificates, and test reports, Contractor shall provide an additional complete copy of these materials for DWR approval.

6-1.02 INSPECTION AND ACCEPTANCE:

All of the construction under this Contract shall be subject to inspection by DWR for conformity with the approved drawings and specifications for protection of DWR's property, and for avoidance of any interference with DWR's construction, operation and maintenance of the area. DWR inspections shall be performed in such a manner as not to delay construction unnecessarily. DWR will assign an inspector and will furnish his/her name and address to the District. DWR's requirements concerning the approved drawings and specifications shall not be waived by either the inspection or the lack of inspection of any portion of such construction, nor the presence or absence of DWR's inspector during such construction. DWR may notify District to halt construction in the event that construction does not conform to DWR's requirements. District shall require Contractor to halt construction immediately upon receipt of DWR notification. District shall allow Contractor to resume construction after DWR requirements have been met. An inspection will be performed by DWR's representative after Contractor has completed construction and site restoration.

DWR will forward a Statement of Acceptance to the District when all of the following conditions are met:

a) DWR finds the facilities constructed by Contractor are satisfactory;

b) A set of reproducible as-built drawings have been submitted to DWR within 30 days of project completion that have been stamped and signed by the Professional Engineer; and

c) Copies of all contract change orders and manufacturer manuals for operation and maintenance of devices and equipment.

**SECTION 7. (*BLANK*)**

**SECTION 8. *(BLANK)***

## SECTION 9. DESCRIPTION OF WORK

Work for this project involves connecting the State Water Project pipeline to the existing County Service Area (CSA) No. 16 waterline through an existing blind flange off the SWP pipeline. Construction of the CSA No. 16 State Water Turnout includes, but is not limited to, installation of a new meter vault, control room building, installation of small diameter pipe and valves, concrete foundations, instrumentation, communication equipment and associated site improvements and such other items of work not mentioned herein that are required by the Drawings, the Standard Specifications, Standard Plans, or these Special Provisions.

## SECTION 10. CONSTRUCTION DETAILS

## SECTION 10-1. GENERAL

**10-1.01** **Order of Work:** The order of work shall conform to the provisions in Section 5-1.05, "Progress Schedule", of the Standard Specifications and these Special Provisions.

Contractor's attention is directed to items and or materials of construction that may have long lead times, including, but not limited to, the meter vault and the control room building. It shall be the Contractor's responsibility to insure that adequate lead time is provided for review and approval of all submittals and for ordering of all materials required for construction of the improvements under this Contract.

**Contractor shall begin work within ten (10) working days of the date of receipt of the Notice to Proceed.**

**At a minimum, submittals for the following material(s) shall be submitted to the Engineer no later than 10 working days after the Contractor's receipt of the Notice to Proceed:**

- **Meter Vault**
- **Control Room Building**
- **Instrumentation and communication equipment**

Shut-down of the State Water Project pipeline or communication is not authorized or allowable as part of work under this Contract. All work under this Contract shall be conducted in such a manner to not shut-down or otherwise impact on-going operation of the State Water Project water line. Impacts to the State Water Project pipeline, adjacent public and/or private property shall not be permitted, and any damage resulting shall be the sole responsibility of the Contractor to fix, repair or replace to pre-existing condition or better to the satisfaction of the District and Central Coast Water Authority (CCWA) as CA Department of Water Resources (DWR) on-site representative.

Contractor's attention is directed to the timing requirements of submittals identified in Section 4-1.03, "Contract Submittals" and these Special Provisions that require review by the Engineer prior to initiating work or ordering materials. It shall be the Contractor's responsibility to insure that adequate lead time is provided for review and approval of all submittals and for ordering of all materials required for construction of the improvements under this Contract.

Contractor's attention is directed to the requirements of these Special Provisions that require the Contractor to coordinate with Department of Water Resources (DWR) and Central Coast Water Authority (CCWA) representatives regarding work within the DWR easement and construction observation. The Contractor's schedule shall account for said coordination.

Contractor shall coordinate with Engineer as to the actual order of work planned to facilitate construction and that order shall be reflected in the progress schedule required elsewhere in these Special Provisions.

After having received written notice to proceed, and within the stated time found in Section 4-1.01, "General", of Section 4 of these Special Provisions, the first order of work shall involve the installation of the required construction area signs in accordance with these Special Provisions before performing other work on the job site.

Attention is directed to Section 5-1.03, "Control of Work", of these Special Provisions regarding requesting stakes or marks to be set for construction purposes and submitting a tentative schedule of all anticipated staking requests.

All work under this Contract shall be conducted in a manner which will minimize roadways disturbance, or traffic obstructions caused by the construction. Damage to adjacent public and private property shall not be permitted, and any damage resulting shall be the sole responsibility of the Contractor.

Contractor shall provide labor and materials sufficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of work with the contract time. If at any time such effort appears to be inefficient, inappropriate or insufficient for securing the quality of work required or for producing the rate of progress, District may order the Contractor to increase the efficiency, change the character, or increase the labor and materials, and the Contractor shall conform to such order. Failure of the District to give such an order shall in no way relieve the Contractor of the obligations to secure the quality of work and rate of progress required.

Full compensation for conforming to these requirements will be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

**10-1.02** **Progress Schedule:** Attention is directed to Section 5-1.06, "Progress Schedule", of the Special Provisions regarding submittal of progress schedules.

When periodic updates to the Progress Schedule indicates work is 14 or more calendar days behind the accepted schedule, the Contractor shall submit a separate recovery schedule indicating the means by which Contractor intends to regain compliance with the schedule. Contractor shall indicate changes to working hours, working days, crew sizes and equipment required to achieve compliance and date by which recovery will be accomplished.

Full compensation for conforming to the Progress Schedule, including Contractor required work to achieve the recovery schedule will be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed thereof.

**10-1.03** **Working Hours:** Work shall be performed during normal work-week: 7:00 a.m. to 7:00 p.m., Monday through Friday, excluding County holidays. Work shall not be performed at any time other than the normal work-week without obtaining written approval from the Engineer at least 4 (four) calendar days in advance. All non-emergency work activities shall be confined to daylight hours.

**10-1.04** **Schedule of Values:** The Contractor shall submit to the Engineer a Schedule of Values at the same time the initial Progress Schedule is submitted. The Schedule of Values shall be in a form accepted by the Engineer and shall subdivide the Contract bid items into components with quantities and prices, which when added together equal the contract price for said bid item. Subdivided components shall be in sufficient detail to serve as the basis for progress payments during performance of the work.

Item 1 – "Mobilization / Demobilization"
Item 2 – "Sheeting and Shoring for Worker Protection"
Item 3 – "Traffic Control"
Item 4 – "CSA 16 – SWP Turnout Connection"

The form and content of the schedule of values shall be approved by the Engineer prior to commencing work.

**10-1.05** **Submittals:** The Contractor shall submit submittals in accordance with the requirements specified in Section 4-1.03, "Contract Submittals", and Section 10-1.01, "Order of Work", of these Special Provisions.

Shop drawings and submittal documents are required for review and acceptance by the Engineer for general conformance with the design concept and general compliance with the information given in the Contract Documents. The Contractor shall be responsible for confirming and correlating all quantities and dimensions, the compatibility of different components, selecting fabrication processes and techniques of construction, coordinating its work with that of other trades or other contractors at the site, and performing its work in a safe and satisfactory manner.

Contractor shall submit five (5) copies of shop drawings and/or manufacturer product data sheets. The District will keep three (3) copies and return the other two (2) copies to the Contractor. If the Contractor desires more than two copies, Contractor shall transfer the Engineer's comments onto additional copies at his/her own expense.

Resubmittals will be reviewed and returned in the same review period as the original submittals. It is considered reasonable that the Contractor shall make a complete and acceptable submittal by the second submission. The Engineer reserves that right to withhold monies due to the Contractor to cover additional costs of any review beyond the second submittal.

Submittals will only be accepted from the Contractor (not sub-contractor or material supplier). Make submittals promptly in such sequence as to cause no delay in the work. Unless other arrangements are made with the Engineer, no items of work pertaining to the submittals shall be permitted until the reviewed submittals are approved.

Submittals shall contain, at a minimum, the following:

a. The Project title and Contract number;
b. Date of submission;
c. Specification Section and the drawing detail to which each shop drawing and/or manufacturer literature is referenced to;

d. All the dates of any previous submission;
e. Clearly marked catalog cut sheets and manufacturer literature to show which model proposed, all pertinent data, capacities, dimensions, clearances, diagrams, paintings, coatings, material list and connections;
f. Shop drawings with field dimensions clearly identified showing the relationship of any item to adjacent materials;
g. Identification of any deviation from the contract documents. If there are any deviations from the contract documents, the Contractor shall submit an approved equivalent material or working drawings in accordance with Section 6-1.05, "Trade Names and Alternatives" of the Standard Specifications for approval by the Engineer.

Payment for conforming to the requirements of this section shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.06** **Certificates of Compliance:** A certificate of compliance shall be furnished for all materials delivered to the work site. Certificates of compliance shall conform to the provisions in Section 6-1.07, "Certificates of Compliance", of the Standard Specifications.

**10-1.07** **Record Drawings and Specifications:** The Contractor shall keep at the project site a copy of the drawings and specifications, including addenda and change orders, to which the Engineer shall have access at all times.

The Contractor shall maintain one (1) set of specifications and full-size plans and mark thereon any deviation from plan dimensions, elevations, or orientations, and all changes rom addenda, change orders, and clarifications. The Contractor shall submit the record drawings in good condition to the Engineer upon completion of Contract work as a condition of acceptance of the work. Marked plans shall be updated at least weekly during construction operations.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.08** **Access to the Site:** Access to the site will be over public and private roads. Contractor shall exercise care in the use of such roads and shall be responsible to repair at Contractor's own expense any damage thereto caused by Contractor's operations. Such repair shall be to the satisfaction of the District or agency having jurisdiction over the road.

Except for the pipeline construction within a private access way, Contractor shall have full use of the project site for construction operations during the construction period. Contractor shall confine construction operations to the Department of Water Resources (DWR) easement and the public right-of-way area as noted on the plans.

Contractor shall maintain safe access for emergency vehicles and authorized parties along the private access road during construction.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.09** **Protection of Property:** All structures, road improvements, utilities, water works and other equipment and material within the vicinity of the project site shall be protected at all times from the Contractor's operations. Any damage to property caused by the Contractor's operations shall be repaired by the Contractor at the Contractor's expense to the satisfaction of the District or agency having jurisdiction.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.10** **Existing Facilities:** Locations of existing utilities, where shown on the plans, are based on available records and are only approximate. The Contractor shall perform pothole/exploratory excavations to identify any potential utility conflicts with the proposed work within the project limits. The Contractor shall assume sole and complete responsibility for locating or having located all underground utilities and other facilities and for protecting the same during the course of constructing the project. Any deviations from the plan location of any existing facilities shall be immediately brought to the attention of the Engineer. Pothole/exploratory excavations shall be backfilled immediately after their purpose has been satisfied and the surface restored in a manner satisfactory to the District.

The following utility companies are known to have existing facilities and/or services within the project limits:

| Company | Contact Person | Phone Number | Utility |
|---|---|---|---|
| DWR | Lincoln King | (916) 653-4389 | SWP pipeline |
| CCWA | John Brady | (805) 688-2292 | SWP operator |
| District | Charlie Berna | (805) 438-5349 | CSA16 waterline |
| AT&T | Neil Zakaria | (805) 546-7012 | Underground conduit |

Underground Service Alert (USA) shall be contacted a minimum of 48 hours prior to the start of construction at (800) 227-2600. Contractor shall provide the USA ticket to the Engineer for verification. Abandoned utilities that interfere with the work of this contract shall be removed and disposed of by the Contractor.

Full compensation for conforming to the requirements of this section, including locating, protecting, or repairing property, removing and disposal of abandoned utilities and coordinating with utility companies shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.11** **Obstructions:** If existing utility or facility obstruction occur at locations other than shown on the Drawings, the Contractor shall notify the Engineer immediately, and a method for correcting said obstructions shall be supplied to the Engineer. Payment for obstructions that are not shown on the plans, nor which may be inferred from surface indications, shall be in accordance with the Special Provisions.

Any necessary relocations of utilities, whether shown on the Drawings or not, shall be coordinated with the affected utility. The Contractor shall perform the relocation only if instructed to do so in writing from the utility and the Engineer.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.12** **General Safety:** Contractor's attention is directed to Section 7-1.09, "Public Safety", of the Standard Specifications. The Contractor shall be responsible for general safety during construction and shall furnish, install and maintain all warning signs and devices necessary to safeguard the public, project personnel and the work.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.13** **Temporary Construction Facilities and Controls:** The Contractor shall provide and/or construct all temporary construction facilities and controls necessary to complete all project work in a safe manner for the public and project personnel; in compliance with all laws, ordinances, codes and regulations; in compliance with all environmental permit conditions and mitigation measures; and in accordance with the Drawings, Standard Specifications and these Special Provisions.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.14** **Mobilization:** Mobilization shall conform to the provisions in Section 11, "Mobilization", of the Standard Specifications and these Special Provisions. Work required for providing submittals identified in Section 4-1.03, "Contract Submittals", of these Special Provisions and not specifically included in other items of work shall be considered part of Mobilization.

**10-1.15** **Construction Site Management:**

10-1.15A General

*Summary*
This work includes controlling potential sources of water pollution before they come in contact with storm water systems or watercourses.

Control material pollution and manage waste and non-stormwater at the job site by implementing effective handling, storage, use, and disposal practices.

For information on documents specified in these Special Provisions, refer to the Department's Preparation Manual, Dewatering Guide, and BMP Manual.

Preparation Manual, Dewatering Guide, and BMP Manual are available from the Department's Construction Storm Water and Water Pollution Control web site at:

http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

*Definitions and Abbreviations*

Active and Inactive areas:

(1) Active areas have soil disturbing work activities occurring at least once within 14 days, and

(2) Inactive areas are areas that have not been disturbed for at least 15 days.

BMP Manual: The Department's Construction Site Best Management Practices (BMP) Manual.

CDPH: California Department of Public Health

Dewatering Guide: The Department's Field Guide to Construction Site Dewatering.

ELAP: Environmental Laboratory Accreditation Program

Minor spills: Small quantities of oil, gasoline, paint, or other material that are small enough to be controlled by a first responder upon discovery of the spill.

MSDS: Material Safety Data Sheet

Preparation Manual: The Department's Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual.

Semi-significant spills: Spills that can be controlled by a first responder with help from other personnel.

Significant or hazardous spills: Spills that cannot be controlled by construction personnel.

WPC: Water Pollution Control

WPC Manager: Water Pollution Control Manager as defined under "Water Pollution Control" of these Special Provisions.

*Submittals*

Submit the following:

1. MSDS at least 5 days before material is used or stored
2. Monthly inventory records for material used or stored
3. Copy of written approval to discharge into a sanitary sewer system at least 5 days before beginning discharge activities

10-1.15B Construction

*Spill Prevention and Control*

Implement spill and leak prevention procedures for chemicals and hazardous substances stored at the job site. If you spill or leak chemicals or hazardous substances at the job site, you are responsible for all associated cleanup costs and related liability.

As soon as it is safe, contain and clean up spills of petroleum products, sanitary and septic waste substances listed under CFR Title 40, Parts 110, 117, and 302.

*Minor Spills*

Clean up minor spills using the following procedures:

1. Contain the spread of the spill
2. Recover the spilled material by absorption
3. Clean the contaminated area
4. Dispose of the contaminated material promptly and properly

*Semi-significant Spills*

Clean up semi-significant spills immediately by the following procedures:

1. Contain the spread of the spill
2. Recover the spilled material using absorption whenever a spill occurs on a paved surface or an impermeable surface
3. Contain the spill with an earthen dike and dig up the contaminated soil for disposal whenever a spill occurs on soil
4. If the spill occurs during precipitation, cover the spill with plastic or other material to prevent contaminated runoff
5. Dispose of the contaminated material promptly and properly

*Significant or Hazardous Spills*

Immediately notify qualified personnel of significant or hazardous spills. Do not let construction personnel attempt to clean up the spill until qualified staff have arrived. Do the following:

1. Notify the Engineer and follow up with a written report
2. Obtain the services of a spills contractor or hazardous material team immediately
3. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept at the job site
4. Notify the Governor's Office of Emergency Services Warning Center at (805) 852-7550
5. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under CFR Title 40, Parts 110, 119, and 302
6. Notify other agencies as appropriate, including:
   - 6.1. Fire Department
   - 6.2. Public Works Department
   - 6.3. Coast Guard
   - 6.4. Highway Patrol
   - 6.5. County Sheriff Department
   - 6.6. Department of Toxic Substances
   - 6.7. California Division of Oil and Gas
   - 6.8. Cal OSHA
   - 6.9. Regional Water Resources Control Board

Report minor, semi-significant, and significant spills to the WPC Manager. The WPC Manager must notify the Engineer immediately. The WPC Manager must oversee and enforce proper spill prevention and control measures.

Prevent spills from entering storm water runoff before and during cleanup. Do not bury spills or wash spills with water.

Keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored.

## 10-1.15C Material Management

*General*

Material must be delivered, used, and stored for this job in a way that minimizes or eliminates discharge of material into the air, storm drain systems, and watercourses.

Implement the practices described under "Material Management" of these Special Provisions while taking delivery of, using, or storing any of the following materials:

1. Hazardous chemicals including acids, lime, glues, adhesives, paints, solvents, and curing compounds
2. Soil stabilizers and binders
3. Fertilizers
4. Detergents
5. Plaster
6. Petroleum materials including fuel, oil, and grease
7. Asphalt components and concrete components
8. Pesticides and herbicides

Employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals.

If practicable, use less hazardous materials.

*Material Storage*

Use the following material storage procedures:

1. Store liquids, petroleum materials, and substances listed in CFR Title 40, Parts 110, 117, and 302 as specified by the Department, and place them in secondary containment facilities.
2. Secondary containment facilities must be impervious to the materials stored there for a minimum contact time of 72 hours.
3. Cover secondary containment facilities during non-working days and when precipitation is predicted. Secondary containment facilities must be adequately ventilated.
4. Keep secondary containment facility free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, collect accumulated liquid and place into drums within 24 hours. Handle these liquids as hazardous waste under "Hazardous Waste" of these Special Provisions unless testing determines them to be nonhazardous.
5. Do not store incompatible materials, such as chlorine and ammonia, in the same secondary containment facility.
6. Store materials in the original containers with the original material labels maintained in legible condition. Replace damaged or illegible labels immediately.
7. Secondary containment facilities must have the capacity to contain precipitation from a 24-hour-long, 25-year storm, and 10 percent of the aggregate volume of all containers, or entire volume of the largest container within the facility, whichever is greater.
8. Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during non-working days and while precipitation is predicted.
9. Provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas must be kept clean, well organized, and equipped with cleanup supplies appropriate for the materials being stored.
10. Repair or replace perimeter controls, containment structures, covers, and liners as necessary. Inspect storage areas before and after precipitation, and at least weekly during other times.

*Stockpile Management*

Use the following stockpile management procedures:

1. Reduce or eliminate potential water pollution from stockpiled material including soil, paving material, and pressure treated wood.
2. Locate stockpiles:
   - 2.1. If within the floodplain, at least 100 feet from concentrated flows of storm water, drainage courses, and inlets unless approved
   - 2.2. If outside the floodplain, at least 50 feet from concentrated flows of storm water, drainage courses, and inlets unless approved

Install WPC practices within 15 days or before predicted precipitation, whichever occurs first.

Active and inactive soil stockpiles must be:

1. Covered with soil stabilization measures, plastic sheeting, or geosynthetic fabric
2. Surrounded with a linear sediment barrier

Portland cement concrete rubble, AC, HMA, AC and HMA rubble, aggregate base or aggregate sub-base stockpiles must be:

1. Covered with plastic sheeting, or geosynthetic fabric
2. Surrounded with a linear sediment barrier

Pressure treated wood stockpiles must be:

1. Placed on pallets
2. Covered with impermeable material

Cold mix asphalt concrete stockpiles must be:

1. Placed on impervious surface
2. Covered with impermeable material
3. Protected from run-on and runoff

Control wind erosion year round under Section 10, "Dust Control" of the Standard Specifications.

Repair or replace linear sediment barriers and covers as needed to keep them functioning properly. If sediment accumulates to 1/3 of the linear sediment barrier height, remove the sediment.

10-1.15D Waste Management

*Solid Waste*

Do not allow litter or debris to accumulate anywhere at the job site, including storm drain grates, trash racks, and ditch lines. Pick up and remove trash and debris from the job site at least once a week. The WPC Manager must monitor solid waste storage and disposal procedures at the job site.

If practicable, recycle nonhazardous job site waste and excess material. If recycling is not practicable, disposal must comply with Section 7-1.13, "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

Furnish enough closed-lid dumpsters of sufficient size to contain any solid waste generated by work activities. When the refuse reaches the fill line, empty the dumpsters. Dumpsters must be watertight. Do not wash out dumpsters at the job site. Furnish additional containers and pick up dumpsters more frequent during the demolition phase of construction.

Solid waste includes:

1. Brick
2. Mortar
3. Timber
4. Metal scraps
5. Sawdust
6. Pipe
7. Electrical cuttings
8. Non-hazardous equipment parts
9. Styrofoam and other packaging materials
10. Vegetative material and plant containers from highway planting
11. Litter and smoking material, including litter generated randomly by the public
12. Other trash and debris

Furnish and use trash receptacles at the job site yard, field trailers, and locations where workers gather for lunch and breaks.

*Hazardous Waste*

Use hazardous waste management practices if waste is generated at the job site from the following substances:

1. Petroleum products
2. Asphalt products
3. Concrete curing compound
4. Pesticides
5. Acids
6. Paints
7. Stains
8. Solvents
9. Wood preservatives and treated posts
10. Roofing tar
11. Road flares
12. Lime
13. Glues and adhesives
14. Materials classified as hazardous by California Code of Regulations, Title 22, Division 4.5; or listed in CFR Title 40, Parts 110, 117, 261, or 302

The WPC Manager must oversee and enforce hazardous waste management practices. Minimize the production of hazardous materials and hazardous waste at the job site. If damaged, repair or replace perimeter controls, containment structures, and covers.

If hazardous material levels are unknown, use a laboratory certified by ELAP under CDPH to sample and test waste to determine safe methods for storage and disposal.

Separate potentially hazardous waste from nonhazardous waste at the job site. Hazardous waste must be handled, stored, and disposed of under California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

Store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated under California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Keep hazardous waste containers in temporary containment facilities under "Material Storage" of these Special Provisions.

Furnish containers with adequate storage volume at convenient locations for hazardous waste collection. Do not overfill hazardous waste containers. Do not mix hazardous wastes. Do not allow potentially hazardous waste to accumulate on the ground. Store containers of dry waste that are not watertight on pallets. Store hazardous waste away from storm drains, watercourses, moving vehicles, and equipment.

Clean water based or oil based paint from brushes or equipment within a contained area and in a way that does not contaminate soil, watercourses, and storm drain systems. Handle and dispose of the following as hazardous waste: paints, thinners, solvents, residues, and sludges that cannot be recycled or reused. When thoroughly dry, dispose of the following as solid waste: dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths.

Dispose of hazardous waste within 90 days of being generated. Use a licensed hazardous waste transporter to take hazardous waste to a Class I Disposal Site. Submit a copy of uniform hazardous waste manifest forms within 24 hours of transporting hazardous waste.

The WPC Manager must inspect the following daily:
1. Storage areas for hazardous materials and wastes
2. Hazardous waste disposal and transporting activities
3. Hazardous material delivery and storage activities

*Contaminated Soil*
Identify contaminated soil from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination must be sampled and tested by a laboratory certified by ELAP.

If levels of contamination are found to be hazardous, handle and dispose of the soil as hazardous waste.

Prevent the flow of water, including ground water, from mixing with contaminated soil by using one or a combination of the following measures:
1. Berms
2. Cofferdams
3. Grout curtains
4. Freeze walls
5. Concrete seal course

If water mixes with contaminated soil and becomes contaminated, sample and test the water using a laboratory certified by ELAP. If levels of contamination are found to be hazardous, handle and dispose of the water as hazardous waste.

*Concrete Waste*
Use practices that will prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Collect and dispose of portland cement concrete, AC, or HMA waste at locations where:
1. Concrete material, including grout, is used
2. Concrete dust and debris result from demolition
3. Sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry
4. Concrete truck or other concrete-coated equipment is cleaned at the job site

*Sanitary and Septic Waste*
Do not bury or discharge wastewater from sanitary or septic systems within County right-of-way. The WPC Manager must inspect sanitary or septic waste storage and monitor disposal procedures at least weekly. Sanitary facilities that discharge to the sanitary sewer system must be properly connected and free from leaks. Place sanitary facilities at least 50 feet away from storm drains, watercourses, and flow lines.

Obtain written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system, and submit a copy to the Engineer. Comply with local health agency provisions while using an on-site disposal system.

*Liquid Waste*
Use practices that will prevent job site liquid waste from entering storm drain systems or watercourses. Liquid wastes include the following:
1. Drilling slurries or fluids
2. Grease-free or oil-free wastewater or rinse water
3. Dredgings, including liquid waste from drainage system cleaning
4. Liquid waste running off a surface including wash or rinse water
5. Other non-stormwater liquids not covered by separate permits

Hold liquid waste in structurally sound, leak proof containers such as:
1. Roll-off bins
2. Portable tanks

Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills and leaks.

Store containers:
1. At least 50 feet from moving vehicles and equipment
2. If within the floodplain, at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

3. If outside the floodplain, at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

Remove and dispose of deposited solids from sediment traps under "Solid Waste" of these Special Provisions unless the Engineer approves another method.

Liquid waste may require testing to determine hazardous material content before disposal.

Drilling fluids and residue must be disposed of outside the highway right-of-way.

If an approved location is available within the job site, fluids and residue exempt under California Code of Regulations, Title 23, Section 2511(g) may be dried by evaporation in a leak proof container. Dispose of remaining solid waste under "Solid Waste" of these Special Provisions.

10-1.15E Non-Storm Water Management

*Water Control and Conservation*
Manage water used for work activities to prevent erosion or discharge of pollutants into storm drain systems or watercourses. Obtain approval before washing anything at the job site with water that could discharge into a storm drain system or watercourse. Report discharges immediately.

If water is used at the job site, implement water conservation practices. Inspect irrigation areas. Adjust watering schedules to prevent erosion, excess watering, or runoff. Shut off water source to broken lines, sprinklers, or valves, and repair breaks within 24 hours. If possible, reuse water from waterline flushing for landscape irrigation. Sweep and vacuum paved areas; do not wash them with water.

Direct job site water runoff, including water from water line repair, to areas where it can infiltrate into the ground and not enter storm drain systems or watercourses. Do not allow spilled water to escape water truck filling areas. If possible, direct water from off-site sources around the job site. Minimize the contact of off-site water with job site water.

*Illegal Connection and Discharge Detection and Reporting*
Inspect the job site and the site perimeter before starting work for evidence of illegal connections, discharges, or dumping. After starting work, inspect the job site and perimeter on a daily schedule.

Whenever illegal connections, discharges, or dumping are discovered, notify the Engineer immediately. Take no further action unless ordered by the Engineer. Assume unlabeled or unidentifiable material is hazardous.

Look for the following evidence of illegal connections, discharges, or dumping:
1. Debris or trash piles
2. Staining or discoloration on pavement or soils
3. Pungent odors coming from drainage systems
4. Discoloration or oily sheen on water

5. Stains or residue in ditches, channels or drain boxes
6. Abnormal water flow during dry weather
7. Excessive sediment deposits
8. Nonstandard drainage junction structures
9. Broken concrete or other disturbances near junction structures

*Vehicle and Equipment Cleaning*

Limit vehicle and equipment cleaning or washing at the job site except what is necessary to control vehicle tracking or hazardous waste. Notify the Engineer before cleaning vehicles and equipment at the job site with soap, solvents, or steam. Contain and recycle or dispose of resulting waste under "Liquid Waste" or "Hazardous Waste" of these Special Provisions, whichever is applicable. Do not use diesel to clean vehicles or equipment, and minimize the use of solvents.

Clean or wash vehicles and equipment in a structure equipped with disposal facilities. If using a structure is not possible, clean or wash vehicles and equipment in an outside area. The outside area must be:

1. Paved with AC, HMA, or concrete paving
2. Surrounded by a containment berm
3. Equipped with a sump to collect and dispose of wash water
4. If within the floodplain, located at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved
5. If outside the floodplain, located at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

When washing vehicles or equipment with water, use as little water as possible. Hoses must be equipped with a positive shutoff valve.

Discharge liquid from wash racks to a recycle system or to another approved system. Remove liquids and sediment as necessary.

The WPC Manager must inspect vehicle and equipment cleaning facilities:

1. Daily if vehicle and equipment cleaning occurs daily
2. Weekly if vehicle and equipment cleaning does not occur daily

*Vehicle and Equipment Fueling and Maintenance*

If practicable, perform maintenance on vehicles and equipment off the job site.

If fueling or maintenance must be done at the job site, designate a site, or sites, and obtain approval before using. Minimize mobile fueling or maintenance.

If vehicle and equipment fueling and maintenance must be done at the job site, areas for the following activities must be:

1. On level ground
2. Protected from storm water run-on

3. If within the floodplain, located at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved
4. If outside the floodplain, located at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

Use containment berms or dikes around the fueling and maintenance area. Keep adequate quantities of absorbent spill cleanup material and spill kits in the fueling and maintenance area and on fueling trucks. Dispose of spill cleanup material and kits immediately after use. Use drip pans or absorbent pads during fueling or maintenance.

Fueling or maintenance activities must not be left unattended. Fueling nozzles must be equipped with an automatic shutoff control. Vapor recovery fueling nozzles must be used where required by the Air Quality Management District. When not in use, nozzles must be secured upright. Do not top-off fuel tanks.

Recycle or properly dispose of used batteries and tires.

The WPC Manager must inspect vehicle and equipment maintenance and fueling areas:
1. Daily when vehicle and equipment maintenance and fueling occurs daily
2. Weekly when vehicle and equipment maintenance and fueling does not occur daily

The WPC Manager must inspect vehicles and equipment at the job site for leaks and spills on a daily schedule. Operators must inspect vehicles and equipment each day of use.

If leaks cannot be repaired immediately, remove the vehicle or equipment from the job site.

*Material and Equipment Used Over Water*
Place drip pans and absorbent pads under vehicles or equipment used over water. Keep an adequate supply of spill cleanup material with the vehicle or equipment. If the vehicle or equipment will be idle for more than one hour, place drip pans or plastic sheeting under the vehicle or equipment on docks, barges, or other surfaces over water.

Furnish watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Secure material to prevent spills or discharge into water due to wind.

*Structure Removal Over or Adjacent to Water*
Do not allow demolished material to enter storm water systems or watercourses. Use approved covers and platforms to collect debris. Use attachments on equipment to catch debris on small demolition activities. Empty debris catching devices daily and handle debris under "Waste Management" of these Special Provisions.

The WPC Manager must inspect demolition sites within 50 feet of storm water systems or watercourses daily.

*Paving, Sealing, Sawcutting, Grooving, and Grinding Activities*
Prevent the following materials from entering storm drain systems or water courses:

1. Cementitious material
2. Asphaltic material
3. Aggregate or screenings
4. Grinding grooving, or sawcutting residue
5. Pavement chunks
6. Shoulder backing
7. Methacrylate

Cover drainage inlets and use linear sediment barriers to protect downhill watercourses until paving, sealing, sawcutting, grooving, or grinding activities are completed and excess material has been removed. Cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

If precipitation is predicted, limit paving, sawcutting, and grinding to places where runoff can be captured.

Do not start seal coat, tack coat, slurry seal, or fog seal activities if precipitation is predicted during the application or curing period. Do not excavate material from existing roadways during precipitation.

Use a vacuum to remove slurry immediately after slurry is produced. Do not allow slurry to run onto lanes open to traffic or off the pavement.

Collect residue from portland cement concrete grinding and grooving activities with a vacuum attachment on the grinding machine. Do not leave any residue on the pavement or allow the residue to flow across the pavement.

If approved, material excavated from existing roadways may be stockpiled under "Stockpile Management" of these Special Provisions.

Do not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

When paving equipment is not in use, park over drip pans or plastic sheeting with absorbent material to catch drips.

*Thermoplastic Striping and Pavement Markers*
Thermoplastic striping and preheating equipment shutoff valves must work properly at all times. Do not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or watercourses. Do not fill a preheating container above a level that is 6 inches below the top. Truck beds must be cleaned daily of scraps or melted thermoplastic.

Do not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or watercourses. Release all pressure from a melting tank

before removing the lid to fill or service. Do not fill a melting tank above a level that is 6 inches below the top.

Collect bituminous material from the roadway after marker removal.

*Pile Driving*
Keep spill kits and cleanup material at pile driving locations. Pile driving equipment must be parked over drip pans, absorbent pads, or plastic sheeting with absorbent material. If precipitation is predicted, protect pile driving equipment by parking on plywood and covering with plastic.

Store pile driving equipment when not in use. Stored pile driving equipment must be:
1. Kept on level ground
2. Protected from storm water run-on
3. If within the floodplain, at least 100 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved
4. If outside the floodplain, at least 50 feet from concentrated flows of storm water, drainage courses, watercourses, and storm drain inlets unless approved

If practicable, use vegetable oil instead of hydraulic fluid.

The WPC Manager must inspect the pile driving area for leaks and spills:
1. Daily when pile driving occurs daily
2. Weekly when pile driving does not occur daily

*Concrete Curing*
Do not overspray chemical curing compound. Minimize the drift by spraying as close to the concrete as possible. Cover drainage inlets before applying the curing compound.

Minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture while curing concrete.

*Concrete Finishing*
Collect and dispose of water and solid waste from high-pressure water blasting. Cover drainage inlets within 50 feet before sandblasting. Minimize drift of dust and blast material by keeping the nozzle close to the surface of the concrete. The blast residue may contain hazardous material.

Inspect concrete finishing containment structures for damage before each day of use and before predicted precipitation. Remove liquid and solid waste from containment structures after each work shift.

Sweeping
Sweeping must be done using hand or mechanical methods such as vacuuming.

Monitor paved areas and roadways within the job site for sediment and debris generating activities such as:
1. Clearing and grubbing

2. Earthwork
3. Trenching
4. Roadway structural section work
5. Vehicles entering and leaving the job site
6. Soil disturbing work
7. Work that causes offsite tracking of material

If sediment or debris is observed, perform sweeping:

1. Within:
   1.1. 8 hours of predicted rain
   1.2. 24 hours unless the Engineer approves a longer period
2. On paved roads at job site entrances and exit locations
3. On paved areas within the job site that flow to storm drains or receiving waters

You may stockpile collected material at the job site. Remove collected material including sediment from paved shoulders, drain inlets, curbs and dikes, and other drainage areas. If stockpiled, dispose of collected material at least once per week.

You may dispose of sediment within the job site that you collected during sweeping activities. Protect disposal areas against erosion.

Remove and dispose of trash collected during sweeping under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way" of the Standard Specifications.

*Dewatering*

Dewatering consists of discharging accumulated storm water, ground water, or surface water from excavations or temporary containment facilities.

If dewatering and discharging activities are specified under a work item such as "Temporary Active Treatment System" or "Dewatering and Discharge," perform dewatering work as specified in the section involved.

If dewatering and discharging activities are not specified under a work item and you will be performing dewatering activities, you must:

1. Submit a Dewatering and Discharge Plan under Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and "Water Pollution Control" of these Special Provisions at least 10 days before starting dewatering activities. The Dewatering and Discharge Plan must include:
   1.1. Title sheet and table of contents
   1.2. Description of dewatering and discharge activities detailing locations, quantity of water, equipment, and discharge points
   1.3. Estimated schedule for dewatering and discharge (start and end dates, intermittent or continuous)
   1.4. Discharge alternatives such as dust control or percolation
   1.5. Visual monitoring procedures with inspection log
2. Conduct dewatering activities under the Department's "Field Guide for Construction Dewatering."

3. Ensure that any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials.
4. Discharge the water within the project limits. Dispose of the water in the same way as specified for material in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specification if it cannot be discharged within project limits due to site constraints.
5. Do not discharge storm water or non-stormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Notify the Engineer immediately upon discovering any such condition.

The WPC manager must inspect dewatering activities:
1. Daily when dewatering work occurs daily
2. Weekly when dewatering work does not occur daily

Payment: Full compensation for construction site management, including furnishing all labor, materials, tools, equipment, and incidentals and for fully complying with the provisions in this section and for doing all the work involved in spill prevention and control, material management, waste management, non-storm water management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste resulting from contractor activities, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, shall be considered as included in the contract price paid for the various items of work involved and no separate payment will be made therefor.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

## *10-1.01* **Water Pollution Control:**

### 10-1.01A General:

Summary
Water pollution control work applies to projects where work activities result in less than 1 acre of soil disturbance. Manage work activities to reduce the discharge of pollutants to surface waters, groundwater, or municipal separate storm sewer systems including contract work item for Prepare Water Pollution Control Program. Water Pollution Control Program (WPCP) preparation includes obtaining WPCP acceptance, amending the WPCP, and installation, maintenance, monitoring, and inspecting water pollution control practices at the job site.

Do not begin work until the WPCP is accepted.

Definitions and Abbreviations
active and inactive areas: (1) Active areas have soil disturbing work activities occurring at least once within 14 days, and (2) Inactive areas are areas that have not been disturbed for at least 15 days.
BMPs: Best Management Practices are water pollution control practices.

construction phase: Construction phases are (1) Highway Construction including work activities for building roads and structures, (2) Plant Establishment including maintenance on vegetation installed for final stabilization, and (3) Suspension where work activities are suspended and areas are inactive.

Preparation Manual: The Department's "Storm Water Pollution Prevention Plan and Water Pollution Control Program Preparation Manual."

NPDES: National Pollutant Discharge Elimination System

RWQCB: Regional Water Quality Control Board

SWPPP: Storm Water Pollution Prevention Plan

SWRCB: State Water Resources Control Board

Water Pollution Control Manager: The Water Pollution Control Manager implements water pollution control work described in the WPCP and oversees revisions and amendments to the WPCP.

WPCP: Water Pollution Control Program

Submittals

Within 10 calendar days, not including Saturdays, Sundays, and legal holidays, of receipt of the executed contract, start the following process for WPCP acceptance:

1. Submit 2 copies of the WPCP and allow 5 days for the Engineer's review. If revisions are required, the Engineer provides comments and specifies the date that the review stopped.
2. Change and resubmit the WPCP within 5 days of receipt of the Engineer's comments. The Engineer's review resumes when the complete WPCP is resubmitted.
3. When the Engineer accepts the WPCP, submit an electronic and 3 printed copies of the accepted WPCP.

Submit:

1. Stormwater training records including training dates and subject for employees and subcontractors. Include dates and subject for ongoing training, including tailgate meetings.
2. Employee training records:
   - 2.1. Within 5 days of WPCP acceptance for existing employees
   - 2.2. Within 5 days of training for new employees
   - 2.3. At least 5 days before subcontractors start work for subcontractor's employees

Submit as required:

1. BMP Status Report
2. Inspection Reports

At least 5 days before operating any construction support facility:

1. Submit a plan showing the location and quantity of water pollution control practices associated with the construction support facility
2. If you will be operating a batch plant or a crushing plant under the General Industrial Permit, submit a copy of the NOI approved by the RWQCB and the WPCP approved by the RWQCB.

Quality Control and Assurance:

*Training*

Provide storm water training for:

1. Project managers
2. Supervisory personnel
3. Employees involved with water pollution control work

Train all employees, including subcontractor's employees, in the following subjects:

1. Water pollution control rules and regulations
2. Implementation and maintenance for:
   2.1. Temporary Soil Stabilization
   2.2. Temporary Sediment Control
   2.3. Tracking Control
   2.4. Wind Erosion Control
   2.5. Material pollution prevention and control
   2.6. Waste management
   2.7. Non-storm water management
   2.8. Identifying and handling hazardous substances
   2.9. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances

Employees must receive initial water pollution control training before working on the job.

Conduct weekly training meetings covering:

1. Water pollution control BMPs deficiencies and corrective actions
2. BMPs that are required for work activities during the week
3. Spill prevention and control
4. Material delivery, storage, use, and disposal
5. Waste management
6. Non-storm water management procedures

You may obtain copies of the Preparation Manual from the Publication Distribution Unit. The mailing address for the Publication Distribution Unit is:

State of California
Department of Transportation
Publication Distribution Unit
1900 Royal Oaks Drive
Sacramento, California 95815
Telephone: (916) 445-3520

For the Preparation Manual and other water pollution control references, go to the Department's "Construction Storm Water and Water Pollution Control" web site at:

http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm

If you operate construction support facilities, protect storm water systems or receiving waters from the discharge of potential pollutants by using water pollution control practices.

Construction support facilities include:

1. Staging areas
2. Storage yards for equipment and materials
3. Mobile operations
4. Batch plants for PCC and HMA
5. Crushing plants for rock and aggregate
6. Other facilities installed for your convenience such as haul roads

If you operate a batch plant to manufacture PCC, HMA, or other material; or a crushing plant to produce rock or aggregate; obtain coverage under the General Industrial Permit. You must be covered under the General Industrial Permit for batch plants and crushing plants located:

1. Outside of the job site
2. Within the job site that serve one or more contracts

Discharges from manufacturing facilities such as batch plants must comply with the general waste discharge requirements for Order No. 97-03-DWQ, NPDES General Permit No. CAS000001, issued by the SWRCB for "Discharge of Stormwater Associated with Industrial Activities Excluding Construction Activities." The General Industrial Permit is available at:

http://www.waterboards.ca.gov/

Water Pollution Control Manager

The Contractor shall designate in writing a Water Pollution Control Manager (WPCM). The Contractor shall submit a statement of qualifications describing the training, work history, and expertise of the proposed WPCM. The WPCM must have at least one of the following qualifications:

1. Certified Erosion, Sediment and Storm Water Inspector (CESSWI)™ registered through Enviro Cert International, Inc.
2. Certified Inspector of Sediment and Erosion Control (CISEC) registered through CISEC, Inc.
3. Qualifications described in the Permit (Order No. 2009-009-DWQ, NPDES No. CAS000002) for a QSD.
4. Department approved storm water management training described in the Department's "Construction Storm Water and Water Pollution Control" web site

At the job site, the Water Pollution Control Manager must:

1. Be responsible for water pollution control work
2. Be the primary contact for water pollution control work
3. Oversee the maintenance of water pollution control practices

4. Oversee and enforce hazardous waste management practices
5. Have the authority to mobilize crews to make immediate repairs to water pollution control practices
6. Ensure that all employees have current water pollution control training
7. Implement the accepted WPCP and amend the WPCP when required

Water Pollution Control Manager must oversee:

1. Inspections of water pollution control practices identified in the WPCP
2. Inspections for visual monitoring

You may designate one manager to prepare the WPCP and a different manager to implement the plan. The WPCP preparer shall meet the training requirements for the WPCM.

10-1.01B Water Pollution Control Program:

The work includes preparing a WPCP, obtaining WPCP acceptance, amending the WPCP, and reporting on water pollution control practices at the job site. The WPCP must comply with the Preparation Manual. The WPCP is required by the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, and these Special Provisions.

You may request, or the Engineer may order, changes to the water pollution control work. Changes may include addition of new water pollution control practices. Additional water pollution control work is change order work.

The WPCP must include water pollution control practices:

1. For storm water and non-stormwater from areas outside of the job site related to project work activities such as:
   1.1. Staging areas
   1.2. Storage yards
   1.3. Access roads
2. For activities or mobile operations related to contractor obtained NPDES permits
3. Construction support facilities

The WPCP must include a copy of permits obtained by the County such as Fish & Game permits, US Army Corps of Engineers permits, RWQCB 401 Certifications, and RWQCB Waste Discharge Requirements for Aerially Deposited Lead Reuse.

WPCP Amendments
You must amend the WPCP when:

1. Changes in work activities could affect the discharge of pollutants
2. Water pollution control practices are added by change order work
3. Water pollution control practices are added by your discretion

If you amend the WPCP, follow the same process specified for WPCP acceptance.

Retain a printed copy of the accepted WPCP at the job site.

WPCP Schedule
The WPCP schedule must:

1. Describe when work activities will be performed that could cause the discharge of pollutants in storm water
2. Describe water pollution control practices associated with each construction phase
3. Identify soil stabilization and sediment control practices for disturbed soil areas

10-1.01C Implementation Requirements:

Monitor the National Weather Service Forecast Office on a daily basis. For forecasts, go to:

http://www.srh.noaa.gov/forecast

Whenever you or the Engineer identifies a deficiency in the implementation of the accepted WPCP:

1. Correct the deficiency immediately, unless the Engineer authorizes an agreed date for correction
2. Correct the deficiency before precipitation occurs

If you fail to correct the deficiency by the agreed date or before the onset of precipitation, the County may correct the deficiency and deduct the cost of correcting the deficiency from payment.

If you fail to comply with "Water Pollution Control" of these Special Provisions, the Engineer will order a suspension of work until the project complies with the requirements of "Water Pollution Control" of these Special Provisions.

The Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications.

Install water pollution control practices within 15 days or before predicted precipitation, whichever occurs first.

If actions for your convenience disturb one or more acres, you must pay all costs and be responsible for all delays associated with complying with Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002) issued by the SWRCB for "Storm Water Discharges Associated with Construction and Land Disturbance Activities." The General Permit is available at:

http://www.waterboards.ca.gov/

Inspection
The Water Pollution Control Manager must oversee inspections for water pollution control practices identified in the WPCP:

1. Before a forecasted storm
2. After precipitation that causes site runoff
3. At 24-hour intervals during extended precipitation
4. On a predetermined schedule, a minimum of once a week

The Water Pollution Control Manager must oversee daily inspections of:

1. Storage areas for hazardous materials and wastes
2. Hazardous waste disposal and transporting activities
3. Hazardous material delivery and storage activities
4. Water pollution control practices specified under "Construction Site Management" of these Special Provisions

The Water Pollution Control Manager must use the Storm Water Site Inspection Report provided in the Preparation Manual.

The Water Pollution Control Manager must prepare BMP status reports that include the following:

1. Location and quantity of installed water pollution control practices
2. Location and quantity of disturbed soil for the active or inactive areas

Within 24 hours of finishing the weekly inspection, the Water Pollution Control Manager must submit:

1. Copy of the completed site inspection report
2. Copy of the BMP status report

Reporting Requirements
If the following occur, notify the Engineer within 6 hours:

1. You identify discharges into receiving waters or drainage systems causing or potentially causing pollution
2. The job receives a written notice or order from a regulatory agency

No later than 48 hours after the conclusion of a storm event resulting in a discharge, a non-stormwater discharge, or receiving the notice or order, submit:

1. Date, time, location, and nature of the activity, type of discharge and quantity, and the cause of the notice or order
2. Water pollution control practices used before the discharge, or before receiving the notice or order
3. Description of water pollution control practices and corrective actions taken to manage the discharge or cause of the notice

10-1.01D Payment:

If you fail to comply with "Water Pollution Control" of these Special Provisions or fail to implement water pollution control practices during each estimate period, the County withholds 25 percent from progress payment.

Withholds for failure to perform water pollution control work are in addition to all other withholds provided for in the contract. The County returns performance-failure withholds in the progress payment following the correction for noncompliance.

Full compensation for Water Pollution Control, including furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining acceptance of, and amending the WPCP and inspecting water pollution control practices as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, shall be included in the contract price paid for the various items of work involved and no separate payment will be made therefor.

**10-1.16** **Construction Area Signs:** Construction area signs shall conform to the provisions of Section 12, "Construction Area Traffic Control Devices", of the Standard Specifications and these Special Provisions.

The Contractor shall furnish all sign panels, posts and hardware. The Contractor shall also erect and maintain all construction area signs shown on the plans and/or specified in these Special Provisions. The Contractor is responsible for having any underground utilities marked where sign posts will be placed. Construction area signs shall not be used until they are needed and when no longer need, they shall be removed from the site of the work by the Contractor.

The base material of construction area signs shall not be plywood. Used sign panels in good repair, as determined by the Engineer, may be used. If determined by the Engineer, signs damaged by any cause shall be repaired or replaced by the Contractor at the Contractor's own expense.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.17** **Traffic Control System**: Contractor shall be responsible for all traffic control measures and/or devices needed to provide and maintain safe access to the travelling public on roadways adjacent to the project site. Contractor shall maintain free access to all fire hydrants, water valves and meters, private driveways and farm roads.

One-way traffic shall be controlled through the project in accordance with the Standard Plan titled, "Traffic Control System for Lane Closure of Two Lane Conventional Highway," and these Special Provisions. The Contractor shall utilize flaggers for one-way traffic.

If any component in the traffic control system is damaged, displaced or ceases to operate or function as specified, from any cause during the progress of the work, the Contractor shall immediately repair said component to its original condition, or replace said component, and shall restore the component to its original location.

When lane closures are made for work periods only, all components of the traffic control system except portable delineators placed along open trenches or excavations adjacent to the travelled way, shall be removed from the travelled way, shoulder and auxiliary lanes at the end of each work period. If the Contractor so elects, the components of the traffic control system may be stored at selected central locations, approved by the Engineer, within the limits of the highway right of way.

Upon completion of the work requiring lane closure, all components of the traffic control system shall be removed from the site of the work by the Contractor.

Any traffic control system that is required by work which is classed as extra work, as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications, will be paid for as part of said extra work.

The contract lump sum price paid for "**TRAFFIC CONTROL SYSTEM**" shall include full compensation for furnishing all labor (except for flagging costs), materials (including signs), tools, equipment, and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing and disposing of the components of the traffic control system shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Flagging cost will be paid for as provided in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

**10-1.18** **Construction Water:** The District will permit the Contractor to use water free of charge for construction operations on this project only. Contractor may obtain construction water by filling water trucks from a fire hydrant of the District's choosing located in the town of Shandon. If it is determined by the Engineer that Contractor's use of water is excessive or wasteful, the District will charge the Contractor for water usage at a rate to be determined at the time of the Engineer's determination.

Full compensation for obtaining, pumping, transporting and applying construction water shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.19** **Electrical Power:** The Contractor shall furnish all power required for performance of all the work in this contract.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.20** **Sanitary Facilities:** The Contractor shall supply and maintain adequate toilet facilities at or near the work site. All sanitary facilities shall be removed from the site when work is complete.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.21** **Staging / Storage Areas:** Contractor shall use staging/storage areas shown on the Drawings. Contractor shall supply all materials required to construct staging/storage areas in accordance with the Contractor's needs. If said materials are not available on site, Contractor shall import said materials. All project equipment and materials shall be stored, maintained and refueled within an approved designated staging/storage area.

If the Contractor's operations require additional staging/storage space, Contractor may propose additional site(s) to be designated as staging and storage areas. All such additional sites shall be approved by the Engineer prior to use. Contractor shall be responsible for making arrangements for the use of all additional staging/storage areas in accordance with all local, State and Federal regulations at his/her own expense.

Contractor shall remove all staging/storage areas at the completion of work and shall restore areas to pre-existing grades and conditions.

Full compensation for set-up, maintenance and tear down of the staging/storage areas shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.22** **Cast-in Place Concrete:** Contractor's attention is directed to Section 51-1.02, "Minor Structures", of the Standard Specifications. Concrete mix design for all structures and concrete not otherwise specified on the plans shall have a 28-day compressive strength of 4,000 pounds per square inch (psi) and a minimum cement content of 564 pounds per cubic yard.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.23** **Security:** The Contractor shall, at all times, be responsible for security of their plant, construction materials, tools and equipment. Materials and equipment shall be stored so as to ensure the preservation of their quality and fitness for the work. The Contractor shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment supplied by the Contractor, until completion and final acceptance of the project work by the Engineer.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

**10-1.24** **Mobilization/Demobilization:** Mobilization shall conform to the provisions in Section 11, "Mobilization", of the Standard Specifications and these Special Provisions.

Prior to final demobilization from the worksite, Contractor shall remove from the vicinity of the completed work and adjacent property and streets, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. All parts of the work shall be left in a neat and presentable condition. All disturbed areas and surfaces shall be returned to their

original condition unless otherwise shown on the plans or specified in these Special Provisions.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

The contract lump sum price paid for **"MOBILIZATION/DEMOBILIZATION"** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the establishment of other facilities necessary for work on the project; and for all other work and operations which must be performed or costs incurred prior to beginning work on the various contract items on the project site, including but not limited to, submittal of a detailed construction schedule and schedule of values; and for final site clean-up and restoration as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.25** **Trench Safety:** The Contractor, prior to beginning any trench or structure excavation five (5) feet deep or over, shall submit to the Engineer and shall be in receipt of the Engineer's written acceptance of the Contractor's detailed plan showing design of all shoring, bracing, sloping of the sides of excavation, or other provisions for worker protection against the hazard of caving ground during the excavation of such trenches or structure excavation.

The Contractor's attention is directed to the provisions for "Shoring and Bracing Drawings" in Section 6705 of the California Labor Code. If such plan varies from the shoring system standards established in the Construction Safety Orders of the State of California, such alternative systems shall be prepared by a Civil or Structural Engineer licensed in the State of California.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

The contract lump sum price paid for **"SHEETING AND SHORING FOR WORKER PROTECTION"** shall include full compensation for furnishing all engineering documents and approvals, labor, materials, tools, equipment, and incidentals and for doing all the work involved in trench safety including, but not limited to, those necessary for the movement of personnel, equipment, supplies and incidentals to the project site; for the installation and removal of trench safety materials, as specified in the Standard Specifications, these Special Provisions and no additional compensation will be allowed therefor.

**10-1.26** **Turnout Connection:** Construction of the CSA 16 State Water Project (SWP) Turnout Connection shall conform to the Contract Drawings, the Standard Specifications and these Special Provisions, including Section 10-2, "Technical Specifications".

Constructed pipelines will be located substantially as indicated on the Drawings, but the right is reserved by the District to make such modifications in location as may be found to be desirable to avoid interference with existing structures. Where fittings, etc., are noted on the Drawings, such notations are for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

Small interior piping is indicated diagrammatically on the Drawings, and the exact location is to be determined in the field. Piping shall be arranged in a neat, compact, and workmanlike manner, with a minimum of crossing and interlacing, so as not to interfere with equipment or access ways, and, in general, without diagonal runs.

All open excavations shall be adequately safeguarded by providing the necessary construction area signs, and other means to prevent accidents to persons and damage to property, and in accordance with applicable occupational health and safety regulations. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by workmen. The length and size of excavations shall be controlled by the particular surrounding conditions and as necessary to complete the work. If the excavation becomes, or may become a hazard, or excessively restricts traffic at any point, District may require special construction procedures such as limiting the length of the open trench, prohibiting the location of stacked excavated material, and requiring that the trench shall not remain open overnight.

The contract lump sum price paid for **"CSA 16 - SWP TURNOUT CONNECTION"** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparatory work, construction, installation, testing and operational start-up of a new fully functioning State Water Project turnout connection, including, meter vault, control room building, installation of small diameter pipe and valves, service meters, trenching, backfilling, installation of chain link fence, concrete foundations, instrumentation, including flow meters, electrical service planning, application and extension to project site, process control equipment and instrumentation, programmable logic controls, fiber optic equipment, a remote terminal unit, associated site improvements, and all appurtenant work and materials, in accordance with the Contract Drawings, the Standard Specifications, these Special Provisions (including Section 10-2, "Technical Specifications") and as directed by the Engineer.

## 2.54. TESTING PIPELINES

The pressure tests and leakage tests will be performed at the same time.

After the valves have been installed, the pipeline shall be filled with water for a minimum of 24 hours and then subjected to a hydrostatic pressure test. Unless otherwise specified, the test pressure is measured at the lowest elevation of the system. The pressure test will be made after backfilling has been completed but before placement of permanent paving. A test shall be made only after all backfilling has been completed and at least 36 hours after the last concrete thrust or reaction backing has been cast with high early strength cement, or at least 7 days after the last concrete thrust or reaction backing has been cast with

standard cement. The duration of the test shall be 2 hours unless otherwise directed by the Engineer.

Pressure Testing Plan: Contractor shall submit a pressure testing plan, satisfactory to the Engineer, a minimum of 48 hours prior to the beginning of any pressure testing. The plan shall show location to be tested, sequence of testing, location of temporary components for testing, segments isolated, and other relevant testing information.

Procedure: Each section or pipeline shall be slowly filled with water, and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The pump, pipe connection(s) and all necessary apparatus except the water meter shall be furnished by the Contractor.

All pressure gauges shall be approved by the Engineer.

During the filling of the pipe and before the application of the specified test pressure, all air shall be expelled from the pipeline if necessary, by means of taps at points of highest elevation, and, after completion of the test, the taps shall be tightly plugged, unless otherwise specified. During the test, all exposed pipe, fittings, valves, hydrants, and PVC couplings shall be carefully examined. All cracked or defective elements shall be removed and replaced by the Contractor at his/her expense. The test shall then be repeated until the results are satisfactory to the Engineer.

Pressure testing against valves shall not be allowed.

Payment for pressure testing including furnishing all labor, materials, tools, equipment, incidentals and all work involved in pressure testing of the installed system, complete in place, including but not limited to, preparation of testing plan, testing appurtenances, services, and testing laterals as shown on the Plans, and as specified in these Technical Specifications, and as directed by the Engineer, shall be considered as included in the contract price paid for the various items of work require pressure testing, and no separate payment will be made therefor.

## 2.55. DISINFECTION, FLUSHING, BACTERIOLOGICAL TESTING, CONNECTION TO DISTRIBUTION, AND DOCUMENTATION

The Contractor shall disinfect, dechlorinate (if necessary), drain, and dispose of heavily chlorinated water. The Contractor shall submit a disinfection plan to the Engineer for review and approval prior to beginning the disinfection procedure.

Bacteriological and physical samples will not be collected until pressure and leakage testing has been completed and approved by the Engineer.

The Contractor shall provide a minimum of 48 hours advance notice to the Engineer prior to the scheduled time sampling is requested.

County staff will collect samples and provide bacteriological and physical analysis. The cost of the initial sampling and analysis shall be paid by the County. In the event that follow-up analyses are required due to unacceptable test results, the Contractor will be liable for all costs associated with the follow-up sampling and analysis.

Direct connection to the existing water system shall not be permitted until the newly installed portion has passed bacteriological and physical testing. Maintain air gap per San Luis Obispo County 2011 Standard Drawing W-9 and per AWWA C651.

DISINFECTION

Disinfection shall be in accordance with the San Luis Obispo County Department of Public Works Procedural Memorandum O-3 (Revised 15 July 2002), included in these Technical Specifications. Chlorination will be accomplished using the continuous feed method. The section of pipeline to be chlorinated shall be filled entirely with water. Liquid Sodium hypochlorite solution conforming to ANS1/AWWA B300 standards shall be fed at or before the entry point in an amount sufficient enough to produce not less than 25 mg/L of free chlorine residual throughout the new pipeline and its appurtenances. The chlorinated water shall be retained in the main for a minimum of 24 hours. At the end of the 24 hour period, the chlorinated water in all portions of the main shall have a free chlorine residual of not less than 10 mg/L.

FLUSHING

Heavily chlorinated water shall be flushed from the main following the required minimum 24 hour contact time period. All main fittings, valves, and branches must be flushed. The chlorinated water shall be flushed until chlorine measurements show that the concentration of free chlorine in the exiting water is not higher than the water in the distribution system (typically 2.0 mg/L).

If the disposal of heavily chlorinated water will cause damage to the environment or a waterway, then enough of a neutralizing chemical shall be applied to the water to be discharged so that no free chlorine residual is detected. Approved neutralization techniques must be used in accordance with AWWA C6501-05, Appendix C.

Any discharge created from dechlorination, flushing, pumping, or dewatering shall be in accordance with the California Regional Water Quality Control Board NPDES Permit for Discharges with Low Threat to Water Quality, Receiving Water Limitations. Any discharge shall not cause the following limits to be exceeded in the receiving water.

TABLE 2: DISCHARGES WITH LOW THREAT TO WATER QUALITY, RECEIVING WATER LIMITATIONS

| CONSTITUENT | MAXIMUM OR RANGE |
|---|---|
| Total Chlorine Residual | Must not be detected |
| pH | Between 7.0 and 8.3 at all times, and not changed more than 0.5 units |

| | |
|---|---|
| Temperature | Maximum increase of 5°F |
| Colour | Maximum increase of 15 colour units |
| Dissolved Oxygen | Not to be depressed below 5.0 mg/L |
| Where upstream water turbidity is... | The receiving water shall not be increased more than... |
| Less than 25 NTUs | 5 NTUs |
| 25 – 50 NTU | 20% |
| 50 – 100 NTU | 10 NTUs |
| Greater than 100 NTU | 10% |

BACTERIOLOGICAL ANALYSIS

Bacteriological samples will be collected and analyzed by County staff following the SLO County Procedural Memorandum O-3. Bacteriological analysis on water in the new pipeline shall be done after flushing but before it is connected to the distribution system. Two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new pipeline. At least one set of samples shall be collected from every 1200 feet of the new pipeline, plus one set from the end of the line and at least one set from each branch. The results for total coliform and E. coli must be negative (no coliform present) and hetrotrophic plate counts must be less than 500 CFU/mL before connecting the new pipeline and releasing water for use by customers.

TABLE 3: BACTERIOLOGICAL ACCEPTANCE LIMITS

| CONSTITUENT | ACCEPTANCE LIMIT |
|---|---|
| Total coliform/E. coli | <1 MPN / 100 mL |
| Heterotrophic Plate Count (HPC) | < 500 CFU / mL |

If sample results indicate the presence of coliforms or an HPC > 500 CFU / mL, flushing shall be resumed and additional sets of coliform and HPC samples shall be collected until 2 sets (collected at least 24 hours apart), show the absence of coliforms and HPCs < 500 CFU / mL.

PHYSICAL ANALYSIS

Physical samples will be collected and analyzed by County staff. Sample location and frequency will be determined by County staff.

TABLE 4: PHYSICAL ACCEPTANCE LIMITS

| CONSTITUENT | ACCEPTANCE LIMIT | MAXIMUM CONTAMINANT LIMIT |
|---|---|---|
| Odor | < 3 TON | 3 TON |
| Turbidity | < 1 NTU | 5 NTU |
| Colour | < 15 CU | 15 NTU |

SAMPLES

Samples shall be collected by the Contractor on working days (Monday through Friday) and shall arrive at the Lab no later than 3:00 PM (Monday – Thursday)

and no later than 12:00 noon on Fridays. Results for coliform testing will be available within 24 hours. Other test results will be available with 48 hours.

NOTIFICATION PROCEDURE

Notification of analytical results shall be in accordance with the San Luis Obispo County Department of Public Works Procedural Memorandum O-3, Notification Procedure.

CONNECTION TO DISTRIBUTION SYSTEM

When all bacteriological and physical test results are satisfactory and approved by the Distribution Operator and the Engineer, the new pipeline may be connected to the distribution system and placed in service.

DROP IN PRESSURE

If at any time, the system pressure drops to less than five (5) psi, bacteriological samples shall be collected from water representative of the water quality in the affected portions of the system.

DOCUMENTATION

Accurate records shall be made by the Contractor to document the pipeline installation conditions and chlorine residual data. The records should include documentation of the date/time of any disinfection, flushing, sample collection, and/or connection to the distribution system. The records should identify who performed the work and who release the pipeline for service.

A record must be maintained of any discharged created. The record must document the volume of the discharge and location and description of the receiving area. Discharge records must include documentation of dechlorination and on-going confirmation that no total chlorine residual has been detected throughout the discharge event. In the event that the discharge enters surface water, analytical results of the NPDES Discharge Permit requirements must be documented.

PAYMENT

Full compensation for "DISINFECTION, FLUSHING, BACTERIOLOGICAL TESTING, CONNECTION TO DISTRIBUTION, AND DOCUMENTATION", including furnishing all labor, materials, tools, equipment and incidentals and for doing all the work involved in disinfecting the installed system, complete in place, including but not limited to, preparation of disinfection plan, sample collection, dechlorination, flushing, disposal of dechlorinated water, and chlorine swabbing of connection fittings shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.27** **Final Site Clean-up:** Prior to final demobilization from the worksite, Contractor shall remove from the vicinity of the completed work and adjacent property and streets, all

rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. All parts of the work shall be left in a neat and presentable condition. All disturbed areas and surfaces shall be returned, at least, to their original condition unless otherwise shown on the plans or specified in these Special Provisions.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

# SECTION 10-2 TECHNICAL SPECIFICATIOINS

SECTION 10-2. TECHNICAL SPECIFICATIONS

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions.

1.02 PROJECT INFORMATION:

A. Owner's Representative: John Brady, PE, Operations Manager 805.688.2292

B. AECOM: Douglas M. Hahn, PE – 805.764.4060

1.03 WORK COVERED BY CONTRACT DOCUMENTS:

A. The Work of Project is defined by the Contract Documents and consists of the following:

The construction of the Shandon State Water Turnout including, but not limited to, the installation of a new meter vault, control room building, installation of small diameter pipe and valves, concrete foundations, instrumentation, and site improvements.

B. Type of Contract:

Project will be constructed under a single prime contract.

1.04 ACCESS TO SITE:

A. General: Except for the pipeline connection within a private access way, Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

Limits: Confine construction operations to the Owner's easement and the public right-of-way and to the areas noted on the drawings.

Access Road: Contractor shall maintain safe access for emergency vehicles and authorized parties along the private access road during construction.

1.05 WORK RESTRICTIONS:

A. Work Restrictions, General: Comply with restrictions on construction operations.

Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site work hours are limited to 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.

1. Weekend Hours: None.
2. Early Morning Hours: None.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others.

1.06 SPECIFICATION AND DRAWING CONVENTIONS:

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SCOPE OF WORK:

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 DEFINITIONS:

A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

C. Standard Product Warranties and Special Warranties shall start on the date established as the date of Substantial Completion.

1.03 RELATED WORK:

A. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.

B. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Division 2 through 48.

C. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

1.04 SUBMITTALS:

A. Submit written warranties to the Owner prior to the date fixed by the Owner for Substantial Completion. If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Owner.

B. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period,

submit properly executed warranties to the Owner within fifteen days of completion of that designated portion of the Work.

C. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for acceptance prior to final execution.

D. Refer to individual Sections of Divisions 2 through 48 for specific content requirements, and particular requirements for submittal of special warranties.

E. At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Contract Documents.

F. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-inch by 11-inch paper.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Contract Documents, with each item identified with the number and title of the specification Section in which specified, and the name of the product or work item.

H. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer, supplier, and manufacturer.

I. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name, address, and telephone numbers of the Contractor and equipment supplier.

J. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

1.05 WARRANTY REQUIREMENT:

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.

E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

G. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

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SECTION 02 01 30

CONNECTIONS TO EXISTING BURIED PIPELINES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Connecting to Existing Buried Pipelines

Tapping existing buried pipelines.

1.02 REFERENCES:

A. American Society of Mechanical Engineers (ASME):

1. B16.1: AN Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800

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

1. A36: Standard Specification for Carbon Structural Steel

2. A325: Standard Specification for Structural Bolts, Steel, Heat-Treated 120/105 ksi Minimum Tensile Strength

3. A325M: Standard Specification for Structural Bolts, Steel, Heat-Treated 830 MPa Minimum Tensile Strength (Metric)

4. A536: Standard Specification for Ductile Iron Castings

C. American Water Works Association (AWWA):

1. C110: Ductile Iron and Gray Iron Fittings
2. C153: Ductile-Iron Compact Fittings for Water Service
3. C213: Fusion Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines
4. C223: Fabricated Steel and Stainless Steel Tapping Sleeves
5. C509: Resilient Seated Gate Valves for Water Service
6. C550: Protective Interior Coatings for Valves and Hydrants
7. C800: Underground Service Line Valves and Fittings

D. Manufacturer's Standardization Society (MSS):

1. SP-60: Connecting Flange Joint Between Tapping Sleeves and Tapping Valves
2. SP-111: Gray Iron and Ductile Iron Tapping Sleeves
3. SP-113: Connection Joint Between Tapping Machine and Tapping Valve

E. NSF International (NSF):

61: Drinking Water System Components Health Effects

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01 33 00.

Manufacturer's catalog data for products to be used.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Tapping Sleeves for tapping outlets 2-inch to 12-inch diameter for Ductile Iron, Steel, Asbestos Cement, and PVC Pipe:

1. Manufacturers:

a. Smith-Blair
b. Mueller

2. Products:

a. Complies with AWWA C223.
b. Carbon Steel, ASTM A36
c. 18-8 Type 304 stainless steel
d. Ductile Iron.
e. Bolts, Nuts, and Washers: Type 304 Stainless Steel, coated to protect from galvanic corrosion.
f. Outlet: Recessed for tapping valve per MSS-SP 60.
g. Pressure Rating: To match or exceed rating of existing piping.

3. Coating:

Epoxy coated in accordance with AWWA C213.

B. Tapping Valves 2-inch to 12-inch diameter:

1. Manufacturers:

a. Mueller
b. US Pipe
c. American Pipe

2. Products:

a. Conforms to AWWA C509.

b. Ends: Conform to ANSI B16.1, Class 125, and MSS SP-60 and MSS SP-113.
c. Wedge: Iron, fully encapsulated in rubber.
d. Stem: Non-rising.
e. Bonnet and Stuffing Box: 304 stainless steel.
f. Nuts and Bolts: 304 stainless steel.

3. Coating:

a. Fusion bonded epoxy, conforming to AWWA C550.
b. Certified to meet NSF 61 standard.

C. Tapping Saddles, 4 inch diameter and smaller, for Ductile Iron Steel, Asbestos Cement, and PVC Pipe:

1. Manufacturers:

Smith-Blair

2. Products:

a. Conforms to AWWA C800 and NSF 61.
b. Body: Ductile Iron, ASTM A536.
c. Outlet: Threaded NPT.
d. Gasket: Buna-N, conforming to NSF 61.
e. Straps: Single at least 2-inches wide (50 mm), or multiple each 1.5-inches (38 mm) wide.
f. Studs, Nuts, and Washers: Type 304 Stainless Steel, coated to protect from galvanic corrosion.
g. Pressure Rating: To match or exceed rating of existing piping.

3. Coating:

Fusion-bonded epoxy coating.

PART 3 - EXECUTION

3.01 EXAMINATION:

Tapping: Expose the existing pipeline to be tapped. Verify material of construction and outside diameter prior to ordering tapping materials.

3.02 PREPARATION:

Coordinate work to be performed with pipeline Owner.

END OF SECTION

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SECTION 03 48 18

PRECAST REINFORCED CONCRETE VAULTS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section includes materials, design, and installation of factory-built precast reinforced concrete underground vaults and chambers.

1.02 REFERENCES:

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

M198: Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

B. American Concrete Institute (ACI):

318: Building Code Requirements for Structural Concrete and Commentary

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

1. A48: Standard Specification for Gray Iron Castings.
2. A615: Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods.
3. C31: Practice for Making and Curing Concrete Test Specimens in the Field
4. C33: Specification for Concrete Aggregates
5. C39: Test Method for Compressive Strength of Cylindrical Concrete Specimens
6. C143: Test method for Slump of Hydraulic Cement Concrete
7. C150: Specification for Portland Cement
8. C172: Practice for Sampling Freshly Mixed Concrete
9. C192: Practice for Making and Curing Concrete Test Specimens in the Laboratory
10. C231: Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
11. C260: Specification for Air-Entraining Admixtures for Concrete
12. C494: Specification for Chemical Admixtures for Concrete
13. C857: Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
14. C858: Specification for Underground Precast Utility Chambers
15. C1064: Test Method for Temperature of Freshly Mixed Portland Cement Concrete
16. D75: Practice for Sampling Aggregates
17. D4101: Standard Specification for Polypropylene Injection and Extrusion Materials

1.03 SUBMITTALS:

A. Shop Drawings: Submit the following in accordance with Section 01 33 00.

Completely detailed shop drawings for precast concrete vaults. Indicate all dimensions, details, reinforcing steel, inserts, connections, openings and lifting devices. Mark each component for identification. Show mark on erection plan and place legibly on unit at time of manufacture.

B. Drawings of modifications or changes in features or details, which are necessitated by design requirements. Make such modifications without additional compensation.

C. Do not fabricate precast concrete vaults before shop drawings are reviewed and returned with "no exceptions taken" by the Owner.

D. Certification, signed and sealed by a Professional Engineer registered in the State of California and employed by the vault manufacturer and stating:

1. Elements and connections are designed to withstand required loads and forces
2. Structure is not affected by buoyant forces.
3. Codes and specifications to which structural design conforms.

1.04 QUALITY ASSURANCE:

Vault design and construction comply with the specified design load conditions, ASTM C858 and as specified herein.

1.05 DELIVERY, STORAGE AND HANDLING:

Store vaults on clean blocking, off the ground and protected from rain and ground splatter.

PART 2 - PRODUCTS

2.01 PRECAST REINFORCED CONCRETE VAULTS:

A. Manufacturers:

1. Oldcastle Precast, Inc.
2. Shea Concrete Products Inc.
3. Mid-State Concrete

B. Materials:

1. Minimum concrete compressive strength of 5,000 psi (35 MPa) at 28 days and otherwise conforming to Section 03 30 00.
3. Portland Cement: ASTM C150, Type II.

4. Coarse Aggregate and sand conforming to Section 03 30 00.
5. Steel reinforcement conforming to ASTM A615, Grade 60.
6. Water: Potable.
7. Provide concrete admixtures as specified in Section 03 30 00.
8. Butyl rubber-based sealants conforming to AASHTO M198, Type B but with no bitumen content.
9. Non-Shrink Grout:

    a. BASF Chemical Company; Masterflow 713 Plus
    b. The Euclid Chemical Co.; Euco NS Grout
    c. Sika Corporation; SikaGrout 212

C. Design Criteria. Use design loads according to ASTM C857 or as indicated below, whichever produces the more severe conditions:

1. Design precast reinforced concrete vault to withstand earth and groundwater loads. Assume groundwater elevation to be at the top of the vault. Provide design based on an equivalent fluid pressure equal to a minimum of 95pounds per cubic foot.

2. Design precast reinforced concrete vault to withstand vehicle loading with an impact factor as prescribed in ASTM C857 but a minimum of 250 psf surcharge. Account for vehicle positions both above and alongside vault.

3. Design and install vaults to withstand hydrostatic uplift caused by a groundwater elevation at grade level or equal to the top of the vault, whichever produces the most severe condition. Use only the weight of the vault and hold-down slab to resist hydrostatic uplift with a minimum safety factory of 1.15. Do not include side friction of soil on walls. At a minimum, extend the floor slab 6 inches outside the exterior wall, as indicated on the drawings, to withstand hydrostatic uplift.

4. Walls and floor slab: minimum of 6 inches in thickness. Cast lower wall section and floor slab together in one placement.

5. Design vault to withstand the load condition where the vault roof is removed while the structure is backfilled to grade and subject to live and dead loads.

6. Provide precast reinforced concrete vault as indicated on the drawings. Provide a watertight vault enclosure including sumps and entrance tubes as indicated.

7. Fabricate precast reinforced concrete vault in sections as required for installation.

8. Provide pipe sleeves with water stops, rubber pipe boots or other devices at pipe penetrations as indicated.

2.02 BITUMINOUS WATERPROOFING MATERIAL:

A. Manufacturers:

1. Tnemec Company, Inc.; Series 46-465 H.B. Tnemecol
2. PPG Industries; Amercoat 78HB.
3. Carboline; Bitumastic 300M

B. Apply waterproofing to outside of walls, floor, and ceiling.

2.03 ENTRANCE HATCHES:

B. Provide access hatches per Section 05 53 00.

A. Manufacturers:

1. Bilco Co.
2. Halliday
3. Babcock-Davis Associates, Inc.

C. Provide aluminum hatches of the type and size indicated and as follows:

1. Fabricate hatch and frame with 1/4-inch (6 mm) extruded aluminum frame and 1/4- inch (6 mm) diamond checkered aluminum plate covers.

2. Reinforce cover, with aluminum bars and angles welded to underside of covers, to withstand AASHTO H-20S wheel loading.

3. Provide hatch with hinges, hold-open safety-lock bars and flush lift handles, factory assembled, and shipped complete for installation.

4. Provide stainless steel hardware throughout. Hinge covers to frames with heavy duty stainless steel concealed hinges and stainless steel pins. Attach hinges to covers and frames with countersunk/flathead stainless steel machine screws. Fit covers flush to frame.

5. Provide slam latch, flush mounted grip handle, and removable plug and key wrench.

6. Fabricate gutter type hatches with 1-1/2-inch (38 mm) drainage coupling in one corner of the channel frame.

7. Provide frost proof inner hatch.

8. Provide stairs as shown on the drawings.

9. Provide drain PVC drain piping to location required by the Contract Drawings or as recommended by the Owner.

2.04 STAIRS:

See Section 05 51 20.

PART 3 - EXECUTION

3.01 PROTECTION:

A. Protect aluminum from contact with dissimilar metals, concrete, masonry or mortar.

B. Before coating application, clean contact surfaces, remove dirt, grease, oil, foreign substances.

3.02 FINISHES:

A. Finishes: Aluminum ladders to receive finish as specified. Hatches to receive manufacturers' standard finish for aluminum.

3.03 INSTALLATION:

A. Install precast reinforced concrete vault, and related appurtenances in accordance with manufacturer's instructions.

B. Place precast reinforced concrete vault onto level prepared bedding as indicated. Provide uniform bearing over entire base of vault.

C. Seal all joints inside and out with specified sealant to ensure joints are waterproof.

D. Repair or replace damaged waterproofing.

E. Backfill vault excavation uniformily and in such a manner so as not to damage the waterproofing.

END OF SECTION

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SECTION 05 50 00

MISCELLANEOUS METAL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section includes metal fabrications not specifically included in other Sections and required for completion of work as shown on Contract Drawings and in accordance with Contract Documents.

B. Furnish labor, materials, equipment and incidentals necessary to install the products specified.

1.02 REFERENCES:

A. American Institute of Steel Construction (AISC):

1. ANSI/AISC 360-5: Specification for Structural Steel Buildings
2. AISC Manual of Steel Construction, Thirteenth Edition

B. American Welding Society (AWS):

1. A2.4: Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. D1.1: Structural Welding Code.
3. D1.2: Structural Welding Code - Aluminum.

E. National Association of Architectural Metal Manufacturers (NAAMM):

1. MBG 531: Metal Bar Grating Manual.
2. MBG 532: Heavy Duty Metal Bar Grating Manual.
3. MBG 533: Welding Specifications for Fabrication of Steel, Aluminum and Stainless Bar Grating.

F. Aluminum Association:

1. Aluminum Design Manual–Specifications and Guidelines for Aluminum Structures.

a. AA M31C22A41

(1) M31: Mechanical Finish, Fine Satin
(2) C22: Finish, Medium Matte
(3) A41: Clear Anodic Coating, Class I

G. International Code Council – Evaluation Services (ICC-ES):

1. ICC-ES Acceptance Criteria 193: Mechanical Anchors in Concrete Elements

2. ICC-ES Acceptance Criteria 308: Post-installed Adhesive Anchors in Concrete Elements

H. Submit the following shop drawings in accordance with Section 01 33 00.

1. Submit shop drawings and product data showing materials of construction and details of installation for all items furnished under this Section. Shop drawings shall show sizes of members, method of assembly, anchorage and connection to other members.

2. Test Reports:

Submit certified copies of mill test reports on each steel, stainless steel, or aluminum proposed for use showing the physical properties and chemical analysis.

3. Product Data:

Manufacturer's catalog sheets on pre-manufactured items.

4. Miscellaneous Submittals:

Provide International Conference of Building Officials (ICBO) or other similar building code organization recommendations regarding safe allowable design loads for concrete anchors.

5. Stamped by Professional Engineer registered in the State of California.

1.03 QUALITY ASSURANCE:

A. Aluminum:

Weld with gas metal arc (GMA) or gas tungsten arc (GTA) processes in accordance with AWS.

B. Adhesive Anchors:

Adhesive Anchor Installers shall be trained and certified by manufacturer.

C. Galvanized Coating:

Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

1.04 DELIVERY STORAGE AND HANDLING:

A. Insofar as practical, factory assemble items specified herein. Package, ship and tag unassembled materials in a manner that will protect materials from damage and will facilitate identification and field assembly.

B. Package stainless steel items in a manner to provide protection from carbon impregnation.

C. Protect painted coatings and hot-dip galvanized finishes from damage due to metal banding and rough handling. Use padded slings and straps.

D. Deliver items to be incorporated into the work of other trades in sufficient time to be checked prior to installation.

E. Store fabricated items in a dry area, not in direct contact with ground.

1.05 FIELD MEASUREMENTS:

A. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the work.

B. The Contractor shall review the Contract Drawings and any discrepancies shall be reported to the Owner for clarification prior to starting fabrication.

PART 2 - PRODUCTS

2.01 MISCELLANEOUS METAL SHAPES, CASTINGS, BOLTS AND ACCESSORIES:

A. Structural Steel Shapes:

| | | |
|---|---|---|
| 1. | S, C and MC Shapes: | ASTM A36 |
| 2. | L Shapes: | ASTM A36 |
| 3. | HSS Square and Rectangular Shapes: | ASTM A500, Grade B, 46 ksi |
| 4. | Pipe Shapes: | ASTM A53, Grade B, 35 ksi |
| 5. | Plates and Bars: | ASTM A36 |
| 6. | Steel Sheets: | ASTM A366 |

B. Stainless Steel Shapes:

| | | |
|---|---|---|
| 1. | Exterior and Submerged Uses: | AISI, Type 316 |
| 2. | Interior and Architectural Uses: | AISI, Type 304 |
| 3. | For Welding: | AISI, Type 304L, Type 316L |
| 4. | Shapes and Bars | ASTM A276 |
| 5. | Plate, Sheet and Strip | ASTM A240 |

C. Aluminum Shapes:

1. Structural Shapes — ASTM B308, Alloy 6061-T6
2. Extruded Pipe — ASTM B429, Alloy 6063-T6
3. Aluminum Sheet and Plate — ASTM B209, Alloy 6061-T6

C. Steel Washers — ASTM F436

D. Plain Unhardened Steel Washers: — ASTM F844

D. Anchor Bolts: ASTM F1554, Grade 36 standard headed bolts with heavy hex nuts, Grade A washers, hot-dip galvanized, unless otherwise specified.

E. Stainless Steel Bolts and Nuts: F593 and F594, AISI Type 316

F. Galvanizing: ASTM A123, Zn w/0.5 percent minimum Ni.

G. Galvanizing, hardware: ASTM A153, Zn w/0.5 percent minimum Ni.

2.02 POST INSTALLED ANCHORS:

A. Adhesive Anchors:

1. Products:

a. Hilti Corporation, HIT-RE 500-SD HIT-HY 150 MAX
b. Powers Fasteners, PE1000+ Epoxy Adhesive Anchoring System
c. Simpson Strong Tie, SET-XP Epoxy-Tie or Acrylic-Tie

1. General:

a. Adhesive anchors shall be Stainless Steel Type 304 or Type 316.
b. Epoxy adhesive shall be ANSI/NSF approved for use in contact with potable water.

2.03 NEOPRENE GASKET:

A. Provide soft, closed-cell neoprene gasket material suitable for exposure to sewage and sewage gases conforming to ASTM D1056, Type 2, Class C, and Grade 1.

B. Unless otherwise shown on Contract Drawings, provide neoprene gaskets with a minimum thickness of 1/4-inch.

C. Furnish neoprene gaskets without skin coat.

2.04 STEEL BOLLARDS:

Galvanized steel pipe bollards shall be fabricated to dimensions and details shown in Contract Drawings. Fabricated bollards from 4 inch nominal outside diameter pipe.

2.05 FABRICATION:

A. Connections and Workmanship:

1. Fabricate details and connection assemblies in accordance with Contract Drawings and Specifications, with projecting corners clipped and filler pieces welded flush.

2. Fit work together in fabrication shop and deliver complete or in parts, ready to be set in-place or assembled in field

3. Provide work true to detail; with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture free from defects impairing strength or durability.

4. Provide clips, lugs, brackets, straps, plates, bolts, nuts, washers, and similar items, as required for fabrication and erection.

5. Provide castings of uniform quality, free from blowholes, porosity, hard spots, shrinkage distortion; smooth and well cleaned by shot blasting.

6. Welding:

a. Provide rigid and continuous welds or spot welded as specified and as shown on Contract Drawing. Dress the face of welds flush and smooth. Close fit exposed joints and locate where least conspicuous.

b. Weld aluminum work on the unexposed side when possible in order to prevent pitting or discoloration.

c. Weld aluminum in compliance with the latest edition of AWS D1.2. Support and clamp component parts of built-up members in proper position for welding.

d. Weld shop connections and bolt or field weld connections, unless otherwise specified.

e. Grind exposed edges of welds to 1/8-inch minimum radius. Grind burrs, jagged edges, and surface defects smooth.

f. Prepare welds and adjacent areas so there is:

(1) No undercutting or reverse ridges on weld bead.

(2) No weld spatter on or adjacent to weld or other area to be painted or coated.

(3) No sharp peaks or ridges along weld bead.

7. Bolting:

a. Use bolts of lengths required so bolts do not project more than 1/4-inch beyond face of nut. Do not use washers unless specified. Provide hexagonal head bolts with hexagonal nuts.

b. Provide holes required for connection of adjacent or adjoining work wherever noted on Drawings. Locate holes for bolting equipment to supports to tolerance of +/- 1/16-inch of dimensions indicated.

B. Galvanizing:

1. Galvanize after fabrication by hot-dipped process conforming with ASTM A123.
2. Ship and handle in manner to avoid damage to zinc coating.

C. Shop Painting:

1. Do not paint or coat ferrous metal surfaces embedded in concrete.
2. Comply with Section 09 91 14.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Upon receipt of material at job site, inspect all materials for shipping damage. Replace damaged items at no cost to Owner.

B. Examine supports for size, layout and alignment.

C. Correct defects considered detrimental to proper installation.

3.02 INSTALLATION:

A. Provide items such as bolts, shims, blocks, nuts, washers, and wedging pieces to complete installation.

B. Erect to lines and levels, plumb and true, and in correct relation to adjoining Work. Secure parts using concealed connections when practicable.

C. Plumb and true vertical members to tolerance of +/- 1/8 inch in 10 feet. Level horizontal members to tolerance of +/- 1/8 inch in 10 feet.

D. Use steel bolts to connect structural steel members. Use stainless steel bolts to connect structural aluminum members.

E. Anchor Bolts and Concrete Anchors:

1. Preset anchor bolts using templates.

2. After anchor bolts are embedded, protect projecting threads by applying grease and having the nuts installed until the time of installation of equipment or metalwork.

3. Do not install concrete anchors until concrete has reached specified minimum compressive strength.

4. Install concrete anchors in accordance with anchor manufacturer recommendation. Embedment depth of anchor shall be as recommended by the anchor manufacturer, but not less than as shown on Contract Drawings.

5. Locate concrete anchors to clear reinforcing bars in concrete.

F. Weld headed anchor studs in accordance with manufacturer's recommendations.

G. Do not place new holes or enlarge unfair holes by use of cutting torch.

3.03 PAINTING, REPAIR, AND PROTECTION:

A. Paint aluminum in contact with concrete in accordance Section 09 91 14. Under no circumstances shall aluminum contact dissimilar metal.

B. Between aluminum grating, aluminum stair treads, or aluminum handrail brackets and steel supports, insert 1/4-inch thick neoprene isolator pads, 85 +/- 5 Shore A durometer, sized for full width and length of bracket or support.

C. Apply an anti-seize compound on all stainless steel fasteners to prevent galling.

D. Field paint in compliance with Section 09 91 14.

E. Field repair of damaged galvanized coatings:

1. Clean and repair Zinc coating that has been burned by welding, abraded, or otherwise damaged after installation. Clean damage area by wire brushing and removing all traces of welding flux and loose or cracked zinc coating

2. Coat surfaces using zinc-rich paint.

F. Field repair of damaged primer.

1. Touch up abrasions in the shop primer immediately after erection. Paint areas left unprimed for welding with primer after welding.

END OF SECTION

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SECTION 05 51 20

ALUMINUM STAIRS AND LADDERS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section describes materials, fabrication, and installation of aluminum stairs as indicated and in compliance with Contract Documents.

1.02 REFERENCES:

A. Aluminum Association (AA):

Aluminum Design Manual–Specifications and Guidelines for Aluminum Structures.

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

1. A276: Standard Specification for Stainless Steel Bars and Shapes.
2. B26: Specification for Aluminum-Alloy Sand Castings.
3. B209: Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
4. B211: Specification for Aluminum-Alloy Bars, Rods, Profiles and Tubes.
5. B221: Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
6. B247: Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings and Rolled Ring Forgings.
7. B429: Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

C. American Welding Society (AWS):

1. A2.4: Standard Symbols for Welding, Brazing, and Nondestructive Examination.
2. D1.1: Structural Welding Code - Steel.

D. California Building Code (CBC).

E. Occupational Safety and Health Administration (OSHA):

29 CFR, Part 1910, Occupational Safety and Health Standards.

1.03 DESIGN CRITERIA:

A. Stairs shall conform to OSHA, California Safety Standards CBC.

B. Stairs and inclined (ships) ladders shall be designed to withstand a minimum uniform live load of 100 psf or a concentrated live load of 300 pounds applied on an area of 4 square inches at any point along the element.

1.04 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01 33 00.

1. Shop drawings showing clearly the location, size and details of all members

2. Indicate materials, dimensions, connection attachments, anchorage, size and type of fasteners, holes, finishes, and accessories for aluminum stairs.

3. Reference materials of construction by ASTM designation and grade.

4. Indicate welds including length and size of all shop and field welds by symbols conforming to AWS standards.

5. Letter certifying that stairs and ladders are designed and detailed to meet the requirements of standards, building codes, specifications and design criteria herein described.

B. Product Data:

1. Manufacturer's catalog sheets on pre-manufactured items.
2. Manufacturer's specifications, load tables, anchor details, and installation details.

C. Certificates:

Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE:

A. Obtain field measurements and elevations prior to preparation of shop drawings and fabrication.

B. Welding Qualification and Certification:

1. Furnish written welding procedure for all welds in conformance with AWS Structural Welding Code.

2. Use welders, tackers and welding operators certified by test to perform type of work required in conformance with AWS Structural Welding Code. Maintain current test records certified by an independent testing laboratory.

3. Maintain duplicate qualification and certification records at the job site readily available for examination.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Identify and match-mark materials, items and fabrications, for installation and field assembly.

B. Deliver items to jobsite as complete units, wherever practicable, ready for installation or erection, with anchors, hangers, fasteners and miscellaneous metal items required for installation.

C. Carefully handle and store materials, protected from weather, corrosion and other damage.

D. Store off the ground on suitable supports.

E. Accept material on site. Inspect for damage.

F. Do not incorporate damaged material in the work.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Aluminum materials and welding electrodes per Section 05 50 00.

B. Aluminum plates, shapes, pipe and castings shall conform to the following ASTM specifications, alloy and temper designations.

1. Extruded structural shapes, bars and tubes: ASTM B221 Alloy 6061-T6.
2. Extruded structural tube or pipe: ASTM B429 Alloy 6061-T6.
3. Sheet and plate: ASTM B209 Alloy 6061-T6.
4. Die and hand forgings: ASTM B247 Alloy 6061-T6.
5. Castings: ASTM B26.
6. Bolts, washers and nuts: Type 304 stainless steel.
7. Gratings (bearing bars): ASTM B211 Alloy 6061-T6 (connecting bars): ASTM B211 Alloy 6061-T5.

C. Welding:

Provide filler materials appropriate for the alloys and tempers in accordance with the AWS Structural Welding Code.

2.02 FABRICATION:

A. General:

1. Fabricate true to shape, size and tolerances as indicated and specified.

2. Straighten work bent by shearing or punching.

3. Dress exposed edges and ends of metal smooth, with no sharp edges and with corners slightly rounded.

4. Provide sufficient quantity and size of anchors for the proper fastening of the work.

5. Fabricate details and connection assemblies in accordance with drawings, with projecting corners clipped and filler pieces welded flush.

6. Provide clips, lugs, brackets, straps, plates, bolts, nuts, washers, and similar items, as required for fabrication and erection.

7. Use connections of type and design required by forces to be resisted, and to provide secure fastening.

8. Fit work together in fabrication shop and deliver complete, or in parts, ready to be set in place.

B. Welding:

1. Grind exposed edges of welds to a 1/8 inch minimum radius. Grind burrs, jagged edges and surface defects smooth.

2. Prepare welds and adjacent areas such that there is no undercutting or reverse ridges on the weld bead and no sharp peaks or ridges along the weld bead.

3. Grind embedded pieces of electrode or wire flush with adjacent surface of weld bead.

C. Bolting:

1. Provide stainless steel stud bolts and nuts with heavy aluminum washers for fastening aluminum material.

2. Provide holes required for the connection of adjacent or adjoining work wherever noted on drawings. Locate holes for bolting to supports to a tolerance of 1/16-inch of exact dimensions indicated.

2.03 ALUMINUM STAIRS:

A. Provide aluminum stairs fabricated from structural aluminum channel stringers, aluminum pipe rails and aluminum treads.

B. Rectangular Bar Grating Treads:

1. Provide stair treads of the same type and bar spacing as grating specified.

2. Provide serrated top surface of bearing bars.

3. Provide minimum 3 inch by 3/16 inch carrier end plates welded to stair treads and punched for bolting to stringers.

4. Provide 1-1/4 inch abrasive nosings.

5. Manufacturers:

a. IKG Borden Metal Products Co.; Type B.
b. Ohio Gratings, Inc.; Type SG Series.
c. McNichols Co.; Type A.

C. Riveted Grating Treads:

1. Provide stair treads of the same type and bar spacing as grating specified.

2. Raise serrated top surface of connecting bars slightly above the top surface of the bearing bars.

3. Provide minimum 3 inch by 3/16-inch carrier end plates welded to stair treads and punched for bolting to stringers.

4. Provide 1-1/4 inch abrasive nosings.

5. Manufacturers:

   a. IKG Borden Metal Products Co.; Type K.
   b. Ohio Gratings, Inc.; Type AR Series.
   c. McNichols Co.; Type GM

PART 3 - EXECUTION

3.01 GENERAL:

A. Set and secure in place as indicated. Where bolted connections are used, draw together and draw nuts tightly. Use bolts of lengths required so that they do not project more than 1/4-inch beyond face of nut. Do not use washers unless specified. Provide hexagonal head bolts with hexagonal nuts.

B. Locate anchors and anchor bolts and build into connecting work.

C. Install stairs in accordance with accepted shop drawings.

3.02 STAIRS:

Provide structural aluminum angles, struts, rod hangers, closure plates, and brackets indicated.

3.03 CORROSION PROTECTION FOR ALUMINUM SURFACES:

A. Coat aluminum surfaces to be embedded or which will be in contact with concrete or masonry per Section 09 91 14.

B. Where aluminum surfaces come in contact with dissimilar metals, keep the dissimilar metallic surfaces from direct contact by use of neoprene gaskets or washers.

END OF SECTION

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SECTION 05 53 00

# GRATING, COVER PLATES, AND ACCESS HATCHES

## PART 1 - GENERAL

### 1.01 DESCRIPTION:

A. Provide grating, cover plates and access hatches as indicated and in compliance with Contract Documents.

B. This section includes:
   1. Aluminum Bar Grating.
   2. Fiberglass Reinforced Plastic Grating.
   3. Floor Access Hatches.

C. Furnish all labor, materials, equipment and incidentals necessary to install the products specified.

### 1.02 REFERENCES:

A. American Society for Testing and Materials International (ASTM):

1. A6: General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
2. A36: Standard Specification for Carbon Structural Steel.
3. A123/A123M: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. A307: Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
5. A325: Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength.
6. A502: Steel Structural Rivets.
7. A569: Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip Commercial Quality.
8. A570: Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.
9. A575: Steel Bars, Carbon, Merchant Quality, M-Grades
10. A576: Steel Bars, Carbon, Hot-Wrought, Special Quality.
11. A675: Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
12. A786: Rolled Steel Floor Plates.
13. A1554: Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-ksi Yield Strength

14. B26: Specification for Aluminum-Alloy Sand Castings.

15. B209: Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

16. B221: Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.

17. B247: Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings and Rolled Ring Forgings.

B. American Welding Society (AWS):

1. D1.1: Structural Welding Code.

2. D1.2: Structural Welding Code - Aluminum.

C. National Association of Architectural Metal Manufacturers (NAAMM):

1. MBG 531: Metal Bar Grating Manual.

2. MBG 532: Heavy Duty Metal Bar Grating Manual.

3. MBG 533: Welding Specifications for Fabrication of Steel, Aluminum and Stainless Bar Grating.

D. Aluminum Association:

1. Aluminum Association Designation System for Aluminum Finishes

2. AAMA 607.1: Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum

1.03 DESIGN CRITERIA:

A. Grating:

1. Provide grating meeting the design live load of adjacent floor area but not less than a uniform live load of 100 psf or a concentrated load of 300 pounds over a 12 inch area at the center or span, whichever produces the greatest stresses.

B. Floor Access Hatches

AASHTO HS-20 loading.

1.04 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01 33 00.

1. Detail shop drawings indicating:

a. Dimensions.
b. Sectional assembly.
c. Location and identification mark.
d. Connections and fastening methods.

e. Size and location of supporting frames required.
f. Materials of construction.
g. Installation instructions.

2. Catalog data and design tables showing limits for span length and deflection under load.

1.05 QUALITY ASSURANCE:

A. Obtain field measurements prior to preparation of shop drawings and fabrication.

B. Steel:

1. Conform to codes for arc and gas welding in building construction of AWS and to AISC Specifications. Prepare surfaces to be welded according to requirements of AWS D1.1. No welding shall be done when base metal lower than 0 degrees F (-18 degree C).

2. Qualify welding operators in accordance with AWS D1.1. Qualification tests shall be run by recognized testing laboratory accepted by Owner at Contractor's expense.

C. Aluminum:

Weld with gas metal arc (GMA) or gas tungsten arc (GTA) processes in accordance with manufacturer's recommendations as accepted and in accordance with recommendations of AWS D1.2.

1.06 DELIVERY STORAGE AND HANDLING:

A. Store to avoid damage.

B. Remove material that has become damaged as to be unfit for use.

C. Identify and match-mark all materials, items, and fabrications for installation and field assembly.

1.07 FIELD MEASUREMENTS:

A. Verify dimensions and make any field measurements necessary and be fully responsible for accuracy and layout of the work.

B. Review the Contract Drawings and report any discrepancies to the Owner for clarification prior to starting fabrication.

PART 2 - PRODUCTS

2.01 ALUMINUM BAR GRATING:

A. Manufacturers:

1. IKG Borden Metal Products Co.; Type B.

2. Ohio Gratings, Inc.; Type SG Series.
3. McNichols Co.; GAL Series.
4. Approved equal.

B. Provide aluminum alloy 6063-T6 grating material.

C. Provide 3/16-inch thick bearing bars spaced 1-3/16-inch center to center with cross bars pressure locked on 4 inch centers.

D. Anchor grating to support members using stainless steel removable fasteners.

E. Provide serrated top surface with mill finish.

2.02 FIBERGLASS REINFORCED PLASTIC GRATING:

A. Manufacturers:

1. Polycast; DG0659.
2. Strongwell; Duradek.
3. Approved equal.

B. Anchor grating to support members using stainless steel removable fasteners.

2.03 FLOOR ACCESS HATCHES:

A. Manufacturers of Prefabricated Floor Access Hatches:

1. Bilco Company, Type J series.
2. Halliday, W series.
3. Thompson Fabrication Company, TE series.

B. Component Fabrication:

1. Provide access hatches and frames of, type and size as shown on Drawings. Unless otherwise noted, hatches shall be aluminum.

2. Where hatches are noted with drainage channel, drainage channel frame shall be 1/4-inch thick trough frame with continuous anchor flange around perimeter. Weld 1-1/2 inch diameter drain coupling to frame trough unless indicated otherwise on Drawings.

3. Where hatches are noted without drainage channel provide 1/4-inch thick minimum hatch frame with strap anchors or continuous anchors around frame.

4. Door leaves: 1/4-inch diamond plate with reinforcing on underside for live load. Provide stainless steel safety chain and attachments for end of double-leaf door assembly when open.

5. Door Hardware:

a. Equip doors with heavy stainless steel hinges with stainless steel pins. Hinges shall be through bolted to cover and frame with stainless steel bolts.

b. Equip doors with fully enclosed compression springs and hold - open arm with positive locking device with conveniently positioned release handle for easy and controlled closing.

c. Hardware shall be Type 316 stainless steel.

6. Locking and Latching Devices:

Recessed padlock hasp covered by a flush hinged lid.

7. Factory finish on aluminum surfaces shall be mill finish.

8. Manufacturer shall warranty in writing against defects in materials or workmanship for five years.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Upon receipt of material at job site, inspect all materials for shipping damage. Damaged items shall be replaced at no cost to Owner.

B. Examine supports for size, layout and alignment. Surface shall be free of debris.

C. Correct defects considered detrimental to proper installation.

3.02 PROTECTION:

A. Protect aluminum from contact with dissimilar metals, concrete, masonry or mortar. Paint aluminum in contact with concrete in accordance Section 09 47 00. Under no circumstances shall aluminum contact concrete or dissimilar metal.

B. Apply one coat of bituminous paint coating.

C. Before coating application, clean contact surfaces, remove dirt, grease, oil, foreign substances, followed by immersing in, or wipe thoroughly with, an acceptable solvent. Rinse with clean hot water and dry thoroughly.

3.03 INSTALLATION:

A. Install and make connections in accordance with accepted submittals and manufacturer's written instructions.

B. Install materials accurately in location and elevation, level and plumb. Field fabricate as necessary for accurate fit.

C. Coordinate and furnish anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction.

END OF SECTION

SECTION 09 91 14

PAINTING AND COATING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide painting and coating as indicated and in compliance with Contract Documents.

1. Section Includes:

a. Do not coat unless specifically noted otherwise:

(1) Stainless steel.
(2) Plastic coated pipe insulation.
(3) PVC or reinforced plastic piping.
(4) Aluminum louvers or trim.

b. Do not coat over any code-required labels such as UL and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

2. Equipment manufacturer is responsible for surface preparation and coatings of equipment, motors, and appurtenances. Equipment to be coated and coating system are identified in equipment Specification section(s).

1.02 REFERENCES:

A. The Society for Protective Coatings (SSPC):

1. SP1: Solvent Cleaning
2. SP2: Hand Tool Cleaning
3. SP3: Power Tool Cleaning
4. SP5: White Metal Blast Cleaning
5. SP6: Commercial Blast Cleaning
6. SP7: Brush-Off Blast Cleaning
7. SP8: Pickling
8. SP10: Near-White Blast Cleaning
9. SP11: Power Tool Cleaning to Bare Material
10. SP12: Surface Preparation and Cleaning
11. SP13: Surface Preparation of Concrete

1.03 SUBMITTALS:

A. Submit the following shop drawings in accordance with Section 01 33 00.

B. Submit manufacturer's data sheets showing the following information:

1. Percent solids by volume.

2. Minimum and maximum recommended dry-film thickness per coat for prime, intermediate, and finish coats.

3. Recommended surface preparation.

4. Recommended thinners.

5. Statement verifying that the specified prime coat is recommended by the manufacturer for use with the specified intermediate and finish coats.

6. Application instructions including recommended equipment and temperature limitations.

7. Curing requirements and instructions.

C. Submit color swatches.

D. Submit certificate identifying the type and gradation of abrasives used for surface preparation.

E. Submit material safety data sheets for each coating.

1.04 VOLATILE ORGANIC COMPOUNDS:

A. Manufacturer shall supply products that comply with local restrictions controlling use of volatile organic compounds (VOCs).

1.05 DELIVERY STORAGE AND HANDLING:

A. Deliver material in original, sealed, unopened packages and containers bearing manufacturer's name. Each container shall have manufacturer's printed label stating type of coating, color of coating, instructions for reducing, and spreading rate.

B. Protect and heat or cool material storage location to maintain temperature ranges recommended by coating manufacturer for most sensitive coating, but not less than 55 degrees F (13 degrees C).

C. Keep storage area neat and clean and replace or repair damage thereto or to its surroundings.

D. Avoid danger of fire. Deposit cleaning rags and waste materials in metal containers having tight covers or remove from building each night. Provide fire extinguishers of type recommended by coating manufacturer in areas of storage and where finishing is occurring. Allow no smoking or open containers of solvents. Store solvents in safety cans.

1.06 PROJECT/SITE CONDITIONS:

A. Environmental Requirements:

1. Do not apply exterior coating in cold, foggy, damp or rainy weather.

2. Apply no finish in rooms where dust is being generated.

3. Do not apply exterior coating when temperature is lower than 50 degrees F (10 degrees C) or as required by manufacturer.

4. Maintain interior temperature and relative humidity of space, as recommended by coating manufacturer, 24 hours before applying and until coating is cured.

B. Protection:

1. Cover materials and surfaces, including floors, adjoining or below Work with clean drop cloths or canvas.

2. Remove hardware, accessories, plates, lighting fixtures, and similar items or provide protection by masking. Upon completion, replace above items or remove protection and clean.

3. Maintain manufacturer's environmental requirements while coating dries.

1.07 MANUFACTURER'S RECOMMENDATIONS:

Conform to manufacturer's printed instructions for surface preparation, use, safety requirements, mixing, application, curing and intercoat precautions for protective coating. Submit to Owner, four copies of these printed instructions and manufacturer's product data sheets, 30 days prior to application of coating.

PART 2 - PRODUCTS

2.01 PAINTING AND COATING SYSTEMS

The following index lists the various painting and coating systems by service and generic type:

PAINT COATINGS SYSTEM INDEX

| No. | Title | Generic Coating |
|---|---|---|
| Submerged Metal Coating Systems | | |
| 7. | Submerged Metal, Potable or Nonpotable Water | Epoxy |
| Exposed Metal Coating Systems | | |
| 10. | Exposed Metal, Corrosive Environment | High-build epoxy (two-coat system) with polyurethane topcoat |

| No. | Title | Generic Coating |
|---|---|---|
| Buried Metal Coating Systems | | |
| 21. | Buried Metal | Epoxy |
| 24. | Buried Metal | Corrosion-resisting grease |
| Coating Systems for Nonferrous Metals | | |
| 54. | Aluminum Insulation from Concrete and Carbon Steel | Epoxy |

These systems are specified in detail in the following paragraphs. For each coating, the required surface preparation, prime coat, intermediate coat (if required), topcoat, and coating thicknesses are described. Mil thicknesses shown are minimum dry-film thicknesses.

2.02 SUBMERGED METAL COATING SYSTEMS

A. System No. 7--Submerged Metal, Potable or Non-potable Water:

Type: Epoxy.

Service Conditions: For use with structures, valves, piping, or equipment immersed in potable or nonpotable water.

Surface Preparation: SSPC SP-5.

Coating System: Apply the manufacturer's recommended number of coats to attain the specified minimum dry-film coating thickness. Products: Devoe Bar-Rust 233H, Tnemec 100, Scotchkote 323, Tnemec N140, Scotchkote 306, Carboline Carboguard 891, PPG Amercoat 395FD, Keysite 740, or equal; 16 mils total. Color of topcoat: white. Each coat shall be different color than the one preceding it.

2.03 EXPOSED METAL COATING SYSTEMS

A. System No. 10--Exposed Metal, Corrosive Environment:

Type: High-build epoxy intermediate coat having a minimum volume solids of 60%, with an inorganic zinc prime coat and a pigmented polyurethane finish coat having a minimum volume solids of 52%.

Service Conditions: For use with metal structures or pipes subjected to water condensation; chemical fumes, such as hydrogen sulfide; salt spray; and chemical contact.

Surface Preparation: SSPC SP-5.

Prime Coat: Self-curing, two-component inorganic zinc-rich coating recommended by the manufacturer for overcoating with a high-build epoxy finish coat. Minimum zinc

content shall be 12 pounds per gallon. Apply to a thickness of 3 mils. Products: Tnemec 90E-92, Devoe Catha-Coat 304 or 304V, International Interzinc 22HS, PPG Dimetcote 9HS, Carboline Carbozinc 11HS, Sherwin-Williams Zinc-Clad II Plus, PPG METALHIDE® 28 Inorganic Zinc-Rich Primer 97-672, or equal.

Intermediate Coat: Tnemec 104, Devoe Devran 224HS or 231, International Interseal 670HS, PPG Amercoat 385, Carboline Carboguard 890, Sherwin-Williams Macropoxy 646 B58-600, PPG PITT-GUARD® Direct-to-Rust Epoxy Mastic Coating 97-145 series, or equal; 5 mils.

Finish Coat: Two-component pigmented acrylic or aliphatic polyurethane recommended by the manufacturer for overcoating a high-build epoxy coating. Apply to a thickness of at least 2 mils. Products: Tnemec Series 1075, Devoe Devthane 379, International Interline 990HS, PPG Amercoat 450HS, Sherwin-Williams Hi-Solids Polyurethane B65-300, PPG PITTHANE® Ultra Gloss Urethane Enamel 95-812 series, or equal.

2.04 BURIED METAL COATING SYSTEMS

A. System No. 21--Buried Metal:

Type: High solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D2697).

Service Conditions: Buried metal, such as valves, flanges, bolts, nuts, structural steel, and fittings.

Surface Preparation: SSPC SP-5.

Coating System: Apply three or more coats of PPG Amerlock 400 or 400VOC, Tnemec 104HS or 80, Devoe Bar-Rust 233H, Carboline 890LT, Sherwin-Williams Tank Clad HS B62-80 series, or equal; 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

B. System No. 24--Buried Metal:

Type: Corrosion-resisting grease.

Service Conditions: Buried metal, such as bolts, bolt threads, tie rods, and nuts.

Surface Preparation: SSPC SP-3 or SP-6.

Coating: NO-OX-ID GG-2 as manufactured by Sanchem, Inc. Apply to a minimum thickness of 1/4 inch.

## 2.05 COATING SYSTEMS FOR NONFERROUS METALS

A. System No. 54--Aluminum Insulation from Concrete and Carbon Steel:

Type: High solids epoxy or phenolic epoxy having a minimum volume solids of 80% (ASTM D2697).

Service Conditions: Coat areas of aluminum grating, stairs, structural members or aluminum fabrications, in contact with concrete or carbon steel with this system.

Surface Preparation: Solvent or steam cleaning per SSPC SP-1; do not use alkali cleaning. Then dust blast.

Coating System: Apply three or more coats of PPG Amerlock 400 or 400VOC, Tnemec Series 135, Devoe Bar-Rust 233H, Sherwin-Williams Macropoxy B58-600, PPG PITT-GUARD® Direct-to-Rust Epoxy Mastic Coating 97-145 series, or equal; 30 mils total. Maximum thickness of an individual coating shall not exceed the manufacturer's recommendation.

## 2.06 ABRASIVES FOR SURFACE PREPARATION

A. Abrasives used for preparation of ferrous (excluding stainless steel) surfaces shall be one of the following:

1. 16 to 30 or 16 to 40 mesh silica sand or mineral grit.
2. 20 to 40 mesh garnet.
3. Crushed iron slag, 100% retained on No. 80 mesh.
4. SAE Grade G-40 or G-50 iron or steel grit.

B. In the above gradations, 100% of the material shall pass through the first stated sieve size and 100% shall be retained on the second stated sieve size.

# PART 3 - EXECUTION

## 3.01 WEATHER CONDITIONS

A. Do not paint in the rain, wind, snow, mist, and fog or when steel or metal surface temperatures are less than 5°F above the dew point.

B. Do not apply paint when the relative humidity is above 85%.

C. Do not paint when temperature of metal to be painted is above 120°F.

D. Do not apply alkyd, inorganic zinc, silicone aluminum, or silicone acrylic paints if air or surface temperature is below 40°F or expected to be below 40°F within 24 hours.

E. Do not apply epoxy, acrylic latex, and polyurethane paints on an exterior or interior surface if air or surface temperature is below 60°F or expected to drop below 60°F in 24 hours.

## 3.02 SURFACE PREPARATION PROCEDURES

A. Remove oil and grease from metal surfaces in accordance with SSPC SP-1. Use clean cloths and cleaning solvents and wipe dry with clean cloths. Do not leave a film or greasy residue on the cleaned surfaces before abrasive blasting.

B. Remove weld spatter and weld slag from metal surfaces and grind smoothly rough welds, beads, peaked corners, and sharp edges including erection lugs in accordance with SSPC SP-2 and SSPC SP-3. Grind 0.020 inch (minimum) off the weld caps on pipe weld seams. Grind outside sharp corners, such as the outside edges of flanges, to a minimum radius of 1/4 inch.

C. Do not abrasive blast or prepare more surface area in one day than can be coated in one day; prepare surfaces and apply coatings the same day. Remove sharp edges, burrs, and weld spatter.

D. For carbon steel, do not touch the surface between the time of abrasive blasting and the time the coating is applied. Apply coatings within two hours of blasting or before any rust bloom forms.

E. Surface preparation shall conform with the SSPC specifications as follows:

| | |
|---|---|
| Solvent Cleaning | SP-1 |
| Hand Tool Cleaning | SP-2 |
| Power Tool Cleaning | SP-3 |
| White Metal Blast Cleaning | SP-5 |
| Commercial Blast Cleaning | SP-6 |
| Brush-Off Blast Cleaning | SP-7 |
| Pickling | SP-8 |
| Near-White Blast Cleaning | SP-10 |
| Power Tool Cleaning to Bare Metal | SP-11 |
| Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating | SP-12 |
| Surface Preparation of Concrete | SP-13 |

F. Wherever the words "solvent cleaning," "hand tool cleaning," "wire brushing," or "blast cleaning" or similar words are used in these specifications or in paint manufacturer's specifications, they shall be understood to refer to the applicable SSPC (Society for Protective Coatings), surface preparation specifications listed above.

G. For carbon steel surfaces, after abrasive blast cleaning, the height of the surface profile shall be 2 to 3 mils. Verify the surface profile by measuring with an impresser tape acceptable to the Owner's Representative. Perform a minimum of one test per 100 square feet of surface area. Testing shall be witnessed by the Owner's Representative. The impresser tape used in the test shall be permanently marked with the date, time, and locations where the test was made. Test results shall be promptly presented to the Owner's Representative.

H. Do not apply any part of a coating system before the Owner's Representative has reviewed the surface preparation. If coating has been applied without this review, if directed by the Owner's Representative, remove the applied coating by abrasive blasting and reapply the coat in accordance with this specification.

## 3.03 ABRASIVE BLAST CLEANING

A. Use dry abrasive blast cleaning for metal surfaces. Do not use abrasives in automatic equipment that have become contaminated. When shop or field blast cleaning with handheld nozzles, do not recycle or reuse blast particles.

B. After abrasive blast cleaning and prior to application of coating, dry clean surfaces to be coated by dusting, sweeping, and vacuuming to remove residue from blasting. Apply the specified primer or touch-up coating within the period of an eight-hour working day. Do not apply coating over damp or moist surfaces. Reclean prior to application of primer or touch-up coating any blast cleaned surface not coated within said eight-hour period.

C. Keep the area of the work in a clean condition and do not permit blasting particles to accumulate and constitute a nuisance or hazard.

D. During abrasive blast cleaning, prevent damage to adjacent coatings. Schedule blast cleaning and coating such that dust, dirt, blast particles, old coatings, rust, mill scale, etc., will not damage or fall upon wet or newly coated surfaces.

## 3.04 PROCEDURES FOR ITEMS HAVING SHOP-APPLIED PRIME COATS

A. After application of primer to surfaces, allow coating to cure for a minimum of two hours before handling to minimize damage.

B. When loading for shipment to the project site, use spacers and other protective devices to separate items to prevent damaging the shop-primed surfaces during transit and unloading. If wood spacers are used, remove wood splinters and particles from the shop-primed surfaces after separation. Use padded chains or ribbon binders to secure the loaded items and minimize damage to the shop-primed surfaces.

C. Cover shop-primed items 100% with protective coverings or tarpaulins to prevent deposition of road salts, fuel residue, and other contaminants in transit.

D. Handle shop-primed items with care during unloading, installation, and erection operations to minimize damage. Do not place or store shop-primed items on the ground or on top of other work unless ground or work is covered with a protective covering or tarpaulin. Place shop-primed items above the ground upon platforms, skids, or other supports.

3.05 FIELD TOUCH-UP OF SHOP-APPLIED PRIME COATS

A. Remove oil and grease surface contaminants on metal surfaces in accordance with SSPC SP-1. Use clean rags wetted with a degreasing solution, rinse with clean water, and wipe dry.

B. Remove dust, dirt, salts, moisture, chalking primers, or other surface contaminants that will affect the adhesion or durability of the coating system. Use a high-pressure water blaster or scrub surfaces with a broom or brush wetted with a solution of trisodium phosphate, detergent, and water. Before applying intermediate or finish coats to inorganic zinc primers, remove any soluble zinc salts that have formed by means of scrubbing with a stiff bristle brush. Rinse scrubbed surfaces with clean water.

C. Remove loose or peeling primer and other surface contaminants not easily removed by the previous cleaning methods in accordance with SSPC SP-7. Take care that remaining primers are not damaged by the blast cleaning operation. Remaining primers shall be firmly bonded to the steel surfaces with blast cleaned edges feathered.

D. Remove rust, scaling, or primer damaged by welding or during shipment, storage, and erection in accordance with SSPC SP-10. Take care that remaining primers are not damaged by the blast cleaning operation. Areas smaller than 1 square inch may be prepared per SSPC SP-11. Remaining primers shall be firmly bonded to the steel surfaces with cleaned edges feathered.

E. Use repair procedures on damaged primer that protects adjacent primer. Blast cleaning may require the use of lower air pressure, smaller nozzles, and abrasive particle sizes, short blast nozzle distance from surface, shielding, and/or masking.

F. After abrasive blast cleaning of damaged and defective areas, remove dust, blast particles, and other debris by dusting, sweeping, and vacuuming; then apply the specified touch-up coating.

G. Surfaces that are shop primed shall receive a field touch-up of the same primer used in the original prime coat.

3.06 PAINTING SYSTEMS

A. All materials of a specified painting system, including primer, intermediate, and finish coats, shall be produced by the same manufacturer. Thinners, cleaners, driers, and other additives shall be as recommended by the paint manufacturer for the particular coating system.

B. Deliver paints to the jobsite in the original, unopened containers.

3.07 PAINT STORAGE AND MIXING

A. Store and mix materials only in areas designated for that purpose by the Owner's Representative. The area shall be well-ventilated, with precautionary measures taken to prevent fire hazards. Post "No Smoking" signs. Storage and mixing areas shall be clean and free of rags, waste, and scrapings. Tightly close containers after each use. Store paint at an ambient temperature from 50°F to 100°F.

B. Prepare multiple-component coatings using all of the contents of the container for each component as packaged by the paint manufacturer. Do not use partial batches. Do not use multiple-component coatings that have been mixed beyond their pot life. Provide small quantity kits for touch-up painting and for painting other small areas. Mix only the components specified and furnished by the paint manufacturer. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.

3.08 PROCEDURES FOR THE APPLICATION OF COATINGS

A. Conform to the requirements of SSPC PA-1. Follow the recommendations of the coating manufacturer including the selection of spray equipment, brushes, rollers, cleaners, thinners, mixing, drying time, temperature and humidity of application, and safety precautions.

B. Stir, strain, and keep coating materials at a uniform consistency during application. Power mix components. For multiple component materials, premix each component before combining. Apply each coating evenly, free of brush marks, sags, runs, and other evidence of poor workmanship. Use a different shade or tint on succeeding coating applications to indicate coverage where possible. Finished surfaces shall be free from defects or blemishes.

C. Do not use thinners unless recommended by the coating manufacturer. If thinning is allowed, do not exceed the maximum allowable amount of thinner per gallon of coating material. Stir coating materials at all times when adding thinner. Do not flood the coating material surface with thinner prior to mixing. Do not reduce coating materials more than is absolutely necessary to obtain the proper application characteristics and to obtain the specified dry-film thicknesses.

D. Remove dust, blast particles, and other debris from blast cleaned surfaces by dusting, sweeping, and vacuuming. Allow ventilator fans to clean airborne dust to provide good visibility of working area prior to coating applications. Remove dust from coated surfaces by dusting, sweeping, and vacuuming prior to applying succeeding coats.

E. Apply coating systems to the specified minimum dry-film thicknesses as determined per SSPC PA-2.

F. Apply primer immediately after blast cleaning and before any surface rusting occurs, or any dust, dirt, or any foreign matter has accumulated. Reclean surfaces by blast cleaning that have surface colored or become moist prior to coating application.

G. Apply a brush coat of primer on welds, sharp edges, nuts, bolts, and irregular surfaces prior to the application of the primer and finish coat. Apply the brush coat prior to and in conjunction with the spray coat application. Apply the spray coat over the brush coat.

H. Before applying subsequent coats, allow the primer and intermediate coats to dry for the minimum curing time recommended by the manufacturer. In no case shall the time between coats exceed the manufacturer's recommendation.

I. Each coat shall cover the surface of the preceding coat completely, and there shall be a visually perceptible difference in applied shade or tint of colors.

J. Applied coating systems shall be cured at 75°F or higher for 48 hours. If temperature is lower than 75°F, curing time shall be in accordance with printed recommendations of the manufacturer, unless otherwise allowed by the Owner's Representative.

K. Assembled parts shall be disassembled sufficiently before painting or coating to ensure complete coverage by the required coating.

## 3.09 PROTECTION OF SURFACES NOT TO BE PAINTED

Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent paint and other materials from entering the motors.

## 3.10 SURFACES TO BE COATED

A. Coat aboveground and exposed steel surfaces in vaults and structures per System 10.

B. Coat submerged steel surfaces per System No. 7.

C. Coat valves as described the same as the adjacent piping. Aboveground valves, or valves in vaults and structures, shall match the color of the connecting piping.

D. Coat aluminum surfaces in contact with concrete per System No. 54.

## 3.11 DRY-FILM THICKNESS TESTING

A. Measure coating thickness specified for carbon steel surfaces with a magnetic-type dry-film thickness gauge in accordance with SSPC PA-2. Provide certification that the gauge has been calibrated by a certified laboratory within the past six months. Provide dry-film thickness gauge as manufactured by Mikrotest or Elcometer.

B. Test the finish coat of metal surfaces (except zinc primer and galvanizing) for holidays and discontinuities with an electrical holiday detector, low-voltage, wet-sponge type. Provide measuring equipment. Provide certification that the gauge has been calibrated by a certified laboratory within the past six months. Provide detector as manufactured by Tinker and Rasor or K-D Bird Dog.

C. Check each coat for the correct dry-film thickness. Do not measure within eight hours after application of the coating.

## 3.12 REPAIR OF IMPROPERLY COATED SURFACES

If the item has an improper finish color or insufficient film thickness, clean and topcoat the surface with the specified paint material to obtain the specified color and coverage. Sandblast or power-sand visible areas of chipped, peeled, or abraded paint, feathering the edges. Then prime and finish coat in accordance with the specifications. Work shall be free of runs, bridges, shiners, laps, or other imperfections.

## 3.13 CLEANING

A. During the progress of the work, remove discarded materials, rubbish, cans, and rags at the end of each day's work.

B. Thoroughly clean brushes and other application equipment at the end of each period of use and when changing to another paint or color.

C. Upon completion of painting work, remove masking tape, tarps, and other protective materials, using care not to damage finished surfaces.

END OF SECTION

SECTION 13 34 23

FIBERGLASS REINFORCED PLASTIC (FRP) ENCLOSURE

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

a. ASTM D630
b. ASTM D790
c. ASTM E84

1.02 SYSTEM DESCRIPTION

A. Size:

a. Exterior Width: 6 ft
b. Exterior Length: 7 ft
c. Wall Height: 8 ft

B. Roof Slope: Sufficient to allow rain drainage, $12^{o}$-$17^{o}$ pitch.

C. System: Design, furnish, and install complete building package using manufacturer's standard components.

D. Structure Type: Fiberglass Reinforced Plastic (FRP) shelter on a formed and poured concrete pad as specified herein.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Manufacturer's Standard Details: Mark those portions that apply to specific Project and those parts that do not apply.

b. Manufacturer's Literature and Technical Data: Drawings and Specifications for proposed building system.

c. Drawings prepared specifically for this Project:

i. Materials and Details: Show materials, details of components (including doors and other accessories), finishes, fastenings, methods of joining, sealants,

anchor bolt details, structural members and bracing, and openings. Include color chart(s) for Owner's selection.

ii. Anchorage details of structure to foundation.

B. Enclosure Design:

1. Structural Loading

a. Wind Loads: 2013 CBC/ASCE 7-10

i. $V_U = 115$ MPH

ii. Risk Category = IV

iii. Exposure = C

iv. $I_W = 1.00$

b. Seismic Loads: 2013 CBC/ASCE 7-10

i. $S_{DS} = 1.0$; $S_{D1} = 0.627$

ii. Risk Category = IV

iii. $I_e = 1.5$; $R = 2$

iv. Seismic Design Category = D

c. Live Loads:

i. Roof = 20 psf

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:

a. At least 7 years' experience in work of the type required in this section.

b. Production capacity to provide work required for this Project without delay.

c. Certified Test Results: The manufacturer shall have an entire fiberglass panel destructive tested by an accredited Testing Laboratory and Third Party Quality Control Agency and upon request shall furnish to the engineer the certified and stamped test results of the laboratory testing. The accredited Testing Laboratory must be accredited to ISO 17020 and 17025. The manufacturer shall maintain a quality assurance program that is also certified by an accredited Testing Laboratory and Third Party Quality Control Agency and shall furnish to the engineer the certified and stamped quality assurance program by an accredited Testing Laboratory and Third party Quality Control Agency.

2. Erector/Installer:

a. Not less than 2 years' experience in the offloading and installation of prefabricated structures.

B. Material Properties:

1. Fiberglass Laminate Properties:

| | |
|---|---|
| a. Tensile Strength (ASTM D 638) | 12,458 (psi) |
| b. Flexural Strength (ASTM D 790) | 20,386 (psi) |
| c. Flexural Modulus (ASTM D 790) | 920,271 (psi) |
| d. Tensile Modulus (ASTM D 638) | 1,277,218 (psi) |
| e. Barcol Hardness | 45 |
| f. Burning Characteristics (ASTM E84) | <150 Flame Spread<br><1,000 Smoke Density |
| g. Izod Impact – Notched ((ft.-lbs)/in) | 16.30 |
| h. Izod Impact – Unnotched ((ft.-lbs)/in) | 21.79 |

2. Foam shall be rigid closed cell, self-extinguishing, polyisocyanurate with a density of minimum 2.0 pounds per cubic foot.

| | |
|---|---|
| a. Flame Spread (ASTM E 84) | <75 |
| b. Smoke Development (ASTM E 84) | <450 |

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. The fiberglass shelter and the accessory items shall be carefully transported, stored, handled and set in place in a manner that will prevent distortion, misalignment or other damage to the units.

B. During storage prior to installation and following installation, but prior to placing in service, the manufacturer's recommendations regarding handling shall be followed.

## 1.06 SPECIAL GUARANTEE

A. Manufacturer shall provide a five (5) year warranty on the enclosure materials and workmanship, according to the following specifications:

B. Prior to any warranty claims, the Owner should verify that the shelter was transported, lifted, installed, and supported properly.

C. Products manufactured by Manufacturer are warranted to be free of defects in workmanship and will not appreciably deteriorate for a period of (5) Five Years.

D. Any shelter penetrations made by Manufacturer must be maintained by the Owner to ensure proper sealing. Suggested intervals is every (2) two years. All penetrations made by the Owner during shelter installation are the responsibility of the Owner and may void or limit the warranty if done improperly.

E. Any equipment supplied by the Owner is not covered under this warranty.

F. Component Parts incorporated into the design of the shelter are purchased from reputable manufacturers and may carry their own warranties which will be honored by Manufacturer.

G. All warranties are Null and Void if the shelter and/or its components are modified or damaged as a result of unauthorized repair, misuse, negligence, accident, or act of God. This warranty does not cover vandalism, unreasonable use, damage caused by flying or falling objects, collision with animals or vehicles, or damages caused by environmental extremes or natural disasters, such as earthquakes, floods, hail or lightning.

## PART 2 PRODUCTS

### 2.01 BUILDING SYSTEM MANUFACTURERS

A. Products of the following, meeting these Specifications, may be used on this Project:

1. Shelter Works, St. Louis, MO (314-664-9300) or equal.
2. Products from other manufacturers will be considered for substitution 14 days prior to bid. Requests for substitution will not be considered if received 13 or fewer days before bid. Requests for substitution must include the following information in order to be considered:
   a. Formal written request certifying that products to be substituted will match specified products in terms of structural properties, dimensions, physical appearance, quality level and quantities and that they will perform the same function in the same manner and will achieve the same end result.
   b. Manufacturer's and supplier's material data sheets, specifications and performance data.
   c. A list of ten (10) projects in satisfactory service for not less than three years with enclosures similar to those being proposed for substitution. For each project, include name, address and telephone number of the engineer, the contractor and the plant manager.

### 2.02 COMPONENTS

A. U-BOLTS. Through-wall lifting/tie-down eyes at the top of each corner to facilitate handling.

B. CONNECTIONS. Wall panels shall overlap to form a permanent weather-proof connection with a seamless exterior appearance that uses low-maintenance silicone caulk matching the shelter's exterior color. Internal connections shall use stainless steel hardware spaced no less than 12" on center. Hold down anchors shall be SST grouted epoxy anchors with ICC acceptance rating.

C. ROOF. Roof shall be wind-resistant "hip" design with pitch sufficient for good moisture drainage to all four sides. Roof shall overlap the top of the walls to form a permanent weather-proof connection with a seamless exterior appearance that uses low-maintenance silicone caulk matching the shelter's exterior color. Internal connections shall use stainless steel hardware spaced the same as the wall-to-wall connections.

D. EXTERIOR. All exterior surfaces shall be brick textured with 18-20 mils of high quality Polycor 944 isopthalic gel coat, incorporating ultra-violet inhibitors. Exterior color shall be tan, white, green, or grey.

E. INTERIOR. All interior surfaces shall be sprayed with 18-20 mils of Polycor 944 high quality isophthalic white gel coat finish offering the same characteristics as the exterior surfaces without ultra-violet inhibitors

F. FLANGE. Shelter shall have a minimum 4 ¾" interior fiberglass base flange with minimum 2" reveal for mounting to the concrete slab by the installing contractor. Conseal shall be provided for a weather-proof connection between the shelter and base pad. Contractor shall follow shelter manufacturer's installation instructions. Contractor shall provide any required Type 316 stainless steel expansion anchors.

G. DOOR

1. Doors shall be made of fiberglass reinforced plastic (FRP) using exclusive FiberWrap technology to eliminate the possibility of delamination during the shelter's entire lifespan.
2. Doors shall be hung with stainless steel ball bearing type hinges equipped with tamper-resistant, non-removable pins. Hinges shall be oriented with no fasteners exposed when door is closed.
3. Doors shall be sealed with a weather-tight neoprene gasket along the entire perimeter of the door.
4. A rain drip molding shall be located above each door.
5. One 3' wide x 7' high door.
   a. Door must be able to be set in 'open' position with no hands. Door must be able to be removed from 'open' position and closed with no hands. Door must have hydraulic closer to prevent wind damage to door.
   b. Closure system is panic push bar, key-lockable.
   c. Threshold is raised step-over.

H. PENETRATIONS. One bulkhead where the end-user can penetrate wall for conduit without exposing the core material thereby guaranteeing a weatherproof penetration for the life of the structure. The location of these areas must not be visible from outside the shelter.

I. VENTILATION

1. (1) exhaust shutter fan which shall create 10 air changes per hour. Fan to be exhaust (blowing from inside out). Fan operation controlled by thermostat.
2. (1) gravity intake louver with insect screen and aperture size the same as the exhaust fan.
3. Ventilation through-wall openings shall be protected from the elements with a weather-tight fiberglass hood the same color as the shelter itself.

J. LIGHTING

1. Vapor-tight, fluorescent light fixtures providing at least 1.3 Watt/sf of illumination.
2. (1) exterior 42 Watt compact fluorescent lamp type light with built-in photocell.

K. SWITCHES. Weather-proof cover.

1. (1) two-gang switch, interior mounted, for interior lights and fan.
2. (1) auto-off switch, interior mounted, to control exterior light.

L. RECEPTACLE. Weather-proof cover.

(2) 120V, 2-pole, 3-wire GFI type duplex receptacles

M. TERMINATION. Electrical terminations in PVC junction box.

N. WIRING

1. Schedule 40 PVC conduit installed around the interior perimeter of the shelter, along the top of the wall. All conduit and fittings shall be UL Listed.
2. Conduit and wiring shall be installed in accordance with the most recent National Electric Code (NEC).
3. Minimum 12 gauge shall be used for wiring in conduit.
4. Wiring shall not be loaded above 60° C temperature rating.

2.03 MATERIALS

A. Walls, roof and doors shall be seamless, one-piece panels laminated with 1/8" thick sprayed fiberglass outside surface, core material, and 1/8" thick sprayed fiberglass inside surface. Walls, roof and doors shall have vertical FiberBeam laminations at least every 12" to permanently bond inner FRP surface with outer FRP surface to provide structural integrity and prevent de-lamination of the fiberglass from the core material.

B. Walls and roof shall have minimum R-10 insulation with core consisting of minimum 1.5" thick foam.

C. At least ½" thick wood imbedded in exterior surface of shelter for Owner-supplied electric service meter.

PART 3 EXECUTION

3.01 EXAMINATION

Investigate site, including soils, to determine effect on proposed building.

3.02 PREPARATION

Install concrete slab true and level to a maximum surface variance of 3/16" where the building interfaces with the slab. The slab immediately surrounding the building perimeter shall be sloped away at a pitch of ½" per foot to promote proper drainage and eliminate the potential of standing water around the building.

3.03 ERECTION

A. At the time of installation the slab shall be clean and dry.

B. Snug down anchor bolt nuts and grout uneven places beneath shelter base using non-shrink grout.

C. Install and make final electrical connections to all equipment shipped loose with water-tight flexible conduit and fittings.

3.04 FIELD FINISHING

Do not paint electrical equipment

3.05 HEATING AND VENTILATION

Install per manufacturer's instructions.

3.06 ELECTRICAL SYSTEMS

Wire per latest version of National Electric Code (NEC).

3.07 FIELD QUALITY CONTROL

Conduct functional tests on moving and operating components.

3.08 MANUFACTURER'S SERVICES

If available, provide manufacturer representative at site when needed.

3.09 CLEANING/ADJUSTING

Clean interior and exterior of shelter and leave weather-tight and ready for use.

3.10 PROTECTION

Protect installed products from damage.

END OF SECTION

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SECTION 22 14 29

SUMP PUMPS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide two new sump pumps as indicated and in compliance with Contract Documents.

B. The Work of this Section shall include all labor, materials, tools, equipment and appurtenances, and performing all operations necessary to furnish and install complete and operable systems in accordance with this Section of these Specifications, the Drawings, and the codes and standards listed herein.

1.02 REFERENCES:

A. Except as specified herein, the latest edition of the standards listed below form a part of this Specification to the extent referenced in this Section. Where earlier editions of standards are adopted as referenced in applicable codes, those shall govern. The publications are referred to within the text by the basic designation only.

B. In each of the standards referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.

C. American Society of Mechanical Engineers (ASME):

1. A112.6.1M: Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use

2. A112.18.1M: Plumbing Fixture Fittings

3. A112.19.1M: Enameled Cast Iron Plumbing Fixtures

4. A112.21.1M: Floor Drains

5. B16.1: Cast Iron Pipe Flanges and Flanged Fittings

6. B16.12: Cast Iron Threaded Drainage Fittings

D. American Society for Testing Materials (ASTM):

1. A74: Cast Iron Soil Pipe and Fittings

2. D2665: Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

3. F441: Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80

E. Institute of Electrical and Electronic Engineers (IEEE):

1. C37.90.1: Sure Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.

F. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS):

1. SP-58: Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application and Installation

2. SP-110: Ball Valves Threaded, Socket Welding, Solder Joints, Grooved and Flared Ends

G. National Sanitation Foundation (NSF):

1. 61: Drinking Water System Components

1.03 SUBMITTALS:

Submit the following shop drawings in accordance with Section 01 33 00:

1. Shop Drawings – submit dimensional drawings.

2. Product Data - Submit manufacturer's catalog data and detail drawings showing all pump parts and described by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show linings and coatings.

PART 2 - PRODUCTS

2.01 PUMP DESIGN

A. Equipment for the pumps, including motors, level switches, and floats shall be provided as a complete unit by the pump manufacturer.

B. Impellers shall be dynamically balanced.

2.02 MATERIALS OF CONSTRUCTION FOR SUMP PUMPS

Pumps shall have the following materials of construction:

| Component | Material | Specification |
|---|---|---|
| Motor housing, volute, head, shell, and mounting bracket | Cast iron | ASTM A48, Class 30 |
| Shaft | Stainless steel | AISI Type 303 or 416 |
| Impeller | Cast iron | ASTM A48 |
| Impeller cover | Ductile iron | ASTM A536 |
| Exposed cap screws, nuts, and bolts | Stainless steel | AISI Type 316 |

2.03 SUBMERSIBLE SUMP PUMPS

A. Pumps shall incorporate an automatic level on/off control, strain relief cable grip, thermal overload protection for motor, power cable, and lifting handle. Pumps shall incorporate a lower ball bearing assembly between the motor and lower mounting plate. Provide self-lubricated mechanical seal in a seal chamber between the lower mounting plate and the impeller. Provide upper ball bearing assembly. Provide perforated suction strainer.

B. Provide high water level "on" and low water level "off" mercury float switch. Switch shall automatically start and stop the pump at high and low water levels, respectively.

C. Motor shall be 3,500 rpm (maximum), single phase, 115 volts, hermetically sealed capacitor start with built-in overload protection.

D. Pumps shall be ABS Model EF 04W-2, Weil Series 1411, or equal.

2.04 CONTROLS

A. Provide NEMA 4X control panel with alternator circuit, UL listed. Provide a HOA switch, motor fail light, high temperature light, moisture light, and pump run light for each pump. Provide Lead pump selector switch, motor/moisture detection, motor temperature monitoring, motor contactor and circuit breakers. Provide output contacts for the following statuses:

1. Pump 1 Fail (generated by a pump fail, moisture detection, or over temp)

2. Pump 2 Fail (generated by a pump fail, moisture detection, or over temp)

3. Pump 1 Run

4. Pump 2 Run

5. High Water Level

B. Provide two float switches:

1. One high level float to start the pumps sequentially at high water level.

2. One low level float to stop both pumps at low water level.

C. The sump pump system shall function as follows:

1. The Operator shall select the Lead pump (Pump 1, Pump 2, or Auto) via 3-position hand switch.

2. When the high float switch activates on a high level, the Lead pump shall start. If the float is continuously activated for 1 minute (adjustable), the lag pump shall be called to start.

3. When the low level float deactivates on low water level, both pumps shall stop. If Lead pump selector switch is in the Auto position, the two pumps shall switch Lead and Lag assignments.

D. Provide mercury-free float switches. Float switches shall be Healy-Ruff, Anchor Scientific Inc., or equal.

E. Provide Type 316 stainless steel support pipe and brackets for the float switches.

2.05 SPARE PARTS

A. Provide the following spare parts for each pump installation:

| Quantity | Description |
|---|---|
| 1 | Float Switch |
| 2 | Seal assemblies |
| 2 sets | Bearings (upper and lower) |

B. Pack spare parts in a wooden box; label with the manufacturer's name and local representative's name, address, and telephone number; and attach list of materials contained within.

PART 3 - EXECUTION

3.01 SERVICE CONDITIONS

Pump performance conditions and design data shall be as shown below. Data is based on first-listed manufacturer.

| | |
|---|---|
| Motor horsepower (minimum): | 0.4 |

| Tag Numbers | Pump Type | Flow (gpm) | Total Head (±2 feet) |
|---|---|---|---|
| SP1 | Sump | 40/80 | 40 |
| SP2 | Sump | 40/80 | 40 |

3.02 PAINTING AND COATING

Coat pump and motor systems the same as the adjacent piping per Section 09 91 14, Painting and Coating, System No. 10. Line pump per Section 09 91 14, Painting and Coating, System, No. 7. Apply the specified prime, intermediate, and finish coats at the place of manufacture. Finish coat shall match the color of the adjacent piping.

3.03 SHIPMENT AND STORAGE

A. Prepare equipment for shipment including blocking of the rotor when necessary. Identify blocked rotors by means of corrosion-resistant tags attached with stainless steel wire. The preparation shall make the equipment suitable for three months of outdoor storage from the time of shipment, with no disassembly required before operation, except for inspection of bearings and seals.

B. Identify the equipment with item and serial numbers. Material shipped separately shall be identified with securely affixed, corrosion-resistant metal tags indicating the item and serial number of the equipment for which it is intended. In addition, ship crated equipment with duplicate packing lists, one inside and one on the outside of the shipping container.

C. Pack and ship one copy of the manufacturer's standard installation instructions with the equipment. Provide the instructions necessary to preserve the integrity of the storage preparation after the equipment arrives at the jobsite and before start-up.

D. The interior of the equipment shall be clean and free from scale, welding spatter, and foreign objects.

E. Provide flanged openings with metal closures at least 3/16-inch thick, with elastomer gaskets and at least four full-diameter bolts. Provide closures at the place of pump manufacture prior to shipping. For studded openings, use all the nuts needed for the intended service to secure closures.

F. Provide threaded openings with steel caps or solid-shank steel plugs. Do not use nonmetallic (such as plastic) plugs or caps. Provide caps or plugs at the place of pump manufacture prior to shipping.

G. Clearly identify lifting points and lifting lugs on the equipment or equipment package. Identify the recommended lifting arrangement on boxed equipment.

H. If electric motors are stored or installed outside or in areas subject to temperatures below 40°F or are exposed to the weather prior to permanent installation, provide the manufacturer's recommended procedures for extended storage. Provide temporary covers over the motor electrical components. Provide temporary conduits, wiring, and electrical supply to space heaters. Inspect electrical contacts before start up.

3.04 FIELD TESTING

Operate sump pump for one hour, during which time no repairs or adjustments shall be required. Demonstrate that pumps start and stop in response to their level switches or controls. Add water to fill sump four times and activate the level controls. Repair or adjust equipment until the system functions for the test period.

END OF SECTION

SECTION 26 05 00

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. One-Year Guarantee: General Provisions and Supplement.

2. Permits and Licenses: General Provisions and Supplement.

3. Temporary Facilities: 01 55 00.

C. REGULATORY AGENCIES AND STANDARDS

See General Provisions and Supplement.

D. QUALITY CONTROL

Materials, appliances, equipment, and devices shall conform to the applicable Underwriters' Laboratories, Inc. (UL) standards. The label of, or listing by, UL is required for all electrical equipment where applicable.

E. UTILITY COMPANY REQUIREMENTS AND FEES

1. The Contractor shall follow up on application for electrical service made by the Owner. The Contractor shall make any service and installation agreements that the utility company may require.

2. Submit service meter box shop drawings to the serving utility company as specified in General Conditions.

3. Installation of service entrance equipment, conduit, riser and associated appurtenances shall comply with the Utility company requirements.

F. POWER FOR CONSTRUCTION

Provide for or purchase power for construction in accordance with Section 01 50 00.

G. SUBMITTALS

1. Submit shop drawings in accordance with General Conditions and Supplement.

2. Where catalog cuts are included, all items shown in such catalog cuts not pertinent to this project shall be crossed out. Where catalog lists manufacturer's standard options, those options not to be included shall be crossed out and those options to be provided shall be clearly highlighted.

## PART 2 - PRODUCTS

### A. GENERAL

1. Similar materials and equipment shall be the product of a single manufacturer.

2. Provide only products which are new, undamaged, and in the original cartons or containers.

3. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current design.

4. Materials and equipment shall be suitable for storage, installation, and operation at an ambient temperature of 0°C to 40°C except where more stringent conditions are stated in individual equipment specifications.

5. Electrical equipment and panels shall be factory finished with manufacturer's standard primer and enamel topcoats, unless stated otherwise in the individual equipment specifications.

## PART 3 - EXECUTION

### A. INSTALLATION

1. The drawings indicate connections for typical equipment only. If the equipment furnished is different from what is shown, provide the modifications necessary for a safe and properly operating installation in accordance with the equipment manufacturer's recommendations.

2. The drawings diagrammatically indicate the desired location and arrangement of outlets, conduit runs, equipment, and other items. Field-determine exact location based on physical size and arrangement of equipment, finished elevations, and obstructions.

3. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the electrical systems shall be accomplished without additional cost to the Owner.

4. Accomplish work required to pierce any waterproofing after the part piercing the waterproofing has been set in place. Seal and make watertight the openings made for this purpose.

5. Install equipment and material piercing firewalls and fire-resistant or fire-stopped walls, partitions, ceilings, and floors in a manner so the rating remains equivalent.

6. Seal weather tight equipment or components exposed to the weather.

7. Protect equipment outlets and conduit openings with factory-made plugs or caps whenever work is not in progress at that point.

B. NAMEPLATES

1. Provide a nameplate inside the door of panelboard listing its designation, voltage, and feeder circuit number.

C. WARNING SIGNS

1. Install warning, caution, or instruction signs where required by NEC and NFPA 79 paragraph 4.5.1 and where reasonably required to assure safe operation and maintenance of electrical systems and of the items to which they connect.

END OF SECTION

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SECTION 26 05 19

WIRES AND CABLES

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

2. Grounding and Bonding: 26 05 26.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Submit material list for each conductor type. Indicate insulation material, conductor material, voltage rating, manufacturer and other data pertinent to the specific cable, such as shielding, number of pairs, and applicable standards.

PART 2 - PRODUCTS

A. LOW-VOLTAGE BUILDING WIRE

1. Conductor material shall be copper.

2. Low-voltage building wire for use at 600 volts or less shall be 600-volt insulated, Type XHHW or THWN, and rated for continuous operation at 75°C.

3. No. 12 AWG minimum conductor size for power and lighting circuits.

4. No. 14 AWG minimum conductor size for control circuits.

5. Conductors for lighting and receptacle circuits that are No. 10 AWG and smaller shall be solid. All other conductors shall be stranded.

B. TWISTED-SHIELDED CABLE

Single-pair cables shall be two No. 18 AWG and single-triads shall be three No. 18 AWG stranded tinned-copper conductors individually insulated with fully color-coded PVC

rated at 600 volts; insulated conductors twisted together and shielded with a spiral-wound metal foil tape overlapped for 100% shielding. Outer jacket shall be PVC.

C. GROUNDING CONDUCTORS--BARE COPPER

Refer to Section 26 05 26 for bare copper grounding conductors.

D. CONDUCTOR TAGS

Provide individual or sleeved, nonmetallic, snap-on type; Grafoplast, Phoenix Contact, Thomas & Betts sleeve markers, or self-extinguishing heat-shrink adhesive-type markers. Brady, Thomas & Betts, or equal.

E. PLASTIC ADHESIVES

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

PART 3 - EXECUTION

A. LOW-VOLTAGE BUILDING WIRE INSTALLATION

1. Install wiring and cable in conduit and terminate unless otherwise noted.

2. To reduce pulling tension in long runs, coat cables with pulling compound recommended by the cable manufacturer before being pulled into conduits.

3. Remove debris and moisture from the conduits, boxes, and cabinets prior to cable installation.

4. Group conductors in panelboard. Tie with plastic ties; and fan out to terminals.

B. TWISTED-SHIELDED CABLE INSTALLATION

1. Twisted-shielded cable shall be used to connect transmitter to Instrumentation Panel. Install cable in ¾" conduit.

C. IDENTIFICATION

1. Color Coding of Low-Voltage Building Wire: Provide color coding throughout the entire network of feeders and circuits (600 volts and below) as follows:

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

2. Phase conductors No. 10 AWG and smaller and neutral/ground conductors No. 6 and smaller shall have factory color coding with solid color insulation. Do not use onsite coloring of ends of conductors or apply colored plastic adhesives in lieu of factory color coding. Larger conductors may have onsite application of colored plastic adhesives at ends of conductors and at each splice.

D. LOW-VOLTAGE WIRE SPLICES

1. Solid Conductors: Use 3M "Scotchlok," Ideal "Super Nut," Buchanan B-Cap, or equal. Seal splices in underground handholes and pull boxes and in light poles with individual sealing packs of Scotchcast Brand 400 Resin or equal.

2. Stranded Conductors No. 8 and Larger: Use T & B "Locktite" connectors, Burndy Versitaps and heavy-duty connectors, O.Z. solderless connectors, or equal.

3. Stranded Conductors No. 10 and Smaller: Use crimp connectors with tools by same manufacturer and/or UL listed for connectors of all stranded conductors.

E. LOW-VOLTAGE WIRE TERMINATIONS

1. Terminate wires and cables at each end.

2. Provide ring tongue, nylon- or vinyl-insulated copper crimp terminals for termination on screw-type terminals, except for light switches and receptacles. Utilize installation tools recommended by the crimp manufacturer.

3. Terminal lugs shall be UL listed and of the copper compression type, electro-tin plated. Provide color-coded system on terminal and die sets to provide the correct number and location of crimps. Permanent die index number shall be embossed on completed crimp for inspection purposes.

4. Tighten screws to the value recommended by the manufacturer.

5. Wiring terminals in the remote generator control panel and medium-voltage switchgear shall be as specified in the respective specification sections.

F. FIELD TESTING

1. Perform visual and mechanical inspection and electrical tests on low-voltage cables per NETA ATS Section 7.3.2.

2. Twisted Shielded Cables: Inspect for proper shield grounding, proper terminations, and proper circuit identification.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

2. Wires and Cables Less Than 600 Volts: 26 05 19.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Submit material list for all grounding materials and equipment. Indicate size, material, and manufacturer.

3. Submit test results. Indicate overall resistance to ground and resistance of each electrode.

D. PERFORMANCE REQUIREMENTS

1. Grounding System Resistance:

a. Transformer Grounding Electrodes: 25 ohms or less.

b. Separately Derived Sources Grounding Electrodes: 10 ohms or less.

c. Noncurrent-Carrying Metal Parts: 25 ohms or less.

d. Grounds Not Covered Above: 25 ohms or less.

PART 2 - PRODUCTS

A. CONDUCTORS

1. Equipment Ground: Conductors shall be low-voltage building-wire type as specified in Section 26 05 19.

2. Bare Copper Conductors: Annealed bare copper, confirming to ASTM B 3 and B 8.

B. GROUND TEST WELL

Provide a handhole and ground rod as detailed in the drawings. Connect ground wire from ground rod to service meter box as shown in the drawings. Bond the ground conductor to the rebar in the slab as shown in the drawings

PART 3 - EXECUTION

A. GROUNDING ELECTRODE

Install grounding electrode as shown in the drawings.

B. EQUIPMENT GROUNDING

1. Ground raceways and noncurrent carrying parts of electrical equipment in accordance with NEC Article 250. Use the metallic conduit system for equipment and enclosure grounding. Grounding through the conduit system shall be in excess of ground conductors.

2. Circuits shall carry one ground conductor for equipment grounding.

END OF SECTION

SECTION 26 05 34

CONDUITS, BOXES, AND FITTINGS

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

2. Grounding and Bonding: 26 05 26.

3. Trenching and Backfill: 31 23 33.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Submit product data for the following:

a. Conduit and fittings for each type specified.

b. Boxes.

D. QUALITY CONTROL

1. NEMA Compliance: Comply with NEMA standards pertaining to conduits and components.

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

PART 2 - PRODUCTS

A. PVC-COATED RIGID STEEL CONDUIT AND FITTINGS

1. Conduit:

a. All conduits shall conform to ANSI C80.1 and UL-6. Conduits shall be hot-dipped galvanized after threading.

b. The zinc surface shall be treated prior to coating to enhance the bond between metal and plastic.

c. Both interior and exterior of the conduit shall be coated with an epoxy acrylic primer of approximately 0.5-mil thickness.

d. The exterior coating shall be applied by dipping in liquid plastisol or other equal method that will produce a finished product conforming to NEMA 5-19-1986.

e. The thickness of the PVC coating shall be a minimum of 40 mils the full length of the conduit except the threads.

f. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic.

g. A chemically cured urethane coating of a nominal thickness of 2 mils shall be applied to the interior of all conduit.

h. The conduit shall be bendable without damage to the PVC or urethane coatings.

i. All threads shall have an added protection of a 2-mil clear urethane coating.

2. Fittings:

a. Fittings and elbows shall be coated similar to the conduits.

b. A loose coupling shall be furnished with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling, and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 2 inches whichever is smaller. The wall thickness of the sleeve shall be the same as the plastic coating on the pipe.

c. The PVC coating on the coupling shall be ribbed to enhance installation.

d. All hubs shall have PVC sleeves equal to those on the couplings.

e. All screws on Form 8 fittings shall be of stainless steel with encapsulated plastic heads.

f. All U bolts and RA clamps shall be sized to fit conduit, and the nuts shall be encapsulated in plastic.

g. Fittings shall otherwise be same as specified for rigid steel.

h. Elbows or bends exceeding 45 degrees shall be PVC coated and shall be standard or long-radius elbows.

3. Conduits and fittings shall conform to NEMA RN-1 and shall be manufactured by Robroy, Ocal Inc., or equal.

B. RIGID NONMETALLIC CONDUIT (PVC) AND FITTINGS

1. Conduit: PVC Schedule 80, 90°C rise rating. Conforming to NEMA TC-2 Type EC-80 and UL-651.

2. Long-Radius Elbows (90 Degrees): Rigid PVC-coated conduit or PVC Schedule 80 conduit of the same dimension as specified for steel conduit.

3. Couplings, Adapters, Bell Ends, Expansion Couplings, Elbows, and Turns of 30 Degrees: Factory made to NEMA TC-2 and TC-3.

4. Joint Cement: As recommended by manufacturer as suitable for the climate, furnished with instructions to achieve watertight joints.

5. Manufacturers: Carlon, Condux, or equal.

C. LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

1. Conduit: Steel, UL-360 listed, PVC jacketed.

2. Fittings:

   a. Conform to ANSI C33.84, UL listed for use with the conduit.

   b. In sizes 1-1/4 inches and less UL listed for grounding.

   c. Made of steel or malleable iron, zinc plated, 105°C insulated throat, grounding and bonding lug.

D. CONDUIT BODIES

1. Provide types, shapes, and sizes to suit individual applications. Provide matching gasketed covers, secured with at least two captive corrosion-resistant screws.

2. Bodies connecting to rigid conduit shall be of the same material and material coating as the conduit, with metal threaded hubs. Provide with threaded covers or gasketed covers secured with at least two corrosion-resistant captive screws.

3. Connect bodies to electrical metallic tubing with compression-type EMT connectors.

4. Bodies connecting to nonmetallic conduit shall be nonmetallic conduit bodies conforming to UL-514B.

E. OUTLET BOXES

1. Cast iron or aluminum, with threaded hubs.

2. Conduit bodies may be used instead of boxes except where boxes contain devices.

F. JUNCTION BOXES

1. Provide factory-made standard sizes, and shop fabricate when nonstandard size boxes are shown or are required. Comply with UL and NEMA standards.

2. NEMA Type 4X: Type 304 or 316 stainless steel or fiberglass, with gasketed covers and Type 304 or 316 stainless steel bolts or screws.

3. Junction boxes shall be manufactured by Hoffman, Wiegmann, or equal.

G. CONDUIT SEALANT

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

2. Fire-Retardant Types: Fire stop material shall be a reusable, nontoxic, asbestos-free, expanding, putty-type material with a three-hour rating in accordance with UL-35L4.

PART 3 - EXECUTION

A. CONDUIT USAGE SCHEDULE

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

1. Exposed:

   a. Material: PVC-coated rigid steel conduit.

   b. Minimum Size: 3/4 inch.

2. Stub-ups:

   a. Material: PVC-coated rigid steel conduit, long radius elbows.

   b. Minimum Size: 3/4 inch.

3. In Earth, Below Concrete Slabs, or Underground:

a. Material: Rigid nonmetallic conduit (PVC).

b. Minimum Size: 1 inch.

4. Final Connections to Motors, Vibrating Equipment, or Instruments:

a. Material: Liquid-tight flexible conduit.

b. Minimum Size: 1/2 inch.

c. Length of liquid-tight flexible conduit shall be 4 feet or less.

B. CONDUIT FILL

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

C. CONDUIT INSTALLATION, GENERAL

1. Install above grade conduits exposed unless specifically noted otherwise or impracticable.

2. Run exposed conduits parallel and perpendicular to surface or exposed structural members and follow surface contours as much as practicable to provide a neat appearance.

3. Make right-angle bends in conduit runs with long-radius elbows or conduits bent to radii not less than those specified for long-radius elbows.

4. Make bends and offsets so that the inside diameter of conduit is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

5. Cap all conduits immediately after installation to prevent entrance of foreign matter.

6. Do not use diagonal runs except when specifically noted in the drawings.

7. Route exposed conduit to preserve headroom, access space, and work space.

8. Use manufacturer's recommended installation tools.

9. Conduit Terminations:

a. Terminate conduits with locknuts and bushings except where threaded hubs are specified.

b. Install conduits squarely to the box and provide one locknut outside the box and one locknut and bushing inside the box.

c. Install locknuts with dished side against the box.

d. When terminating in threaded hubs, screw the conduit or fitting tight into the hub so that the end bears against the fire protection shoulder.

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

10. Install exposed, parallel, or banked conduits together. Make bends in parallel or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel.

11. Conduit runs are shown schematically. Supports, pull boxes, junction boxes, and other ancillary equipment are not usually shown in drawings. If not shown, provide as required by NEC. Provide additional boxes to permit pulling of wires without damage to the conductors or insulation.

D. REQUIREMENTS FOR RIGID NONMETALLIC (PVC) CONDUIT

1. Comply with the installation provisions of NEMA TC2, except as modified below.

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

3. Use factory-made couplings for joining conduit.

4. Cementing and joining operation shall not exceed 20 seconds. Do not disturb joint for 5 minutes, longer (up to 10 minutes) at lower temperatures. Make joints watertight. Joining procedure shall conform with detailed procedures of ASTM D 2855.

5. Install expansion fittings. Expansion fittings are required when the conduit is left exposed in trenches for a period of time during which the conduit's temperature can vary more than 2 degrees. Install expansion fittings near the fixed end of the run and 100 feet on center.

6. Where PVC conduit is installed above ground, provide expansion fittings and nylon or Type 316 stainless steel supports at spacing recommended by the raceway manufacturer.

E. CONDUIT SEALING

1. Seal conduit entries with silicone sealant as follows:

a. Conduits exiting buildings.

b. Conduits entering cable trenches or underground pull boxes.

F. GROUNDING AND BONDING

1. Provide grounding in accordance with Section 26 05 26.

2. Use grounding bushing in service meter box to bond service conduit and conduit carrying grounding electrode, per NEC 250.92.

3. Bonding of conduits to enclosures shall comply with NEC Article 250.

G. CONDUITS EMBEDDED IN CONCRETE AND BELOW SLABS

1. Install conduits and sleeves passing through slabs, walls, columns, or beams so as not to impair the strength of construction. Secure conduit to prevent sagging or shifting during concrete pour.

2. Conduits larger than 1-1/2 inches in diameter may be embedded in structural concrete only after submittal and review of location and reinforcement details.

3. Conduits and sleeves may be installed without specific permission, provided:

   a. They are 1-1/2 inches or less in diameter, are spaced not less than three diameters on centers, and conform to paragraphs b or c below.

   b. Conduits, including fittings, which are embedded within a column, do not displace more than 4% of the cross-sectional area on which structural strength is calculated.

   c. Conduits and sleeves, embedded within a wall, slab, or beam, are not larger in the outside dimension than one-third the overall thickness of wall, slab, or beam in which they are embedded.

   d. There is a minimum of 1-1/2 inches between the conduit and reinforcement for slab and wall penetrations.

4. Install conduits in slabs other than slabs-on-grade as close to the middle of the slabs as practical without disturbing the reinforcement. Outside diameter of the conduit shall not exceed one-third times the slab thickness. Do not space parallel runs of conduit closer than three diameters on centers, except at cabinet and outlet box locations.

5. Conduits shown in or under slab-on-grade construction shall be installed below the floor slab and under curing or damp-proofing membranes. An exception may be made for conduit with an outside diameter not larger than 25% of the slab thickness, in which case, standards applying to slabs other than slab-on-grade may be used.

6. Perform trenching and backfill in accordance with Section 31 23 33.

H. CONDUITS UNDERGROUND

Provide 30-inch minimum cover. Provide 3-inch minimum sand below conduits as specified in Section 312316. Maintain a 12-inch minimum separation between conduit and other systems. Pitch conduit to drain away from buildings. Provide sand-cement slurry extending 3 inches on top and sides of ducts. Slurry shall be as specified in Section 31 23 33 with a red color additive. Provide 6-inch-wide warning tape 12 inches above slurry.

I. CONDUIT SUPPORTS

1. Support conduit at intervals and at locations as required by the NEC. Do not use perforated strap or plumbers tape for conduit supports.

2. Conduit on Concrete or Masonry: Use one-hole malleable iron clamps with pipe spacers (clamp backs) or preformed galvanized steel channels. Anchor with metallic expansion anchors and screws or from preset inserts. Use preset inserts in prestressed concrete. On plaster or stucco, use one-hole malleable iron straps with toggle bolts.

3. Supports at Structural Steel Members: Use Type 304 stainless steel beam clamps in exposed locations and electrogalvanized steel beam clamps in concealed locations. Drilling or welding may be used only where indicated in the drawings.

J. CONDUIT PENETRATIONS

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

2. Conduits passing vertically through concrete slabs and through structural beams shall be sleeved, except where sealing and expansion/deflection fittings are required. Pack sleeves through floors and fire-rated walls with fire-rated packing. Nonrated penetrations may be packed with nonshrink grout.

3. Maintain the integrity of all damp-proofing and waterproofing membranes that are penetrated by conduits and boxes.

K. DAMAGED CONDUIT

1. Repair or replace conduit damaged during or after installation.

2. Replace crushed or clogged conduit or any conduit whose inner surface is damaged or not smooth.

3. Repair cuts, nicks, or abrasions in the zinc coating of galvanized conduit with galvanizing repair stick, Enterprise Galvanizing "Galvabra" or equal.

4. Repair cuts, nicks, or abrasions in the PVC coating of PVC-coated conduit with the manufacturer's recommended PVC material and build up surface thickness to match the factory coating thickness and color.

L. EMPTY CONDUIT

1. Provide 200-pound strength pull cord in all empty conduits.

2. Provide a waterproof label on each end of the pull cords to indicate the destination of the other end.

M. OUTLETS FOR GENERAL WIRING

Install outlets and boxes securely and support them substantially. In stud walls, use rigid bar hangers, attached to hanger with stud and nut. In ceilings, attach to building structure. Anchor boxes into masonry construction with one or more integral flanges.

N. JUNCTION AND PULL BOXES--USAGE SCHEDULE

All boxes shall be NEMA 4X type.

O. EQUIPMENT SUPPORTS

Support wall-mounted junction boxes, enclosures, and panels with Type 304 stainless steel preformed channels and Type 304 stainless steel concrete anchors.

P. ADJUSTING AND CLEANING

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

END OF SECTION

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SECTION 26 14 46

SERVICE METER BOX

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Show ratings and characteristics including voltage ratings, busing arrangement, continuous current ratings, fault current withstand ratings, neutral bus rating, enclosure type, and mounting provisions.

3. Submit outline and dimensional drawings and conduit entry restrictions.

4. Obtain serving utility approval prior to fabrication.

PART 2 - PRODUCTS

A. GENERAL

1. Provide an enclosed meter type service meter box with a main disconnect. The unit shall be a non-residential meter box 0-100 amperes, 0-600 volts. Bus bars shall be tin plated copper and shall be braced to withstand the available short circuit current. The unit shall be approved by the serving utility.

2. Service pedestal shall meet EUSERC requirements and shall have a UL 508 industrial control panel label for service entrance equipment.

B. ENCLOSURE

1. Cabinet shall be constructed from 12 gauge hard drawn sheet metal with hinged front doors, catches and locks. All metal surfaces shall be primed and finished.

2. Cabinet shall have continuous welded seams and shall have full length deadfront with stainless steel hinge and ¼ turn latch & knurled knobs.

3. Cabinet shall have full length deadfront with stainless steel hinge.

4. Cabinet shall have fully framed side hinged outer door with swaged close tolerance sides for flush fit with top drip lip & closed cell neoprene flange compressed gaskets.

5. Cabinet shall be NEMA 3R type enclosure.

6. Interior of cabinet shall be constructed from 14 gauge cold rolled steel electrically welded and reinforced. All nuts, bolts, screws, and rings shall be stainless steel.

7. Cabinet shall have full length deadfront with stainless steel hinge.

8. Provide line and load connectors, meter socket with factory installed test bypass facilities. Meter socket type shall be coordinated with the serving utility.

9. Provide phenolic nameplates as required. Provide a plastic covered wiring diagram attached to the inside of the front door.

10. All control wires shall be marked at both ends by permanent wire markers.

11. Enclosure shall be factory wired and shall conform to the applicable NEMA standards.

C. MAIN DISCONNECT

Provide a 40A/2P circuit breaker interrupting capacity not less than the 10kA.

D. LISTING

Unit shall be UL labeled and service entrance rated.

PART 3 - EXECUTION

A. INSTALLATION

Secure meter box rigidly to wall.

END OF SECTION

SECTION 26 24 10

PANELBOARD

PART 1 - GENERAL

A. DESCRIPTION

This section describes materials, testing, and installation of a panelboard.

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Show ratings and characteristics including voltage ratings, bussing arrangement, continuous current ratings, fault current withstand ratings, neutral bus rating, enclosure type, ratings and arrangement of overcurrent protective devices, and mounting provisions.

3. Submit outline and dimensional drawings and conduit entry restrictions.

PART 2 - PRODUCTS

A. GENERAL

1. Panelboard shall comply with NEMA PB 1 (panelboards) and UL-67 (electric panelboards) requirements.

2. Provide dead front, safety-type panelboard with ratings as scheduled. Panelboard shall be circuit breaker type and suitable for the short circuit ratings specified. Panelboard shall be UL listed and labeled and manufactured by General Electric, Cutler-Hammer, Square D, Siemens, or equal.

B. CABINETS

Enclose panelboard in a single sheet metal cabinet with hinged front doors, catches, and locks. Provide holder for the directory on the inside of the door.

C. BREAKERS

1. Breakers shall be molded-case type and shall comply with NEMA AB3 requirements. Provide quick-make and quick-break toggle mechanism, inverse-time

trip characteristics, and trip-free operation on overload or short circuit. Automatic tripping shall be indicated by a handle position between the manual OFF and ON position. Provide trip ratings as indicated in the panelboard schedules.

2. Single-pole breakers shall be full module size; two poles shall not be installed in a single module. Multiple circuit breakers shall be of the common-trip type having a single operating handle.

D. BREAKER CONNECTIONS

Circuit breaker current-carrying connections to the bus shall be bolted type.

E. BUS BARS

Bus bars shall be copper. Provide a copper ground bus bar installed on the panelboard frame, bonded to the box, and containing at least 10 terminal screws.

F. DIRECTORIES

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

G. NAMEPLATES

Provide nameplates as specified in Section 26 05 00. Designate the identifying nomenclature, voltage, and phase of the panel as shown in the drawings.

PART 3 - EXECUTION

A. ACCESSIBILITY

Install panelboard so that the top of the highest circuit breaker is not more than 6 feet 6 inches above the floor or working platform.

B. FIELD TESTING

Operate each circuit breaker and verify that all phases of each load are disconnected.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

A. DESCRIPTION

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

B. RELATED WORK SPECIFIED ELSEWHERE

1. General Electrical Requirements: 26 05 00.

C. SUBMITTALS

1. Submit shop drawings in accordance with Section 26 05 00.

2. Submit material list for each type of wiring device and cover plate. Indicate type, ratings, material, color, and manufacturer.

D. REFERENCES

1. NEMA WD 1, General Purpose Wiring Devices.

2. NEMA WD 6, Wiring Device Configurations.

PART 2 - PRODUCTS

A. GENERAL

Provide wiring devices that are UL listed.

B. RECEPTACLES

Receptacles: Receptacles shall ground gault interrupter (GFI) duplex type. Receptacles shall be rated 20 amperes and shall comply with UL 943, Class A. Provide Leviton 6398-HGI, 3M GFI-2701, or equal.

C. COVER PLATES

Use individually gasketed weatherproof cover plates. Plates shall be gray polycarbonate lift-cover type. Covers shall provide weatherproof protection while outlet is in use. Provide Tay Mac Industrial Outlet Covers or equal.

PART 3 - EXECUTION

A. GROUNDING

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

B. TESTING

Test each receptacle with a circuit tester that checks voltage, polarity, and grounded conditions. Repair or replace defective receptacles and repeat the test.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide site clearing as indicated and in compliance with Contract Documents.

B. Section Includes:

1. Clearing and grubbing.
2. Tree and shrub protection and removal.
3. Removal of debris related to clearing and grubbing operations.

1.02 DEFINITIONS:

A. Caliper: Instrument used to measure tree diameter.
B. Clearing: Removal and disposal of above-ground items defined herein.
C. Grubbing: Removal and disposal of below-ground items defined herein.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify survey benchmarks and intended elevations for the Work are as indicated.

B. Verify temporary erosion and sediment control measures are installed before commencing with any other work at the site.

C. Verify location and existence of all underground utilities and structures by contacting utility owners, as required by law.

D. Provide 72-hour notice to existing utility owners, prior to beginning construction.

E. Contact utility companies and authorities to make arrangements for handling and disposal of utilities encountered during construction.

3.02 PREPARATION:

A. Protect bench marks, survey control points, and existing structures to remain from damage or displacement.

B. Protect all underground utilities and structures that are to remain. If damage occurs, immediately notify the utility owner within the hour.

C. Protect site features to remain from damage by construction equipment and vehicular traffic.

D. Identify waste areas for stockpiling of removed materials.

3.03 RESTORATION:

A. Existing surfaces, features, utilities, or structures that are to remain but are damaged during construction shall be restored to at least the condition in which they were found immediately before work began, unless noted otherwise.

B. Restore damaged utilities to the satisfaction of the utility owner.

C. Restore damaged private property to the satisfaction of the property owner.

3.04 CLEARING:

A. Remove and dispose of off site:

1. Trees, snags, brush, shrubs, downed timber, decayed wood, and other vegetative growth.

2. Rocks, tiles, lumps of concrete, trash piles, debris, refuse, and rubbish. Remove all evidence of their presence from the surface.

B. Clear ground within limits of work and width of permanent easement, unless otherwise noted.

3.05 GRUBBING:

A. Remove and dispose of all stumps, buried logs, matted roots, roots larger than 2 inches, and organic materials off site.

B. Roots larger than 2 inches in diameter shall be removed to a depth of 12 inches, and roots larger than 1/2-inches in diameter to a depth of 6 inches.

C. Areas designated to receive pavement or structures shall be grubbed a depth of 18 inches. Measure depths of cut from existing ground surface or proposed finished grade, whichever is lower.

D. Apply herbicide to remaining roots and vegetation to inhibit growth.

E. Depressions made by grubbing shall be filled with suitable material and compacted to conform to original adjacent grade.

F. Do not grub areas within drip line of trees to remain to avoid damage to roots.

3.06 CLEANING:

A. Promptly dispose of excess and unsuitable material off site.

B. Remove debris, junk, and trash from site.

C. Leave site in clean condition, ready for subsequent work.

D. Clean up spillage and wind-blown debris before entering public or private property, adjacent to site.

END OF SECTION

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SECTION 31 23 00

EXCAVATION AND FILL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide excavation and fill as indicated and in compliance with Contract Documents.

B. Section includes:

1. Excavation and fill for: Foundations, structures, and pavement; site drainage, structures, and features.

2. Compaction and testing.

1.02 REFERENCES:

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

1. M147: Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.

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

1. C33: Specification for Concrete Aggregates.

2. C136: Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

3. D421: Practice for Dry Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants.

4. D422: Test Method for Particle-Size Analysis of Soils.

5. D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

6. D1556: Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

7. D1557: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3 (600 kN-m/m3)).

8. D2167: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

9. D2487: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

10. D2940/D2940M: Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.

11. D4318: Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

12. D6938: Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

F. Occupational Safety and Health Administration (OSHA) Standards and Regulations:

1. 29 CFR 1926, Subpart P: Safety and Health Regulations for Construction, Excavations.

1.03 DEFINITIONS

A. Percent Compaction or Compaction Density: The field dry density of compacted material, expressed as a percentage of the maximum dry density.

B. Field Dry Density or Field Density: In-place density as determined by ASTM D1556 (Sand Cone Method), ASTM D2167 (Rubber Balloon Method), or ASTM D6938 (Nuclear Method).

C. Maximum Dry Density: Laboratory density as determined by ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor) and occurring at the optimum moisture content of the material being tested.

D. Proof Roll: Single pass of a drum or rubber tire roller, having a gross load between 25 to 50 tons. Rubber tire rollers shall have tires capable of operating at inflation pressures ranging from 90 to 150 psi.

1.04 SUBMITTALS:

Submit the following in accordance with Section 01 33 00:

Temporary excavation and shoring drawings for worker protection in accordance with the General Conditions.

1.05 QUALITY ASSURANCE:

A. Sustainability Standards Certifications.

B. Provide verification from testing laboratory that materials contain less than [1] percent asbestos by weight or volume. Submit asbestos report from testing laboratory to Owner for acceptance.

C. Testing will be provided by the Owner as specified. Contractor shall be responsible for cost of testing and inspection conducted as a result of non-conforming work.

D. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in of loose soil. Protection shall be in accordance with OSHA 29 CFR 1926, Subpart P.

1.06 SITE CONDITIONS:

Existing Conditions:

Final Construction Geology Report Coastal Branch Phase II Reach 2 Pipeline, Cholame Valley to Shedd Canyon: The report is for information only and is not part of the contract documents. Logs of borings are included in the report and indicate conditions encountered only at test boring locations. Nothing in the contract documents shall be construed as guarantee that other materials will not be encountered or that proportion of materials will not vary from proportions shown on the logs of test borings. The report is available upon request from the Owner.

PART 2 - PRODUCTS

2.01 FILL MATERIALS:

A. Suitable Material: Material from on-site excavation that meets all of the specified requirements for its intended use and is not unsuitable. Wet subgrade material which meets other requirements for suitable material is suitable.

B. Unsuitable Material: Material that fails to meet requirements for suitable materials; or contains any of the following:

1. Organic clay, organic silt, or peat; as defined in ASTM D2487.
2. Vegetation, wood, roots, leaves, and organic, degradable material.
3. Stones or rock fragments over 6 inches (15 cm) in any dimension.
4. Porous biodegradable matter, excavated pavement, construction debris, rubbish, or refuse.
5. Ice, snow, frost, or frozen soil particles.

C. General Fill: Suitable, unclassified material.

D. Structural Fill: Suitable material that is classified by the Unified Soil Classification System (USCS) in accordance with ASTM D2487 as GW, GP, GM, GC, SW, SP, SM, SC, CL. Verify that the largest particles in the fill are no greater in dimension than one-half the thickness of the compacted lift thickness.

E. Base: SSPWC 200-2.1, 3/4" crushed gravel.

F. Concrete Fill: Minimum compressive strength, 3,000 psi.

G. Granular Fill:

1. Densely Graded: ASTM D2940/D2940M, for bases.

2. Open Graded: ASTM C33, coarse aggregate, No. 57.

3. Open Graded: Crushed Stone: ASTM C33, Coarse Aggregate, No. 67. Soil particles shall conform to the physical property requirements of ASTM C33.

H. Sand: Natural sand.

2.02 EQUIPMENT:

Compaction equipment shall be capable of consistently achieving the specified compaction requirements.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify that excavation safety and support systems meeting the requirements of OSHA 29 CFR 1926, Subpart P are in place before commencing with excavation.

1. Minimum slopes for laying back excavations or materials are contained in OSHA 29 CFR 1926, Subpart P; Appendices A and B.

2. Minimum requirements for shoring and bracing are contained in OSHA 29 CFR 1926, Subpart P; Appendix C.

B. Verify that fill materials submittals have been accepted by Owner before commencing with work requiring the use of these materials.

C. Verify that erosion and sediment control measures are in place and functioning properly.

D. Immediately notify the Owner if unexpected subsurface facilities or suspected hazardous materials are encountered during excavation. Discontinue affected work in area until notified to resume work.

E. Test Pits:

Excavate test pits to field verify the locations of existing underground utilities at crossings and at tie-in points before ordering materials or commencing excavation. Immediately notify the Owner if conflicts are encountered.

3.02 PREPARATION:

A. Cut pavement with saw or pneumatic tools to prevent damage to remaining pavement. Dispose of large pieces of demolished pavement before proceeding with excavation.

B. Remove subsurface structures and related obstructions as indicated.

C. Remove boulders (greater than 4-inches) within excavation limits.

3.03 PROTECTION OF IN-PLACE CONDITIONS:

A. Support and protect from damage – existing pipes, poles, wires, fences, curbs, property line markers, and other features or structures which must be preserved in place to avoid being temporarily or permanently relocated.

B. Excavation Near Private Property:

1. Record existing condition of features on adjacent property by means of dated photographs or cameras.

2. Protect cultivated hedges, shrubs, and plants which would otherwise be damaged by the work.

3. Where protection of vegetation is not possible, dig up, temporarily transplant, and maintain. After active construction operations in the area have ceased, transplant vegetation to the original positions and provide water and nursery care until growth is re-established.

4. Do not use or operate tractors, bulldozers, or other power-operated equipment on paved surfaces. Provide protection on pavement or tracks if construction traffic is unavoidable.

3.04 RESTORATION:

A. Restore private property promptly. Begin restoration work within 24 hours of when damage occurred.

B. Existing surfaces, features, or utilities that are to remain but are damaged during construction shall be repaired or replaced to at least the condition in which they were found immediately before work began, unless noted otherwise.

C. Cultivated Vegetation: Includes, but is not limited to plants. Vegetation that is damaged shall be replaced with equal kind and of at least the quality before work began.

3.05 EXCAVATION:

A. Excavate to accommodate new structures and construction operations.

B. Excavate to lines and grades necessary to provide finish grades.

C. Excavations that are not shored and deeper than 4 feet shall have banks laid back to a minimum stable slope matching the angle of repose of the excavated material (2 horizontal to 1 vertical).

D. Workers shall have an adequate means of exit from excavations that are 4 feet or greater in depth. The means of exit shall not require more than 25 feet of lateral travel.

E. Establish limits of excavation to allow adequate working space for installing forms and for safety of personnel.

F. Carry out program of excavation, dewatering, and excavation support systems to eliminate possibility of undermining or disturbing foundations of existing structures or the work.

G. Provide sheeting and shoring in accordance with Section 31 41 00.

H. Preserve material below and beyond the lines of excavations.

I. Locate stockpiled excavated material at least 3 feet (90 cm) from edge of excavations to prevent cave-ins or bank slides.

J. Excavate for depressed mat foundations so that adjacent sections of foundation mat will rest on undisturbed ground.

3.06 SUBGRADE PREPARATION:

A. The exposed surface shall be examined by an engineering geologist or soils engineer to determine that the proper bearing material has been exposed.

B. Materials which are determined to be unsuitable by visual inspection shall be over-excavated below the foundation subgrade and backfilled with structural fill.

C. Backfill with compacted screened gravel or crushed stone wrapped with nonwoven geotextile fabric. In no case shall the aggregate be placed directly on the exposed subgrade prior to placing the geotextile fabric.

D. Compact subgrade and proof roll to identify soft spots or other deficiencies prior to filling operations or placing foundations. Correct deficiencies as specified for AUTHORIZED OVER-EXCAVATION and repeat proof roll procedure until successful.

E. When subgrade is below controlled fill, scarify subgrade to bond with subsequent material lifts.

F. Proof roll foundation subgrade prior to filling operation or placing foundation concrete. Continue until successful proof test is attained.

3.07 FILL:

A. Fill to lines and grades necessary to provide finish grades.

B. Use a placement method that does not disturb or damage other work or existing features.

C. Maintain fill materials within 3 percent of optimum moisture, to attain required compaction density.

D. Place and compact material in equal continuous layers.

E. General fill may be used in open areas, over lot fill, and areas which are not load bearing.

F. Use structural fill beneath and adjacent to buildings and structures, and beneath pavements.

G. Use concrete fill where footing bearing surfaces are over-excavated or footing is otherwise not bearing on undisturbed soil.

H. Maximum compacted depth is 6 inches for aggregate materials and 8 inches for soil materials, unless noted otherwise.

I. Deposit material evenly around structure to avoid unequal soil pressure.

J. Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage.

3.08 COMPACTION:

A. Compact to density specified and indicated for various types of material. Control moisture content of material being placed as specified, or if not specified - at a level slightly lower than optimum.

B. Compaction Density: All fill and backfill within the State Water Project right-of-way, unless otherwise noted, shall be 95% percentage of maximum dry density as defined by ASTM D1557 (Modified Proctor).

3.09 BACKFILLING AGAINST STRUCTURES:

A. Backfill shall not be placed against foundation walls until all interior floors have been placed and the concrete has attained design strength. This includes the floor level at grade or the next level above grade if no floor is within 2 feet (0.6 m) of finished grade.

B. Backfill shall not be placed against cantilever walls until the concrete has attained design strength.

3.10 FIELD QUALITY CONTROL:

A. Perform inspection at least once daily to confirm lift thickness and compaction effort for entire fill area.

B. Evaluate field density test results in relation to maximum dry density as determined by testing material in accordance with ASTM D698 Standard Proctor.

C. Location of field density tests shall as recommended by the Owner.

D. In the event compacted material does not meet specified in-place density, re-compact material and re-test area until specified results are obtained.

END OF SECTION

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SECTION 31 23 33

TRENCHING AND BACKFILL

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide trenching and backfill as indicated and in compliance with Contract Documents.

B. Section includes:

1. Trench excavation width and safety.
2. Backfill materials and placement.
3. Utility identification using marking tape and trace wire
4. Soil and aggregate materials.
5. Compaction and testing.

1.02 REFERENCES:

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

1. M147: Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.

B. American Public Works Association (APWA):

Public Works Management Practices Manual; latest edition.

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

1. C33: Specification for Concrete Aggregates.

2. C150: Standard Specification for Portland Cement.

3. C618: Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

4. D75: Standard Practice for Sampling Aggregates.

7. D421: Practice for Dry Preparation of Soil Samples for Particle Size Analysis and Determination of Soil Constants.

8. D422: Test Method for Particle-Size Analysis of Soils.

9. D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).

10. D1556: Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

11. D1557: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb/ft3 (600 kN-m/m3)).

12. D2167: Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

13. D2321: Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

14. D2419: Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

15. D2434: Standard Test Method for Permeability of Granular Soils (Constant Head).

16. D2487: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

17. D2488: Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

18. D2940/D2940M: Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.

19. D4318: Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

20. D4832: Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

21. D6938: Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. Occupational Safety and Health Administration (OSHA) Standards and Regulations:

29 CFR 1926, Subpart P: Safety and Health Regulations for Construction, Excavations.

1.03 DEFINITIONS:

A. Percent Compaction or Compaction Density: The field dry density of compacted material, expressed as a percentage of the maximum dry density.

B. Field Dry Density or Field Density: In-place density as determined by ASTM D1556 (Sand Cone Method), ASTM D2167 (Rubber Balloon Method), or ASTM D6938 (Nuclear Method).

C. Maximum Dry Density: Laboratory density as determined by ASTM D698 (Standard Proctor) or ASTM D1557 (Modified Proctor) and occurring at the optimum moisture content of the soil being tested.

D. Pipe Embedment: Comprised of the following or combination thereof:

1. Bedding: Placed directly underneath the pipe and brings the trench bottom to grade. Provides a firm, stable, and uniform support of the pipe.

2. Haunching: From bottom of pipe to springline.

3. Initial Backfill: From top of bedding or foundation to 6 inches above top of pipe, unless noted otherwise.

4. Final Backfill: Above the initial backfill to the original or finish grade.

5. Backfill: Includes initial and final backfill.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01 33 00.

1. Temporary excavation and shoring drawings for worker protection in accordance with the General Conditions.

2. Asbestos test results.

3. Gradation analysis.

4. Materials Sources: Name of source, location, date of sample, sieve analysis, and laboratory compaction characteristics.

5. Test and Evaluation Reports:

a. Field density testing reports: Provide results from field density testing of prepared subgrade and compacted fill.
b. Grain-size analysis.
c. Laboratory compaction characteristics of soils.
d. Water content.

6. Compaction method.

1.05 QUALITY ASSURANCE:

A. Sample backfill materials in accordance with ASTM D75.

B. Provide verification from testing laboratory that materials contain less than [1] percent asbestos by weight or volume. Submit asbestos report from testing laboratory.

C. Testing will be provided by the Owner as specified. Contractor shall be responsible for cost of testing and inspection conducted as a result of non-conforming work.

D. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods required to prevent cave-in of loose soil. Protection shall be in accordance with OSHA 29 CFR 1926, Subpart P.

1.06 SITE CONDITIONS:

A. Existing Conditions:

1. Final Construction Geology Report Coastal Branch Phase II Reach 2 Pipeline, Cholame Valley to Shedd Canyon. The report is for information only and is not part of the contract documents. Logs of borings are included in the report and indicate conditions encountered only at test boring locations. Nothing in the contract documents shall be construed as guarantee that other materials will not be encountered or that proportion of materials will not vary from proportions shown on the logs of test borings. The report is available upon request from the Owner.

PART 2 - PRODUCTS

2.01 BACKFILL MATERIALS:

A. Suitable Material: Material from on-site excavation that meets all of the specified requirements for its intended use and is not unsuitable. Wet subgrade material which meets other requirements for suitable material is suitable. Gravel and crushed rock materials shall have less than 1% asbestos by weight or volume.

B. Unsuitable Material: Material that fails to meet requirements for suitable materials; or contains any of the following:

1. Organic clay, organic silt, or peat; as defined in ASTM D2487.
2. Vegetation, wood, roots, leaves, and organic, degradable material.
3. Stones or rock fragments over 4 inches in any dimension.
4. Porous biodegradable matter, excavated pavement, construction debris, rubbish, or refuse.
5. Ice, snow, frost, or frozen soil particles.

C. Foundation Material: SSPWC 200-2.1, 3/4" crushed gravel..

D. Bedding: ASTM C33, coarse aggregate, No. 57; depth of 1/8 of diameter, 4 inches minimum, 6 inches maximum.

E. Backfill: Suitable, unclassified material excavated from trench; free of rocks with dimensions greater than 1/2 the compacted lift; and rocks provide less than 50 percent of the final backfill volume.

F. Granular Fill Pipe Zone and Pipe Base:

1. Densely Graded: Bank-Run Gravel with the following properties.

   Gradation: Table 31 23 33-1.

| Table 31 23 33-1 | |
|---|---|
| **Sieve Designation (Square Mesh)** | **Percentage Passing (By Weight)** |
| 3/8" | 100 |
| No. 4 | 75 |
| No. 30 | 12-50 |
| No. 100 | 5-20 |
| No. 200 | 10 |

2. Open Graded: ASTM C33, coarse aggregate, No. 57.

3. Open Graded: ASTM C33, Coarse Aggregate, No. 67. Soil particles shall conform to the physical property requirements of ASTM C33.

G. **Sand**:

1. Granular material free from clay balls, organic matter, and other deleterious substances and conforming to the following gradations:

| Sieve Size | Percent Passing By Weight |
|---|---|
| 3/8 inch | 100 |
| No. 4 | 75 to 100 |
| No. 30 | 12 to 50 |
| No. 100 | 5 to 20 |
| No. 200 | 0 to 10 |

2. Sand shall have a minimum sand equivalent of 50 per ASTM D2419.

H. Base Aggregate for Pavement: ASTM D2487, USCS Classification of SM, SP, SW, GM, GP, or GW; no more than 15 percent fines (passing No. 200 sieve) and a uniformity coefficient greater than 2.

2.02 CONTROLLED LOW-STRENGTH MATERIAL (CLSM) FOR TRENCH BACKFILL:

A. CLSM shall consist of a mixture of portland cement, aggregate, water, and admixtures conforming to the following:

Portland Cement: ASTM C150, Type II, maximum of 94 lb/cy.

B. Proportion the CLSM to achieve a flowable, non-segregating, self-consolidating non-shrink slurry. The water content shall not exceed that required to provide a mix that will flow, can be pumped, and will maintain the soil in suspension without segregation of the aggregate while being placed. Proportion the aggregate, cement, and water either by weight or by volume.

C. The unconfined compressive strength at seven days shall be minimum of 200 psi per ASTM D4832.

2.03 EQUIPMENT:

A. Compaction equipment shall be capable of consistently achieving the specified compaction requirements.

2.04 UTILITY IDENTIFICATION:

A. Trace Wire: Continuous, single-strand copper wire, insulated, maximum 12 AWG. Clear plastic covering, imprinted with inscription describing specific utility in large letters.

B. Marking Tape: Use type specifically manufactured for marking and locating underground utilities. Acid- and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch, minimum strength of 1,750 psi lengthwise and 1,500 psi crosswise. Provide tape manufactured with foil core at least 0.35-mil thick to enable detection by metal detection when tape is buried up to 3 feet deep. Tape shall bear continuous printed inscription describing specific utility. Tape color shall follow APWA Color Codes.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify that dewatering support systems are in place before commencing with excavation.

B. Verify that excavation safety and support systems meeting the requirements of OSHA 29 CFR 1926, Subpart P are in place before commencing with excavation.

1. Minimum slopes for laying back excavations or materials are contained in OSHA 29 CFR 1926, Subpart P; Appendices A and B.

2. Minimum requirements for shoring and bracing are contained in OSHA 29 CFR 1926, Subpart P; Appendix C.

C. Verify that fill materials submittals have been accepted by Owner before commencing with work requiring the use of these materials.

D. Verify that erosion and sediment control measures are in place and functioning properly.

E. Immediately notify the Owner if unexpected subsurface facilities or suspected hazardous materials are encountered during excavation. Discontinue affected work in area until notified to resume work.

F. Test Pits:

Excavate test pits to field verify the locations of existing underground utilities at crossings and at tie-in points before ordering materials or commencing excavation. Immediately notify the Owner if conflicts are encountered.

3.02 PREPARATION:

For excavation in paved areas, cut pavement with saw or pneumatic tools to prevent damage to remaining pavement. Dispose of large pieces of demolished pavement before proceeding with excavation.

3.03 PROTECTION OF IN-PLACE CONDITIONS:

A. Support and protect from damage – existing pipes, poles, wires, fences, curbs, property line markers, and other features or structures which must be preserved in place to avoid being temporarily or permanently relocated.

B. Excavation Near Existing Structures:

1. Discontinue digging by machinery when excavation approaches pipes, conduits, or other underground structures. Continue excavation by use of hand tools. Include such manual excavation in work to be done when incidental to normal excavation and under items involving normal excavation.

2. Excavate test pits near, or at intersection with, existing utilities or underground structures to determine the exact location of existing features.

C. Excavation Near Private Property:

1. Record existing condition of features on adjacent property by means of dated photographs or cameras.

2. Do not use or operate tractors, bulldozers, or other power-operated equipment on paved surfaces. Provide protection on pavement or tracks if construction traffic is unavoidable.

3.04 RESTORATION:

A. Restore private property and structures promptly. Begin restoration work within 24 hours of when damage occurred.

B. Existing surfaces, features, or utilities that are to remain but are damaged during construction shall be repaired or replaced to at least the condition in which they were found immediately before work began, unless noted otherwise.

C. Cultivated Vegetation: Includes, but is not limited to: hedges, shrubs, and plants. Vegetation that is damaged shall be replaced with equal kind and of at least the quality before work began.

3.05 TRENCH EXCAVATION:

A. Provide dewatering system to allow for working conditions in dry, stable soil. Properly dispose of water to avoid damage to property and in accordance with laws and regulations. Lower groundwater table prior to excavation and keep a minimum of 24 inches below lowest excavation subgrade until structure has sufficient strength to withstand soil and water pressures.

B. Sheet and brace trenches, excavations, and adjacent structures to comply with laws and regulations and to provide protection of life, property, and the Work. Where close sheeting is necessary, drive to prevent adjacent soil from entering excavation. Remove close sheeting only when removal would not damage property or the Work.

C. Preserve material below and beyond the lines of excavations.

D. Locate stockpiled excavated material at least 3 feet (90 cm) from edge of excavations to prevent cave-ins or bank slides.

3.06 AUTHORIZED OVER-EXCAVATION:

Remove rock for a depth of 6 inches and backfill with bedding material. Before any over-excavation is commenced, Contractor shall receive written authorization for over-excavation activities.

3.07 UNAUTHORIZED EXCAVATION:

Contractor is responsible for backfilling unauthorized excavations with bedding material.

3.08 BACKFILL:

A. Fill to lines and grades necessary to provide finish grades.

B. Use a placement method that does not disturb or damage other work or existing features.

C. Maintain fill materials within 3 percent of optimum moisture, to attain required compaction density.

D. Place and compact material in equal continuous layers.

E. Maximum compacted depth is 6 inches (150 mm) for aggregate materials and 8 inches (200 mm) for soil materials, unless noted otherwise.

3.09 CLSM PLACEMENT:

A. Provide batching equipment to obtain the proper weights of soil, cement, water, and admixtures. Measuring devices shall be sensitive to a 2 percent variation above or below the actual weights required. Volumetric batching may be used, provided the same accuracy required for weight batching is maintained.

B. Place the CLSM so that it flows easily into all openings between the pipe and the excavated trench. In some cases, such as trenches on a slope, a stiffer mix may be required to prevent it from flowing down the trench. In this case, use vibration to ensure that the CLSM completely fills all spaces.

C. Lay the pipe on the soil pads and place the CLSM bedding as shown in the drawings. Place bedding under pipe from one side and vibrate so that it flows under the pipe until it appears on the other side. Then add CLSM to both sides of the pipe and vibrate until it completely fills the space between the pipe and the excavated trench bottom. This operation shall follow as closely behind pipe laying operations as possible. Place CLSM in such a way as to prevent uplift or buckling of the pipe. Deposit CLSM as nearly as practicable in its final position. Do not disturb the pipe trench or cause foreign material to become mixed with the cement slurry.

D. Do not place backfill above the pipe until the CLSM has reached the initial set. Place and maintain a 6-inch (150 mm) cover of moist backfill cover until additional backfill is placed. If the ambient temperature is 50 degrees F (10 degrees C) or less, place an additional 6-inch (150 mm) cover of backfill over the moist backfill cover prior to the end of the working day.

E. Whenever freezing temperatures are imminent, maintain the CLSM at a temperature of not less than 50 degrees F (10 degrees C) for 24 hours after placement. The temperature of the mix shall be 50 degrees F (10 degrees C) or greater at the time of placement. Monitor the temperature by placing a thermometer in the CLSM immediately after sampling at the placement site. When freezing weather appears imminent, make ready at the placement site materials that may be required for protection of the CLSM. Delay placement of CLSM until adequate provisions for protection against weather are made. Do not place CLSM bedding in pipe trenches when the trench bottom or walls are frozen or contain frozen material. Backfill placed as cover over the CLSM is prohibited from containing any frozen material.

3.10 COMPACTION:

A. Compact to density specified and indicated for various types of material. Control moisture content of material being placed as specified, or if not specified - at a level slightly lower than optimum.

B. Compaction Density: Provide trench backfill densities according to Table 31 23 33-3. The values listed are minimum percentages, unless noted otherwise.

| Table 31 23 33-3 | |
|---|---|
| **Area** | **Relative Compaction** |
| Trench Backfill (under pavement, slabs) | 95 |
| Trench Backfill (under structures) | 95 |
| Trench Backfill | 90 |

3.11 UTILITY IDENTIFICATION:

A. Install marking tape over all site utilities, 12 inches (0.30 m) below finish grade.

B. Install trace wire at top center; pull wire taut to remove any slack.

C. Extend trace wire to utility boxes, manholes and junctions to allow for connection to subsurface location equipment.

3.12 FIELD QUALITY CONTROL:

A. The Owner will test for compaction as described below.

B. Compaction shall be deemed to comply with the specifications when no more than 1 test falls below the specified relative compaction. The one test shall be no more than 3 percentage points below the specified compaction. The Contractor shall pay the costs for any retesting or additional testing of work not conforming to the specifications.

C. Where compaction tests indicate a failure to meet the specified compaction, the Owner will take additional tests every 25 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

D. Perform field density testing in accordance with ASTM D6938.

E. Evaluate field density test results in relation to maximum dry density as determined by testing material in accordance with ASTM D1557.

F. Frequency of field density tests:

| Table 31 23 33-4 | |
|---|---|
| **Area** | **100 Frequency** |
| Trench | 1 per lift for each 250 linear feet |
| Regardless of the minimum testing frequency specified, field density tests shall be performed by the Owner in sufficient number to ensure that specified density is obtained. | |

G. Owner will retain the services of an independent testing laboratory to conduct testing and inspection.

3.13 ADJUSTING:

A. Shrinkage:

1. Backfill to a height above finished grade which will allow for the shrinkage or consolidation of material. Initially, provide at all points, an excess of at least one percent of total height of backfill measured from stripped surface to top of finished surface.

2. Supply specified materials and build up low places, without additional cost if embankment or backfilling settles so as to be below the indicated level for proposed finished surface at any time before final acceptance of the work.

3.14 PROTECTION:

A. Formulate excavation, backfilling, and filling schedule and procedures to eliminate possibility of undermining or disturbing foundations of partially and completed structures, pipelines and embankments or existing structures and pipelines.

END OF SECTION

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SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Section includes:

1. Chain link fence framework, fabric, and accessories.
2. Excavation for post bases.
3. Manual gates and related hardware.

1.02 REFERENCES:

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

M181: Standard Specification for Chain-Link Fence.

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

1. A53/A53M: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. A121: Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
3. A392: Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
4. F567: Standard Practice for Installation of Chain-Link Fence.
5. F654: Standard Specification for Residential Chain Link Fence Gates.
6. F900: Standard Specification for Industrial and Commercial Swing Gates.
7. F1184: Standard Specification for Industrial and Commercial Horizontal Slide Gates.

C. Chain Link Fence Manufacturers Institute (CLFMI):

PM 2445: Chain Link Fence Manufacturers Institute Product Manual.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01 33 00.

1. Submit Manufacturer's specifications, drawings, details and fence layout with appurtenances.
2. Submit certified test reports with results of tests for fence finish.
3. Submit shop drawings, samples and certificates simultaneously as one complete package.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION:

A. Conform to CLFMI PM 2445 for the specified use.

B. Provide framework, fabric, accessories and gates in accordance with ASTM F567.

D. Fence heights as indicated with top rail, bottom tension wire, and three strands of barbed wire projecting outward at top.

E. Gates:

1. Residential: Provide gates in accordance with ASTM F654.

2. Industrial and Commercial: Provide swing gates in accordance with ASTM F900.

2.02 FENCE FABRIC:

A. Galvanized steel.

B. Galvanized steel chain-link fabric conforming to ASTM A392, with Class 2 zinc coating (2.0 ounces of zinc per square foot of uncoated wire surface); Fabric woven in 2-inch mesh from No. 9 gauge wire, knuckled top and bottom.

C. Fiberglass filler strips for diagonal installation into chain link fence shall be fabricated from large sheets of a durable, semi-rigid fiberglass-reinforced polyester resin, pigments, and acrylic modifier for protection against sunlight. Strips are to be 1.77 inches wide by 6 feet long, with a nominal thickness of 0.060 inch. Color shall be approved by Owner.

2.03 BARBED WIRE AND SUPPORT ARMS:

A. Galvanized-steel barbed wire consisting of two strands of twisted No. 12-1/2 gage wires with 4-point barbs spaced 3 inches apart and conforming to ASTM A121, with Class 3 zinc coating (minimum of 0.8 oz of zinc coating over each square foot of uncoated wire surface for No. 12-1/2 gage wire).

B. Support arms projecting outward, from top of posts, at 45 degrees and capable of withstanding 200 lb. downward pull on outermost end of arm, without failure. Arms with provision for attachment of three strands of evenly spaced barbed wire and integral with post top weather caps with holes for passage of top rail at intermediate posts.

2.04 TENSION WIRE:

No. 7-gage coil spring steel wire with galvanized finish having minimum of 0.8 oz of zinc coating over each square foot of uncoated wire surface.

2.05 TIE WIRES:

Tie wires, for fastening fence fabric to line posts and rails, not less than No. 9 gage wire.

2.06 LINE POSTS:

2-3/8 inches outside diameter steel pipe, Schedule 40.

2.07 END, CORNER, AND PULL POSTS:

2-7/8 inch outside diameter steel pipe weighing not less than 5.79 lb/ft, or 2-1/2 inch square steel tube weighing not less than 5.14 lb/ft, or 3-1/2 inch by 3-1/2 inch roll-formed, steel corner section weighing not less than 5.14 lb/ft.

2.08 GATE POSTS:

4-1/2 inch outside diameter steel pipe, gate posts for gate leaves over 6 feet wide and up to and including 8 feet wide shall be Schedule 40.

2.09 RAILINGS:

1-5/8 inch outside diameter Schedule 40 steel pipe.

2.10 TRUSS:

3/8 inch diameter steel rod diagonal truss braces between terminal and adjacent line posts and for gate framework.

2.11 FITTINGS:

Heavy-duty malleable iron or pressed steel fittings of suitable size to produce strong construction.

2.12 STRETCHER BARS:

Flat bars with minimum cross section dimensions of 3/16-inch by 3/4 inch, full height of fabric, secured with bar bands 3/16" x 3/4", spaced approximately 12 inches on centers and bolted with 3/8-inch diameter bolts, for attaching fabric to terminal posts.

2.13 GATE LEAF FRAMEWORK:

1-7/8 inch inch outside diameter Schedule 40 steel pipe.

2.14 GATE HINGES:

Heavy pattern of adequate strength for gate size, with large bearing surfaces for clamping or bolting in position.

2.15 LATCH:

Gates with suitable latch, accessible from both sides and with provision for padlocking.

2.16 GATE PADLOCKS:

A. Manufacturers:

1. Eaton Corp. Lock & Hardware Div., Yale Marketing Dept., Charlotte, NC.

2. P&F Corbin, Div. of Emhart Corp., Berlin, CT.

3. Best Universal Lock Co., Inc., Indianapolis, IN.Solid brass cases hardened steel shackles, removable core cylinders, and galvanized steel chains attached to shackle by a clevis.

2.17 CONCRETE FOOTINGS:

Section 03 30 00 Cast-In-Place Concrete, Class A concrete.

2.18 GROUT:

One part Portland cement and three parts of clean, sharp, well-graded sand with minimum water for proper workability for posts set in solid rock.

2.19 ACCESSORIES:

A. Steel pipe dimensions and weights: ASTM A53/A53M, Schedule 40. Dimensions specified are nominal pipe sizes.

B. Dimensions and weight tolerances: Plus or minus 5 percent.

C. Zinc Coating: Minimum 2.0 ounces per square foot.

D. Provide posts with tops of same material, and designed to fit securely over post and carry top rail. Carry apron around outside of post at base of top fitting.

E. Ferrous metal fittings, posts, fence, gate framework, and accessories galvanized with heavy coating of 2.0 oz/ft2 pure zinc spelter per square foot or surface area to be coated. Use hot-dip process. Thinner zinc coatings, electro-galvanizing, zinc paint or cold galvanizing compounds not used as substitute for hot-dipped galvanized finish not acceptable.

F. Fabricate and weld before hot-dip galvanizing. Weld conforming to American Welding Society standards.

G. Hot-dip galvanized gate frame, after welding, if bolted or riveted corner fittings not used.

H. Galvanize fittings, posts, fence and gate framework, and accessories.

I. Single and double leaf swing gates with center bolt, center stop, and automatic backstops.

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Examine conditions under which fence and gates are to be installed. Notify Owner, in writing, of improper conditions of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Verify measurements at site.

D. Check location of underground work to make sure fence footings clear utilities and drainage work.

E. Do not install fence until final grading is complete and finish elevations are established.

F. Do not drive equipment on areas to be landscaped, except as accepted by Owner. Areas not accessible from roads shall be protected with heavy wood planking. Remove barricades and protection at completion of project. Repair damaged landscape surfaces.

3.02 INSTALLATION:

A. Footings:

1. Vertical sides to minimize up-lift. Dispose of excavated material in accordance with Section 01 74 23.

2. Rod and compact concrete around posts. Slope top of footings above level of adjacent grade, and trowel finish.

3. Size:

a. 9 inches minimum diameter.
b. Set corner, end, pull, and gate posts 42 inches into concrete.
c. Set line posts set 36 inches into concrete.
d. Total depth of concrete 6 inches greater than required for post embedment.

4. Time of Set: 48 hours before rails are erected or before fabric is applied or stretched.

B. Framing:

1. Install line posts not more than 8 feet apart.

2. Install corner posts where the fence line changes direction by more than 30 degrees.

3. Set posts in concrete footings, plumb and true to line.

4. Brace and truss end, pull, corner, and gate posts to adjacent line posts. Provide brace to match top rail spaced midway between top rail and tension wire and extending to adjacent line posts. Provide brace to match top rail spaced midway between top rail and tension wire and extending to adjacent line post. Truss diagonally with 5/16-inch diameter tension rod with turnbuckle.

5. Fasten top rail to end, pull, gate and corner posts. Pass top rail through fittings of line posts.

6. Provide expansion and contraction joints in top rail for each 100 linear feet of fence.

7. Fasten bottom tension wire to end, pull, gate, corner, and line posts.

8. Maximum area of unbraced fence shall not exceed 1,500 square feet.

9. Use galvanized sleeve and grout posts or install with suitable galvanized flange casings and galvanized anchor bolts as accepted by Owner.

C. Fabric:

1. Place fabric on outside of posts and stretch to avoid bulging or buckling.

2. Fasten at line posts, top rail, and bottom tension wire with aluminum or zinc PVC coated ties. Space ties not more than 15 inches apart on line posts and not more than 24 inches apart on rail and tension wire.

3. Fasten at terminal posts at intervals not exceeding 15 inches using flat or beveled galvanized steel bands with 5/16-inch x 1-1/4 inch galvanized carriage bolts and nuts.

4. Make tie connections on interior side of fence.

5. Provide steel angle metal closures where finished ground surface is more than two inches below bottom tension wire. Bolt steel angle to fence posts, and install reinforcing rods and bracing members as accepted. Install rods of accepted length vertically. Where drainage ditches cross fence line, provide concrete ditch lining and steel reinforcing bar grill.

6. Install three strands of barbed wire on each extension arm of line fence and at top of each gate. Pull wires taut and fasten at each support.

7. Install barbed wire on extension arms as indicated. Pull each wire taut, and make entire assembly secure Attach wire to end, corner, pull, and gate posts with wire stretching bands.

8. Install gates plumb, level, and secure for full width of opening and hardware adjusted for smooth operation.

9. Electrical Ground where a power line carrying more than 600 volts passes over fence, install ground rod at nearest point directly below each point of crossing.

3.03 REPAIR:

Remove and replace fencing which is improperly located or is not true to line, grade and plumb within tolerances as indicated.

END OF SECTION

SECTION 33 10 00

WATER UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION:

This section covers water pipes, valves, and appurtenances.

1.02 REFERENCES:

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

HS 20-44: Specification for Highway Bridges, 16th Edition.

C. American Society of Mechanical Engineers (ASME):

1. B16.18: Cast Copper Alloy Solder Joint Pressure Fittings.

2. B16.22: Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

D. American Society of Testing and Materials International (ASTM):

1. B88: Standard Specification for Seamless Copper Water Tube.

2. C890: Standard Specification for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.

3. C913: Standard Specification for Precast Concrete Water and Wastewater Structures.

5. D1784: Standard Specification for Rigid Poly (Vinyl Chloride) Compounds (PVC) and Chlorinated Poly (Vinyl Chloride) Compounds.

6. D1785: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

8. D2441: Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

9. D2466: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

10. D2467: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

11. D2564: Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

12. D3139: Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.

13. F437: Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80

14. F439: Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.

15. F441/F441M: Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.

16. F493: Standard Specification for Solvent Cements for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings; 2004.

18. F1290: Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings

E. American Welding Society (AWS):

A5.8/A5.8M: Specification for Filler Metals for Brazing and Braze Welding.

F. American Water Works Association (AWWA):

1. C500: Metal-Seated Gate Valves for Water Supply Service.

2. C508: Swing-Check Valves for Waterworks Service, 2 In. (50 mm) Through 24 In. (600 mm) NPS.

3. C509: Resilient-Seated Gate Valves for Water Supply Service.

4. C512: Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.

5. C515: Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Services.

6. C550: Protective Interior Coatings for Valves and Hydrants.

7. C701: Cold Water Meters - Turbine Type, for Customer Service.

8. C702: Cold Water Meters - Compound Type.

9. C800: Underground Service Line Valves and Fittings.

10. C900: Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Distribution.

11. C905: Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 Inch Through 36 Inch.

14. M23: PVC Pipe - Design and Installation.

1.03 DEFINITIONS:

Appurtenances: Additional piping items as required to provide a complete piping system suitable to convey water as specified and intended. These items may or may not be specified, but are necessary to complete the piping system.

1.04 SUBMITTALS:

A. Submit the following in accordance with Section 01 33 00.

1. Pipe materials.
2. Pipe fittings.
3. Pipe couplings.
4. Pipe thrust restraint.
5. Valves.
6. Accessories.
7. Appurtenances.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Instructions: Provide manufacturer's installation instructions for pipe valves and appurtenances.

D. Field Test Reports: Provide results for hydrostatic and bacteriological tests.

E. Project Record Documents: Provide actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE:

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. NSF Approval: Material used in the manufacture of pipe, valves, fittings, and appurtenances shall be approved by the National Sanitation Foundation (NSF) for conveying potable water. Materials shall bear the NSF label.

1.06 DELIVERY STORAGE AND HANDLING:

Deliver and store valves in shipping containers with labeling in place.

1.07 WARRANTY:

Provide standard product warranties for piping materials.

PART 2 - PRODUCTS

2.01 STAINLESS STEEL (SST) PIPE

A. Pipe smaller than 3 inches shall conform to ASTM A312, Grade TP 316l.

B. Pipe sizes and wall thicknesses shall conform to ASME B36.19 as follows:

| Pipe Size | Wall Thickness |
|---|---|
| 1 inch and smaller | Schedule 40S |
| 1 1/4 inches through 3 inches | Schedule 40S |

C. Fittings

Fittings 3 inches and smaller shall be threaded or socket welded, conforming to ASME B16.11, 3,000-pound CWP. Material for threaded fittings shall conform to ASTM A403, Class WP316 or ASTM A182, Grade F316. Material for socket welded fittings shall conform to ASTM A403, Class WP316L or ASTM A182, Grade F316L.

D. PICKLING, PASSIVATING, AND FINAL CLEANING

Pipe and fittings shall be final cleaned, pickled, and passivated per ASTM A380. Passivation shall be the removal of exogenous (not inherent in the base metal) iron or iron compounds from the surface of the stainless steel by means of a chemical dissolution, by a treatment with an acid solution that will completely remove the surface contamination but will not significantly affect the stainless steel itself. After final cleaning, wet surfaces with water and inspect for rust spots after 24 hours. Reclean if there is any evidence of rusting.

E. QUALITY CONTROL

Include the "Hydrostatic Test" and "Flattening Test" requirements described in ASTM A999. A nondestructive electric test per ASTM A999 may be substituted for the hydrostatic test.

F. UNIONS

Unions shall be 3,000-pound WOG forged stainless steel, with dimensions conforming to MSS SP-83. Ends shall be threaded per ASME B1.20.1 for socket-welded type. Material shall conform to ASTM A182, Grade F316 for threaded end unions and Grade F316L for socket-welded type.

G. JOINTS

1. Joints for pipes 3 inches and smaller shall be threaded or socket welded, same material as specified for fittings, 3,000-pound WOG, conforming to ASME B16.11.
2. Joints for buried or submerged pipe larger than 3 inches shall be butt-welded.

2.02 PVC PIPE (SMALLER THAN 4 INCHES IN DIAMETER):

A. Pipe: ASTM D1785, Schedule 40.

B. Fittings: ASTM D2467 for solvent welded joints; ASTMD 2464 for threaded joints. Match schedule and pressure rating of adjacent pipe.

C. Joints: Solvent welded or Push-on in accordance with ASTM D3139. Threaded, as indicated. Flanged, in accordance with manufacturer's recommendations, as indicated.

D. Trace Wire: See Section 31 23 2302317 for additional requirements. Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

E. Solvent Cements: Use fast-drying solvent for 1-1/2 inch (38 mm) sizes and smaller. Use heavy slow-drying type for sizes 2 inches (50 mm) and larger. Solvent as furnished by manufacturer of pipe used. Cement shall be compatible with piped fluid.

1. PVC: ASTM D2564.

2. Use only silica-free cements when jointing lines carrying sodium hypochlorite.

F. Thread Lubricant:

1. Liquid: Teflon base liquid in plastic squeeze bottles. Use liquid lubricant on permanent joints.

2. Tape: Teflon base tape. Use tape on joints for valves or joints that may be disconnected often.

G. Bolting: Machine bolts and standard hexagon nuts with N.C. threads, 304 SS, unless noted otherwise.

H. Unions: Union connections to other metal piping materials shall comply with MSS SP-107. The fitting end for connection to PVC pipe shall be a female socket. Provide Type 316 stainless steel tailpieces.

2.03 VALVES:

A. Type 101 – Full Port Flanged Stainless Steel Ball Valves 2 Inches and Smaller:

Stainless steel ball valves, 2 inches and smaller, for water service shall be rated at a minimum pressure of 1,000 psi WOG at a temperature of 100°F. Provide full port ball and body design. Valve body, ball, and stem shall be Type 316 stainless steel, ASTM A276 or A351. Seat and seals shall be reinforced Teflon. Valves shall have lever actuators, plastic coated. Valves shall have non-blowout stems. Valve ends shall be specified in the drawings. Valves shall be Victaulic Series 726S, Worcester Series 59, Apollo 86-100 Series, or equal.

B. Type 102 – Regular Port Threaded Stainless Steel Ball Valves 2 Inches and Smaller:

Stainless steel ball valves, 2 inches and smaller, for water service shall be rated at a minimum pressure of 300 psi WOG at a temperature of 100°F. Valve body, ball, and stem shall be Type 316 stainless steel, ASTM A276 or A351. Seat and seals shall be reinforced Teflon. Valves shall have lever actuators, plastic coated. Valves shall have threaded ends (ASME B1.20.1) and non-blowout stems. Valves shall be McCanna Figure M402, Worcester Series 44, Stockham Figure SD 2120-SSMO-R-T, Apollo 76-100 Series, or equal.

C. Type 103 – Double Union PVC Ball Valves 3 Inches and Smaller:

Thermoplastic ball valves, 3 inches and smaller, for water service shall be rated at a pressure of 150 psi at a temperature of 105°F. Body, ball, and stem shall be PVC conforming to ASTM D1784, Type 1, Grade 1. Seats shall be Teflon. O-ring seals shall be Viton or EPDM. Valve ends shall be of the double-union design. Ends shall be socket welded except where threaded or flanged-end valves are specifically shown in the drawings. Valves shall have handle for manual operation. Valves shall be as manufactured by Chemtrol, Hayward, R & G Sloan, Spears Manufacturing Company, Plast-O-Matic, IPEX Series VK or VKD, or equal.

D. Type 201 – PVC Ball Check Valves, 3 Inches and Smaller:

PVC check valves, 3 inches and smaller, shall be constructed of PVC per ASTM D1784, Type I, Grade 1. Ends shall be double union, socket welded. Seats and seals shall be Viton or EPDM. Valve shall have a pressure rating of 150 psi at a temperature of 73°F.

E. Type 301 – Pressure-Relief Valves 3/4 Inch and Smaller:

Valve shall be a hydraulically operated, diaphragm-actuated globe valve with a direct acting, adjustable, loaded spring to permit flow when inlet pressure exceeds the spring setting. Adjustment range of the spring setting shall be 20 to 200 psi. Valve body and cover shall be stainless steel, ASTM A743. Valve trim shall be Type 303 stainless steel. Diaphragm shall be Buna-N. Valve inlet pressure rating shall be at least 250 psi. Valve shall be Cla-Val Model 55F, Aquatrol 741, or equal.

F. Type 401 – Air-Release Valves 3/4 Inch and Smaller:

Air-release valves for water service 3/4 inch and smaller shall be of the direct-acting type or lever type. Valve cover and body shall be Type 303 stainless steel. Valve ends shall be NPT. Valves shall have an operating pressure of 150 psi. Orifice sizes shall be 1/8 inch or 3/32 inch for 1/2 inch valves and 1/8 inch for 3/4 inch valves. Valves shall be APCO 55; Val-Matic Model 22; Crispin A-series; or equal.

G. Type 501 – Quick Connects, 2 Inches and Smaller:

Two-piece cam-and-groove hose coupling with aluminum body, threaded ends, and stainless steel cam arms. Working pressure shall be 100 psi minimum. Provide as two

piece unit with male adapter mated to female end with threaded plug. Manufacturer and Product: Dixon "Boss-Lock," Types D and F or equal.

2.04 MANUAL OPERATORS:

A. General:

1. Operator force not to exceed 40 lbf (178 N) under any operating condition, including initial breakaway. Gear reduction operator when force exceeds 40 lbf (178 N).

2. Operator to be self-locking type or be equipped with self-locking device.

3. Provide position indicator on quarter-turn valves.

B. Buried Operator:

1. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2-inch and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.

2. Design buried service operators for quarter-turn valves to withstand 450 lbf-ft (610 N-m) of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi (69 kPa).

3. Buried valves shall have extension stems, bonnets, and valve boxes.

2.05 VALVE BOXES:

A. Valve boxes shall be two-piece sliding type, cast iron, with extension shafts.

B. Cast-Iron Boxes: Extension type with slide-type adjustment, flared base and 3/16-inch (4.8 mm) minimum thickness of metal.

C. Cast the word "WATER" in cover. Adapt box length, without full extension, to depth of cover required over pipe at valve location.

D. Coat buried cast-iron pieces per Section 09 91 14, System No. 21.

E. Units shall be as manufactured by Tyler Pipe, Geneco, Star Pipe Products, or equal. Extension pipes shall be cast iron.

2.06 EXTENSION STEMS FOR BURIED VALVE ACTUATORS:

A. Where the depth of the valve is such that its centerline is more than 4 feet below grade, provide operating extension stems to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover. Extension stems shall be Type 316 stainless steel, solid core, and shall be complete with 2-inch-square operating nut. The connections of the extension stems to the operating nuts and to the valves shall withstand without damage a pull of 300 foot-pounds.

B. Extension stem diameters shall be as tabulated below:

| Valve Size (inches) | Minimum Extension Stem Diameter (inches) |
|---|---|
| 2 | 3/4 |
| 3, 4 | 7/8 |

2.07 FLANGE INSULATION KITS:

A. Flange insulation kits shall consist of insulating gasket, an insulating stud sleeve for each bolt, insulating washers for each bolt, and a steel washer between each insulating washer and the nut. The sleeves shall be one piece, integral with the insulating washer. Provide double sleeve and washer sets for each bolt.

B. Gasket material shall be phenolic, 1/8 inch thick. The flange insulating gasket shall be full diameter (full face) of the flange with a nitrile O-ring on each side of the gasket. Dielectric strength shall be not less than 500 volts per mil and a compressive strength of not less than 24,000 psi.

C. Insulating flange bolt sleeves shall be spiral-wrapped mylar having a minimum dielectric strength of 4,000 volts per mil.

D. Insulating flange bolt washers shall be high-strength phenolic a minimum thickness of 1/8 inch. Dielectric strength shall be not less than 500 volts per mil and a compressive strength of not less than 25,000 psi.

E. Steel flange bolt washers for placement over the insulating washers shall be a minimum thickness of 1/8 inch and be zinc plated or stainless steel.

F. Flange insulation kits shall be as manufactured by Advance Product Systems, PSI, Central Plastics Company, or equal.

2.08 ACCESSORIES:

A. Tapping Sleeves: Ductile- or cast-iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of sleeve suitable for maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by manufacturer of sleeve.

B. Tapping Valves: Provide tapping valves that conform to gate valves, specified herein. Provide tapping valves suitable for installation with tapping sleeves and pipe used, designed for minimum water working pressure of 150 psi, and have clear waterway equal to full nominal diameter of valve.

2.09 SHOP PAINTING/COATINGS:

Do not coat stainless steel materials. Unless noted otherwise, provide painting and coating per Section 09 91 14.

2.10 SHOP TESTING:

Test pipes, valves, hydrants, and applicable accessories per manufacturer requirements, and as required by referenced Standards.

PART 3 - EXECUTION

3.01 EXAMINATION:

Verify existing conditions.

3.02 PREPARATION:

A. Ream pipe and tube ends and remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

D. Excavate pipe trench in accordance with Section 31 23 23 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

3.03 WATER PIPE INSTALLATION:

A. Install pipes and structures to within tolerance of 1/2-inch of indicated elevations.

B. Install PVC piping according to AWWA M23.

C. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main and as indicated.

D. (NTS: Coordinate with the local municipality to ensure appropriate bury depths are indicated.)

E. Establish elevations of buried piping to ensure not less than 3 feet of cover. Establish elevations of buried piping to ensure not less than 42 inches of cover underneath traffic areas.

F. Install trace wire continuous over top of pipe buried 6 inches below finish grade, above pipe line; coordinate with Section 31 23 33. Extend wire into valve boxes and adjacent to hydrants for connection to location equipment.

G. Backfill trench in accordance with Section 31 23 33

3.04 VALVE INSTALLATION:

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Install tapping sleeves and tapping valves in accordance with manufacturer's recommendations.

D. Install valves according to applicable AWWA Standards.

3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM:

Refer to Section 33 13 00.

3.06 REPAIR/RESTORATION:

Repair any existing utilities/structures, or features damaged during installation of water utilities to Owner's satisfaction, and at no cost to Owner.

3.07 FIELD TESTING:

Bacteriological testing shall be in accordance with Section 33 13 00.

3.08 FIELD PAINTING/COATINGS:

Repair any shop painting/coatings damaged during storage or installation to Owner's satisfaction.

3.09 PROTECTION:

Protect installed water utilities from damage throughout storage, installation, testing, and final approval.

END OF SECTION

SECTION 40 05 74

SPRING-ACTUATED CONTROL VALVES

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes requirements for materials and installation of two stainless steel spring-loaded, direct-actuated control valves acting as pressure-reducing valves for water service. Valves are located in the vault.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 09 91 14.

B. Water Utilities: 33 10 00.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 00.

B. Submit dimensional drawings for each size and type of valve provided.

C. Submit manufacturer's catalog data and detail drawings showing all valve parts and describe by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show manufacturer's recommended maximum operating pressure and maximum recommended flow. Show linings and coatings.

PART 2 - PRODUCTS

2.01 VALVE END CONNECTIONS

A. Provide valve end connections as specified in the drawings.

B. Stainless steel flanges shall comply with ASME B16.5, Class 150. Flanges shall be flat face.

C. Threaded ends shall comply with ASME B1.20.1.

2.02 SPRING-ACTUATED PRESSURE-REDUCING VALVES FOR WATER SERVICE

A. Valves shall be of the spring-loaded, direct-operated type for water service. The valves shall automatically convert high, varying inlet pressure to a lower, constant outlet pressure. Provide a valve design consisting of a spring in a chamber, acting on a diaphragm that transmits motion to the valve. Outlet pressure shall be adjustable by turning an adjusting handwheel to vary spring tension. Provide pressure gauge integral

with the valve, indicating outlet pressure. Body and cover shall be stainless steel. Diaphragm shall be nitrile or rubber.

B. Outlet pressure shall be field adjustable over a range of 5 to 95 psi. Valves shall be Cla-Val 90-01 or approved equal.

2.03 CLASS 300 RATE-OF-FLOW CONTROL VALVE

A. Equip the control valve with a dual solenoid pilot system and with check valve features. The solenoids shall respond to valve control commands from a valve controller and, using system downstream flowrate, move the stem to the desired position. The pilot system shall function as follows:

1. Provide valve controller to interface with a PLC. The valve controller shall modulate the valve to maintain the flow setpoint received from the PLC. When the valve controller receives "close" from PLC, the valve controller shall drive the valve closed. An operator shall be able to manually control the valve via valve controller. In the manual mode, the operator shall be able to enable the valve controls, enter a flow setpoint, and drive the valve open or closed. A contact closure signal output shall be generated by the valve controller when in valve controller is in manual mode.

2. In a power outage, the valve shall remain in the last position.

B. Provide strainer, three isolation valves, closing speed control, and opening speed control in the pilot control piping and tubing. Opening and closing speed controls shall be adjustable and initially set to 5 minutes (travel time from valve fully open to fully closed and vice-versa).

C. Solenoids shall operate with 24VDC. Provide ball valves to bypass the two solenoid valves in order to facilitate manual control of main valve. Provide isolation valves for each pilot system.

D. Valve shall include a position transmitter for signal feedback.

E. Solenoids shall be identified with stainless steel nameplates as follows:

| Solenoid Function | Nameplate Engraving |
|---|---|
| Open Valve | SOV-A (Open) |
| Close Valve | SOV-B (Close) |

F. The valve shall close tight upon a flow reversal.

G. Valve shall be Cla-Val Series 131 with 131VC electronic valve controller or approved equal.

## PART 3 - EXECUTION

### 3.01 VALVE INSTALLATION

Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be leak tight.

### 3.02 FIELD TESTING

A. Test valves at the same time that the connecting pipelines are pressure tested. Protect or isolate any parts of valves, operators, or control and instrumentation systems whose pressure rating is less than the test pressure. Valve bodies and joints shall have zero leakage.

B. Run water through liquid service valves and air through air or gas service valves and assure that valves regulate or sustain pressure to the specified setting. Duration of this test shall be at least 30 minutes.

END OF SECTION

SECTION 40 23 19

PIPE SUPPORTS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Design, and provide a complete system of pipe supports with inserts, bolts, nuts, restraining and hanger rods, washers, miscellaneous steel, sliding Teflon plates, and accessories as indicated and specified. The term pipe support includes hangers, guides, restraints, anchors and saddles.

B. Provide all support systems and the design of all support systems for all piping as specified herein. The Contractor shall provide pipe support locations, configurations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein.

C. The Contractor shall be responsible for the proper design, fabrication, location, shop drawings and installation of all pipe supports in accordance with the specified requirements.

D. Pipe support locations and types for piping 1/2-inch and larger shall be determined by the Contractor using the guidelines for support spacing specified herein and other criteria contained in this pipe support specification. Guidelines for pipe supports may need to be adjusted based upon field coordination, field routing, or other considerations outlined herein such as structural load limits. The Contractor may revise the pipe support locations and details through accepted shop drawing submittals stamped by a Registered Professional Engineer as specified herein. The Contractor is responsible for the proper design, installation and fabrication of all pipe supports in accordance with the specified requirements. For pipe supports 1/2-inch and larger pipe support shop drawings together with a marked up piping drawing showing support number, location and typical type shall be submitted by the Contractor for acceptance.

1. The Contractor shall be responsible for coordinating all pipe support designs for all trades to ensure compliance with all of the requirements of this specification, including but not limited to the total limitations specified herein.

E. Design and provide all temporary pipe supports required during installation and testing.

1.02 REFERENCES:

A. The American Society of Mechanical Engineers (AMSE):

B31.1: Power Piping.

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

1. A36: Standard Specification for Carbon Structural Steel
2. A307: Standard Specification for Carbon Steel Externally Threaded Standard Fasteners
3. A312: Seamless and Welded Austenic Stainless Steel Pipe
4. A500: Cold Formed Welded and Seamless Carbon Steel Structural Tubing.
5. A572: Specification for Steel Plate.
6. E165: Practice for Liquid Penetrant Inspection Method.
7. E709: Practice for Magnetic Particle Examination.

C. American Welding Society (AWS):

1. D1.1: Structural Welding

D. Fluid Sealing Association: Technical Handbook.

E. Manufacturers' Standardization Society (MSS):

1. SP-58: Pipe Hangers and Supports - Materials and Design.
2. SP-69: Pipe Hangers and Supports - Selection and Application.
3. SP-89: Pipe Hangers and Supports - Fabrication and Installation Practices.
4. SP-90: Guidelines on Terminology for Pipe Hangers and Supports.

F. National Association of Expansion Joint Manufacturers: Standards of the Expansion Joint Manufacturers Association, Inc.

1.03 SUBMITTALS:

A. Submit the following in accordance with Section 01 33 00:

1. Pipe support drawings specified herein and including data for accessory items for acceptance prior to fabrication. The Contractor shall submit pipe support coordination drawings including all piping and pipe supports for all trades.

   a. Detailed drawing of the device with dimensions.

   b. A table of applied forces and moments.

   c. A complete bill of materials.

   d. A unique identification and revision level.

   e. Stamp of a Registered Professional Engineer, registered in the state where this project is being constructed, experienced in pipe support design and pipe stress analysis as specified herein.

   f. Detailed connections to existing structure.

g. Indicate all welds, both shop and field, by Standard Units of Measurement as specified in AWS D1.1.

2. Welding Procedure: Submit description required to illustrate each welding procedure to be performed in the specified work.

3. Welding Equipment: Submit descriptive data for welding equipment, including type, voltage and amperage.

4. Qualification for Welders: Provide certification that welders to be employed in work have satisfactorily passed AWS or ASME qualification tests. If recertification of welders is required, retesting is the Contractor's responsibility at no additional cost to the Owner.

5. Pipe support manufacturers' qualifications as specified herein.

   a. List of at least five (5) successful pipe support projects and current addresses and telephone numbers of persons in charge of representing the owner or the owner of those construction projects during the time of pipe support design, fabrication and installation.

   b. Qualification of manufacturers' Registered Professional Engineer, registered in the state where this project is being constructed, who stamps and seals shop drawings and designs.

6. Coordination drawings for pipe supports shall include as a minimum the following information.

   a. Coordination drawings shall include all pipe supports covered by specifications.

   b. These coordination drawings will be used by the Contractor to ensure that the pipe supports do not obstruct access, access for equipment operation or removal including all mechanical and electrical equipment, panels, valves, gauges, and instrumentation.

   c. The Contractor shall be responsible for including and coordinating the work of all subcontractors into the coordination drawings.

   d. Prepare reproducible coordination drawings, indicating equipment, piping, valves, expansion joints, ductwork, conduit, cable trays, junction boxes, lighting fixtures, sleeves, inserts, embedments, supports, hangers and appurtenances at not less than 1/4-inch scale. Drawings shall show beams, columns, ceiling heights, wall, floors, partitions and structural features as indicated on the contract drawings. Individual pipes and conduit 2-in. or less in diameter that will be field routed need not be shown on coordination drawings.

e. Coordination drawings shall include large-scale details as well as cross and longitudinal sections required to fully delineate all conditions. Particular attention shall be given to the location, size, and clearance dimensions of equipment items, shafts, operators and necessary maintenance access.

f. Make all minor changes in duct, pipe or conduit routings that do not affect the intended function, but items may not be resized or exposed items relocated without the approval of the Owner. No changes shall be made in any wall locations, ceiling heights, door swings or locations, window or other openings or other features affecting the function or aesthetic effect of the building. If conflicts or interferences cannot be resolved, the Owner shall be notified. Any problems of coordination that require architectural or structural changes of design shall be submitted to the Owner for resolution.

g. After the reproducible drawings have been coordinated and all changes have been made, the drawings shall be signed by the Contractor and all subcontractors indicating that all work on that drawing has been coordinated with all associated vendors and subcontractors and all conflicts have been resolved.

h. Relocation of any duct, pipe, conduit or other material that has been installed without proper coordination among all trades shall be performed at no additional cost to the Owner.

7. Written notification of any deviations from the requirements of this specification.

8. Support documentation and justification as specified.

9. Certificates of Design signed by a Registered Professional Engineer for all pipe supports.

10. Manufacturer's product data and specifications for shop painting.

B. Material Certification:

1. Provide certification from the manufacturer that the materials of construction specified are recommended and suitable for the service conditions specified and indicated. If materials other than those specified are proposed based on incompatibility with the service conditions, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated including an installation list of a minimum of five (5) installations in operation for a minimum of five (5) years. Provide proposed materials at no additional cost to the Owner.

2. Where materials are not specified, provide technical data and certification that the proposed materials are recommended and suitable for the service conditions specified and indicated.

C. A copy of the contract mechanical process, and structural drawings, with addenda that are applicable to the equipment specified in this section, marked to show all changes necessary for the equipment proposed for this specification section. If no changes are required, mark all drawings with "No changes required" or provide a statement that no changes are required.

1. Failure to include all drawings or a statement applicable to the equipment specified in this section will result in submittal return without review until a complete package is submitted.

2. A copy of this specification section with addenda and all referenced specification sections with addenda, with each paragraph check-marked to indicate specification compliance or marked and indexed to indicate requested deviations and clarifications from the specified requirements.

a. If deviations and clarifications from the specifications are indicated, therefore requested by the Contractor, provide a detailed written justification for each deviation and clarification.

b. Failure to include a copy of the marked-up specification sections and or the detailed justifications for any requested deviation or clarification will result in submittal return without review until marked up specifications and justifications are submitted in a complete package.

1.04 QUALITY ASSURANCE:

A. Provide manufacturer's certification in writing, that materials meet or exceed minimum requirements as specified.

B. Welder Qualifications:

1. Quality and certify welding procedures, welders, and operators in accordance with ANSI B31.1, paragraph 127.5 for shop and project site welding of piping work.

C. Pipe supports: All supports and parts shall conform to the latest requirements of the Code for Pressure Piping ASME/ANSI B31.1 and Manufactures Standardization Society (MSS) Standard Practice SP-58, SP-69, SP-89 and SP-90 except as supplemented or modified by the requirements of this specification.

D. Structural Concrete: Conform to the requirements of Section 03 30 00. Concrete strength: 4,000 PSI unless noted otherwise.

E. Conform to the requirements of the latest edition of the AISC Manual of Steel Construction for miscellaneous and supplementary steel. Tube steels are ASTM A500 Grade B, structural shapes A36, plates A-572 or equal. Stainless steel structural members shall conform to ASTM requirement Type 316L.

F. Pipe Support Manufacturer Qualifications:

1. Must possess a written quality assurance program.

2. Have a minimum of 5 years experience in the design and fabrication of pipe supports.

3. Have completed the design and fabrication of at least 5 successful pipe support projects of equal size, complexity, and systems as this project within the past 10 years.

4. Retains the services of a Registered Professional Engineer, registered in the state where this project is being constructed, with a minimum of ten years experience in the design of piping systems and pipe supports.

5. Manufacturers' Standardization Society (MSS) Member.

6. Have a field service technician on staff with at least 5 years experience in resolving field installation, interference and interface problems associated with the design, installation and manufacture of pipe supporting components.

## PART 2 - PRODUCTS

### 2.01 MATERIALS:

A. Provide materials used in pipe supports, which are compatible with the pipes to which they are attached. Provide Type 316L stainless steel supports for all stainless steel piping. Copper plated pipe supports are not acceptable.

B. Allowable materials: As indicated in ANSI B31.1 Appendix A and MSS-SP-58 Table 2.

C. Provide Type 316L stainless steel for pipe supports, hangers, guides, restraints, and anchors that are exterior or interior submerged, in potentially wetted areas in wet wells, channels, screening and grit removal areas and in chemically corrosive atmospheres.

D. Provide only new material. Previously used and/or scrap material is not acceptable.

E. Provide tube steels that are ASTM A500 Grade B, Structural shapes A-36, plates A-572 or equal.

F. Concrete anchor bolts - Hilti Kwik-Bolt II Stud Anchors, Rawl Bolt, Phillips Wedge Anchors, or equal.

2.02 DESIGN, LOCATION, AND TYPE OF PIPE SUPPORTS:

B. Design and provide pipe supports for piping 1/2-inch and larger to include the following loads:

1. Gravity Force: This force includes the weight of pipe, pipe contents (hydro load), valves, in-line equipment, insulation and any other weight imposed on the piping and/or pipe support.

2. Hydrostatic/Dynamic Forces: These forces are developed due to the internal pressure (positive and negative) during operation of the piping system. These forces include the forces due to water hammer, pressure pulses due to rapid valve closure, fluid discharge resulting from pump startup, operation of positive displacement pumps, etc.

C. Provide supports, guides, anchors, flexible couplings and expansion joints in accordance with the coupling and joint manufacturers' specifications and requirements.

D. Where possible, provide pipe supports, which are the manufacturers' standard products.

1. Provide pipe supports with individual means of adjustment for alignment.

2. Provide pipe supports complete with appurtenances including locking and adjusting nuts.

3. Metal framing systems will be acceptable to support piping 2 inch and smaller.

4. Do not support pipes from other pipe, conduits or metal stairs.

5. Chain, strap, T-bar, perforated bar and/or wire hangers are not acceptable.

E. For piping 2-inch and smaller provide manufacturer's standard supports and standard spacing guidelines

F. All outside above ground supports shall be Type 316L stainless steel as specified herein.

G. Provide pipe supports that do not overload or over stress the piping, equipment, or structure that they are supporting or to which they are attached. Allowable pipe stress to be within ANSI B31.1 code allowable.

2.03 FABRICATION:

A. Provide pipe supports formed in accordance with paragraph 5.1 of MSS-SP-58.

B. Providing welding in accordance with Structural Welding Code.

C. Provide dimensional tolerances as specified in MSS-SP-89.

D. Provide threading and tapping in accordance with MSS-SP-89.

2.04 SHOP PAINTING:

A. Primer and Finish Paint: Shop apply to all exterior ferrous surfaces, high solids epoxy in accordance with Section 09 91 14.

B. Ferrous surfaces which are not to be painted shall be given a shop applied coat of grease or rust resistant coating.

C. Provide additional shop paint coating for touch-up to all surfaces after installation and testing is completed and equipment accepted.

PART 3 - EXECUTION

3.01 PIPE SUPPORTS:

A. Provide minimum of two pipe supports for each pipe piece.

B. Where pipe connects to equipment, support pipe independently from the equipment. Do not use equipment to support piping.

C. Provide pipe supports so that there is no interference with maintenance or removal of equipment.

D. Unless otherwise indicated or authorized by the Owner, place piping running parallel to walls approximately 1-1/2 inch out from face of wall and at least 3 in. below ceiling.

E. Pedestal pipe supports: adjustable with stanchion, saddle, and anchoring flange. Provide grout between baseplate and floor.

F. Support piping to prevent strain on valves, fittings, and equipment. Provide pipe supports at changes in direction or elevation, adjacent to flexible couplings, adjacent to non-rigid joints, and where otherwise indicated. Do not install pipe supports in equipment access areas or bridge crane runs.

G. Stacked horizontal runs of piping along walls may be supported by metal framing system attached to concrete insert channels.

H. Do not support piping from other piping.

I. Designs generally accepted as exemplifying good engineering practice, using stock or production parts, shall be utilized whenever possible.

J. All threads shall be UNC unless otherwise specified.

END OF SECTION

SECTION 40 50 00

# PROCESS CONTROL AND INSTRUMENTATION SYSTEM (PCIS) GENERAL REQUIREMENTS

## PART 1 - GENERAL

### 1.01 DESCRIPTION

A. This section of the specifications includes materials, testing, and installation of process control and instrumentation system as specified herein and indicated on the drawings.

B. These specifications shall not be interpreted as permission or direction to violate any governing code or ordinance. Equipment, materials, and workmanship shall comply with the latest revisions of the following codes and standards:

1. Instrumentation: ISA - The Instruments, System, and Automation.

2. Wiring: National Electrical Code (NEC), ISA S5.3 and S5.4.

3. Control Panels: NEMA Standards Publication 250-2003.

4. Control Logic: NFPA 79.

### 1.02 SCOPE OF WORK

A. The work involves furnishing all hardware and software, programming, installation, labor, material, equipment, and engineering in strict compliance with the contract documents for the Central Coast Water Authority – Shandon State Water Turnout For San Luis Obispo County Service Area No.16 Project.

B. Contractor shall provide a complete Remote Process Panel (RPP) , instruments, and fiber optic communications per contract documents.

C. The Contractor is responsible for providing Ethernet fiber from the RPP to the splicing point on the existing CCWA SCADA fiber optic system. The Owner will splice existing fiber cable with the new cable. The Contractor shall provide splicing hardware.

D. The existing ClearSCADA HMI will be modified by Owner to interface with the new PLC. The PLC will be programmed by the Owner.

E. See Appendix A at the end of this section for CCWA RPP Standard Equipment List. Unless otherwise noted, the Contractor shall provide the manufacturer and model numbers listed. No deviations will be allowed.

## 1.03 SUBMITTALS

A. Detailed System Drawings and Data:

1. The submittal shall consist of six sets of detailed drawings and data prepared and organized by the Contractor. All drawings, schematics, layouts, and diagrams shall be done on 11" x 17" sheets utilizing AutoCAD.

2. Drawings shall contain only relevant simplified details using symbol approach. Photographic images of components depicting irrelevant details (screws, holes, logos, etc.) are not allowed.

3. Drawings prints shall not contain details and texts smaller than 3/64".

B. Two sets of submittals will be returned to the Contractor.

C. Submit these drawings and data as a complete package at the same time.

D. Submittal Format

1. Each submittal shall be in a three-ring hardcover binder with an interior pocket.

2. Materials in submittals shall be separated by index dividers into sections and/or subsection (groups) such that documents for each submitted component are separated by an individual index tab.

3. Submittal Table of Contents shall not contain any information other than reference to tab numbers and titles.

E. Provide manufacturers cut sheets and manuals for all hardware to be provided.

F. Provide an Instrument Index.

G. Provide ISA type instrumentation data sheets for each component, together with a technical product brochure or bulletin. The data sheets, as a minimum, shall show:

1. Instrument tag designation.

2. Component name.

3. Manufacturer's model number.

4. Calibrated range.

5. Instrument location.

6. Input and output characteristics.

7. Scale range and units (if any) and multiplier (if any).

8. Requirements for electric supply.

H. Group the data sheets together in the submittal by type. Provide individual data sheets for each instrument with one brochure or bulletin to cover all identical uses of that component.

I. The detailed construction drawing submittal shall include, as a minimum, the following types of drawings and diagrams required for the construction of this project:

1. Legend, Symbols, and Index.

2. System Block Diagrams.

3. Power Distribution Diagrams.

4. Instrument Control Panel Layouts/Construction Drawings/Details. The drawings shall include the following:

   a. Dimensions

   b. Location of all components

   c. Identification of all components

   d. Bill of Materials

   e. Conduit entry area.

5. PLC/RTU Rack Elevation Drawing for each PLC/RTU.

6. Internal Panel Wiring Diagrams.

7. Digital I/O Module Wiring Diagrams.

8. Analog I/O Module Wiring Diagrams.

9. Detailed NFPA 79-style Ladder Diagrams (for discrete wiring) to meet the following minimum requirements:

   a. Each subassembly shall be shown as a rectangle in the diagram with all external terminals identified. Terminals unknown at the time of the submittal shall be left blank, to be filled later. Single contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.

b. Where the internal wiring diagrams of subassemblies are furnished on separate sheets, they shall be shown as a rectangle in the schematic diagram with all external points identified and cross-referenced to the separate sheets of the control circuit. Coils and contacts internal to the subassemblies shall be shown in the rectangle connected to their terminal points.

c. Show unique rung numbers on left side of each rung. A cross-referencing system shall be used in conjunction with each relay coil so that associated contacts may be readily located on the diagram. The contacts shall be referenced to coils as well, so that associated coils may be readily located on the diagram. Where a relay contact appears on a sheet separate from the one on which the coil is shown, the purpose of the contact shall be described on the same sheet. Spare contacts shall be shown.

d. Limit, pressure, float, flow, temperature sensitive, and similar switch symbols shall be shown on the schematic (ladder) diagram with all utilities turned off (electric power, air, gas, oil, water, lubrication, etc.) and with the equipment at its normal starting position. If the equipment is shown in a specific position, the position shall be identified.

e. Contacts of multiple contact devices, e.g., selector switches, shall be shown on the line of the schematic diagram where they are connected in a circuit. A mechanical connection between the multiple contacts shall be indicated by a dotted line or arrow. This does not apply to control relays, starters, or contactors. Additional charts or diagrams may be used to indicate the position of multiple contact devices such as drum, cam, and selector switches.

f. The purpose or function of all switches shall be shown adjacent to the symbols. The purpose or function of controls such as relays, starters, contactors, solenoids, subassemblies, and timers on the diagram shall be shown adjacent to their respective symbols. The number of positions of the solenoid valve shall be shown adjacent to the valve solenoid symbol.

10. Detailed Loop Interconnection Wiring Diagrams (per ISA S5.3 and S5.4) for the entire system showing all control equipment, instrumentation, electrical equipment, components, wiring, routing, boxes (pull, junction, and terminal junction), terminations, wire tags, and wire colors. The diagrams shall show the detailed interconnection of all electrical equipment, instrumentation, panels, enclosures, components and the like provided under this contract.

11. Arrangement and construction drawings for consoles, control panels, and for other special panels for field installation. These drawings shall include dimensions, location of all components, identification of all components, bill of materials, detailed schematics of all internal wiring, preparation and finish data, nameplates, and the like. These drawings also shall include enough other details to define the style and overall appearance of the assembly; include a finish sample for all panel surfaces.

12. Installation, mounting, and anchoring details for all field instruments and panel mounted components.

13. An instrument list including all instruments provided under this project.

14. An I/O List for each PLC/RTU in the project.

J. Detailed System Software Submittal: The submittal shall consist of six sets of the software system descriptions and diagrams. Two sets of submittals will be returned to the contractor. The software submittal can be made as a separate package to be inserted in the original submittal. The following items must be submitted at least four weeks prior to the factory witness test orientation:

1. Sample color printouts of each Operator Interface display.

K. Complete detailed bills of material: Detailed bill of material for all components shall be provided including complete manufacturers name and model number, quantity to be provided, and cross references to data sheet sections.

L. Operation, Maintenance, and Repair Manuals (OMM):

1. The organization of the initial submittal required above shall be compatible to eventual inclusion as one volume of the operation, maintenance, and repair manuals.

2. Operation manuals shall be prepared and submitted to the Owner's Representative for preliminary review in six copies. When the Owner's Representative is satisfied that these are complete and properly prepared, six final sets shall be delivered to the Owner's Representative.

3. The complete OMM shall contain the following:

a. All the information included in the preliminary equipment submittal, the detailed installation submittal, and the additional information required herein, all bound in hard-cover binders and arranged for convenient use including tab sheets, all indexed and cross referenced with a separate index for each item.

b. All final "as-built" drawings with the AutoCAD electronic files.

c. Electronic files for Operator Interfaces.

d. Calibration and maintenance instructions.

e. Trouble-shooting instructions.

f. Instructions for ordering replacement parts.

1.04 QUALIFICATIONS AND RESPONSIBILITY OF CONTRACTOR

A. The Contractor shall furnish and install all proposed hardware as shown on the drawings and as specified herein. The PLC system installation and wiring connections to peripheral equipment and instruments shall be the responsibility of the system supplier using qualified personnel possessing the necessary equipment and having experience in making similar installations. Evidence of such qualification, as well as notification of the system supplier assuming unit responsibility, shall be furnished to the Owner in writing prior to commencement of the work.

B. Qualification Evidence: The qualification evidence shall include the following:

1. Verification that the system supplier shall have had a minimum of five years' experience with the installation and programming of industrial control systems similar in type to those to be installed in this project.

2. A list of completed similar installations including name, address, and telephone number of the owner, name of project, and date of completion.

3. The name and qualifications of supervisory personnel to be directly responsible for the programming and installation of the control system.

C. Under this section, the Contractor shall furnish the following:

1. Instrumentation equipment (Sections 40 50 00 and 40 50 20).

2. PLC Hardware (Section 40 50 40).

3. Fiber-Optic Data Transmission System (Section 40 50 70)

4. Remote Process Panel (Section 40 50 80).

5. Spare parts per Sections 40 50 20, 40 50 40, 40 50 70, and 40 50 80.

6. Special tools and test equipment required by the supplier.

7. Installation, integration and testing.

8. Documentation.

9. Operator training.

10. Warranty (one year).

11. Shipping and receiving.

D. All calibration and final checkout of the process control and instrumentation system shall be witnessed by the Owner's Representative to determine if the system complies with the contract documents.

E. The Contractor shall be responsible for coordinating and interfacing with equipment supplied under these contract documents, which are an integral part of the system. Interfacing shall be incorporated in the detailed systems drawings and data section of the contract documents.

F. The system supplier shall be experienced in the design, programming, and service of this type of equipment. In the event of a dispute as to the acceptability of the system supplier, the Owner's Representative shall make the final determination.

1.05 GUARANTEE

A. The Contractor shall repair or replace defective components, rectify malfunctions, correct faulty workmanship, all at no additional cost to the Owner during the warranty period.

B. To fulfill this obligation, the Contractor shall utilize qualified technical service personnel. Services shall be performed within five calendar days after notification by the Owner's Representative.

PART 2 - PRODUCTS

2.01 DESIGNATIONS OF COMPONENTS

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

2.02 INSTRUMENT TAGGING

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

## 2.03 INSTRUMENT SYSTEM POWER

A. Power provided for the instrument system at the facility shall be 120-volt a-c, single phase, 60 Hz.

B. Where d-c power supplies are not furnished integral with any one instrument system loop, then provide separate solid-state power supplies.

## 2.04 MATCHING STYLE, APPEARANCE, AND TYPE

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

# PART 3 - EXECUTION

## 3.01 UNIFORMITY OF COMPONENTS

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

## 3.02 MOUNTING OF EQUIPMENT AND ACCESSORIES

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

B. Locate devices, including accessories, where they shall be accessible from grade, except as shown otherwise.

C. Mount local equipment in cabinets or existing panels as specified. Mount associated I/O terminals on a common panel or rack; mounting panels and rack shall be baked enamel.

D. Coordinate the installation of the electrical service to components related to the system to assure a compatible and functionally correct system. All accessories shall be coordinated and installation supervised by the Contractor.

E. Test the completed system after installation to assure that all components are operating with the specified range and all interlocks are functioning properly.

F. Tubing Valves and Fittings: All instrument tubing manifolds shall be Type 316 stainless steel, unless otherwise specified elsewhere in these specifications. Tubing runs to transmitters shall be installed with a positive slope in one direction. Fittings and valves shall be Type 316 stainless steel. Block/bleed valves shall be as manufactured by Hex Valve Series HB59, or equal.

3.03 CALIBRATION

A. Each instrument requiring factory calibration shall be furnished with calibration data. The calibration data shall be factory certified.

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

3.04 FACTORY TESTING

A. The fully configured RPP shall be successfully submitted to a factory acceptance test before shipment to the jobsite. RPP shall be fully assembled and wired.

B. Factory testing shall take place at the PCIS Integrator's facility located in California.

C. Owner will participate in testing with a temporary SCADA Workstation imitating the ClearSCADA system and by providing the PLC program.

D. The factory test will be for a minimum of one (1) day. Allow additional time for setup, breakdown and pre-testing.

E. Prior to factory system testing, submit a written detailed test procedure for review by the Owner. Notify the Owner in writing four weeks in advance of the scheduled testing.

F. Factory witness tests shall demonstrate that the system will perform each operation required for all specified conditions, including both normal and emergency operations and conditions. Provide a certification and log of all tests to the Owner for review and comment.

G. Check panel wiring against approved submittal drawings. Record any changes made during testing of the equipment on the record drawings.

H. The system shall be exercised through operational tests, under factory-simulated conditions to demonstrate that the system is fully configured to perform all control, logic, monitoring, reporting, and communications functions as specified and that the

system is ready for field installation. All test equipment required to simulate actual field conditions shall be provided by the control system integrator.

I. The factory witness test shall take as long as necessary to demonstrate to the Owner and the Owner's Representative that the system performs each operation which the Contractor is responsible for.

J. A return visit to the Contractor's facility for re-testing will be at the total expense of the Contractor.

3.05 FIELD TESTING

A. Exercise systems through field tests in the presence of the Owner in order to demonstrate achievement of the specified performance.

B. Coordinate field tests dependent upon completion of work specified elsewhere. Schedule tests among all parties involved so that the tests may proceed without delays or disruption by uncompleted work.

3.06 5-DAY ACCEPTANCE TEST

A. When systems are assessed to have been successfully carried through a complete operational test and the Owner concurs in this assessment, a date to start the system acceptance test involving the Owner's operating personnel will be agreed upon.

B. Recheck the systems at this time to verify proper operation, and make final adjustments. The system testing shall consist of five (5) consecutive days (Monday – Friday) of continuous testing utilizing the Owner's day shift working hours. The Contractor shall be on call ready to respond to the site within two hours after day shift working hours and on weekends. The Owner's representative will determine the severity of the problem to the best of his ability and contact the Contractor for disposition. This arrangement will in no way relieve the system supplier of responding within 2 hours and resolving the problem in a mutually agreed upon time frame not greater than 48 hours.

C. The acceptance tests shall have a success factor of 95% system uptime. If the system should fail below the 95% factor, correct the system problems. System start-up shall start over again from day one. This will continue until the system functions for five consecutive days with a 95% uptime success factor.

## 3.07 OPERATOR TRAINING (2-DAYS)

A. Provide the Owner's operating personnel and/or the Owner's Representative with two (2) days of formal instruction in the functions and operations of each system provided under this contract. The training shall cover overall system theory, hardware architecture, and diagnostics. Hands-on experience shall be emphasized. Emphasis shall also be placed on safety features and features, which may require readjustment, resetting or checking, and recalibration by them from time to time.

B. Provide the training sessions at the Owner's facilities and on the equipment furnished under this contract. The education and instruction of operating personnel shall be by a qualified instructor familiar with the requirements for this project. Each training session shall be for four hours of formal instruction. Session dates shall be directed by the Owner. There will be two (2) non-consecutive training sessions, which shall not coincide with any system testing or start-up activities.

END OF SECTION

APPENDIX A

CCWA RPP STANDARD EQUIPMENT LIST

| Item | Description | Manufacturer and Model No. | Requirements |
|---|---|---|---|
| 1 | Load Center | Square D Type QO, No "or equal" | Six circuit |
| 2 | Circuit Breakers | Square D, No "or equal" | 15 A 1 pole 120 VAC |
| 3 | Light Switch | Hubble 1201GY, McMaster-CARR 7030K32, or equal | 120 VAC, 15 Amp rated, toggle |
| 4 | Receptacle | Hubble RR151GY, Phoenix Contact SD-US/SC/LA/GY, or equal | 15 Amp, 120 VAC, GFIC |
| 5 | Surge/Noise Suppressor | Intermatic Panel Guard IG1201F20, no "or equal" | |
| 6 | Exhaust Vent Fan | Saginaw CF6, Hoffman SF05, or equal | 120 VAC, 5"x5" with 12"x 16"x1" pleated paper filter |
| 7 | Thermostat | Saginaw SCE-TEMD, Hoffman Dual Thermostat | 120 VAC, full voltage 0-100 |
| 8 | PLC | Schneider Automation, no "or equal" | Modicon Momentum PLC with Ethernet Adaptor and I/O modules |
| 9 | Fiber Optic Network switch | TC Communications, TC3720, no "or equal" | , Counter rotating fiber optic Ethernet Switch |
| 10 | 24VDC Power Supply/Charger | Condor GPC225-28, no "or equal" | |
| 11 | 12VDC SLA Battery | Power Sonic PS-12350, no "or equal" | |
| 12 | Battery Enclosure | NOCO HM300BK, Attwood Battery Box, or equal | Plastic with cover 9"W x 14"L x 11"T minimum |
| 13 | Panel Heater | Hoffman DAH4001B, no "or equal" | |
| 14 | Pressure Transmitter | ABB 266HSHQSBA1VAE6L1N2, no "or equal" | |
| 15 | Magnetic Flow Meter | ABB WaterMaster, no "or equal" | |

END OF SECTION

## CERTIFICATION OF CONTRACTOR'S EXPERIENCE AND QUALIFICATIONS

The undersigned Contractor certifies that it is, and shall be, throughout the period of the contract, licensed in the State of California, to do the type of work contemplated in the Contract Documents. Contractor further certifies that it is skilled and regularly engaged in the general class and type of work called for in the Contract Documents. Any Contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractor's State License Board.

Contractor represents that it is competent, knowledgeable, and has special skills of the nature, extend, and inherent conditions of the work to be performed. Contractor further acknowledges that there may be certain peculiar and inherent conditions existent in the construction of the particular facilities which may create, during the construction program, unusual or peculiar unsafe conditions hazardous to persons and property. Contractor expressly acknowledges that it is aware of such peculiar risks and that it has the skill and experience to foresee and to adopt protective measures to adequately and safely perform the construction work with respect to such hazards.

Contractor shall fully and completely answer each question set forth below. If necessary attach additional sheets. Print or type each response. If your response to any question is "no" or "none," you must state "no" or "none." "Not applicable" or other similar response will not be accepted.

### I. QUALIFICATIONS AND RESPONSIBILITY OF CONTRACTOR

As noted in Section 40 50 00, Process Control and Instrumentation System (PCIS) General Requirements, Paragraph 1.04.A Qualifications and Responsibility of Contractor. The Contractor shall furnish and install all proposed hardware as shown on the drawings and as specified herein. The PLC system installation and wiring connections to peripheral equipment and instruments shall be the responsibility of the system supplier using qualified personnel possessing the necessary equipment and having experience in making similar installations.

List such project experience below:

*Project 1*

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner’s Address: _____

Owner’s Representative: _____

Owner’s Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

*Project 2*

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner's Address: _____

Owner's Representative: _____

Owner's Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

*Project 3*

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner's Address: _____

Owner's Representative: _____

Owner's Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

Attach additional sheets with project information if necessary

## II. INSTALLER QUALIFICATION

As noted in Section 40 50 00, Process Control and Instrumentation System (PCIS) General Requirements, Paragraph 1.04.B Qualifications and Responsibility of Contractor,

1. Verification that the system supplier shall have had a minimum of five years' experience with the installation and programming of industrial control systems similar in type to those to be installed in this project.
2. A list of completed similar installations including name, address, and telephone number of the owner, name of project, and date of completion.
3. The name and qualifications of supervisory personnel to be directly responsible for the programming and installation of the control system.

Bidder shall list such projects below:

*Project 1* Applies to qualification(s) # 1 2 3 4 (Circle all that apply)

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner's Address: _____

Owner's Representative: _____

Owner's Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

*Project 2* Applies to qualification(s) # 1 2 3 4 (Circle all that apply)

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner's Address: _____

Owner's Representative: _____

Owner's Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

*Project 3* Applies to qualification(s) # 1 2 3 4 (Circle all that apply)

Project Name: _____

Project Manager Name: _____

Owner: _____

Owner's Address: _____

Owner's Representative: _____

Owner's Phone Number: _____

Bid Price: _____

Final Construction Cost: _____

General Description of Work: _____

Attach additional sheets with project information if necessary.

I DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OFCALIFORNIA, AND DO PERSONALLY CERTIFY AND ATTEST THAT: I HAVE THOROUGHLY REVIEWED THE ATTACHED CONTRACTOR QUALIFICATION QUESTIONNAIRE AND ATTACHMENTS, IF ANY, AND KNOW ITS CONTENTS, AND SAID CONTRACTOR QUALIFICATION QUESTIONNAIRE AND ATTACHMENTS, IF ANY,ARE TRUTHFUL, COMPLETE AND ACCURATE; AND THAT DISTRICT MAYREASONABLY RELY UPON THE CONTENTS AS BEING COMPLETE AND ACCURATE;AND, FURTHER, THAT I AM FAMILIAR WITH CALIFORNIA PENAL CODE SECTION 72 AND CALIFORNIA GOVERNMENT CODE SECTION 12650, ET SEQ, PERTAINING TO FALSE CLAIMS, AND FURTHER KNOW AND UNDERSTAND THAT SUBMISSION OR CERTIFICATION OF A FALSE CLAIM MAY LEAD TO FINES, IMPRISONMENT AND/OR OTHER SEVERE LEGAL CONSEQUENCES.

Executed on the date indicated below, at the location indicated below.

Date _____

Name of Contractor _____

Signature of Contractor _____

Printed Name and Title _____

Business Address _____

Telephone Number _____

SECTION 405010

# PROCESS CONTROL AND INSTRUMENTATION SYSTEM CONTROLS NARRATIVE

## PART 1 - GENERAL

### 1.01 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS GENERAL REQUIREMENTS: 40 50 00.

### 1.02 SUBMITTALS

Provide submittals per Section 405000.

### 1.03 DESCRIPTION

A. The descriptions, together with the detail drawings, instrumentation diagrams, comprise the functional design criteria of the Process Instrumentation and Control System (PCIS). The process and instrumentation diagrams (P&IDs) represent the basic concept of the PCIS requirements, whereas the descriptions supplement the instrumentation diagrams.

B. The PCIS Supplier shall utilize the descriptions and P&IDs as the basic criteria for the design of the instrumentation schematics, control software, preparation of data sheets, wiring diagrams, piping layouts, assembly drawings, and other requirements set forth in these specifications.

C. The PCIS will provide an integrated control and reporting system. The function of this system is to monitor, control, report, and safeguard the system. The PCIS system will be based on remote terminal units, linked to a SCADA computer and peripherals, with selected monitoring and alarm functions displayed in the control room.

D. Status-to-Command Disagreement (STCD): Provide a STCD alarm for all equipment controlled with the control system. The STCD alarm shall be initiated if a piece of equipment is commanded to start/stop or open/close by a PLC and the appropriate run or position status is not reported back within a time interval.

E. Provide high-high, high, low, low-low, rate of change and instrument fail alarms for all analog points in the system. If a particular alarm is used by ladder logic, or requires to be displayed at local Operator Interface, that alarm shall be implemented at the PLC.

F. All software switches shall be implemented with associated time delays. Time delay value shall be pre-programmed initially to 10 seconds, unless specified otherwise.

G. All flow values and motors elapsed running time shall be totalized and stored at the PLC. Resetting of those totals shall be coordinated with Owner's Representative during submittal stage.

H. If a field instrument with an analog output has additional alarm discrete (dry contact) outputs, at least one common alarm discrete output shall be interfaced with a PLC to send an advisory alarm to SCS.

I. All scaling of analog signals shall be implemented at the PLCs. Each PLC shall interface with an Operator Interface and with PLC network/SCADA System using data in engineering units.

J. At each PLC the processor shall monitor the internal operation of the PLC and communication system for failures. If a failure is detected, a dry contact closure shall close and illuminate the "PLC Fail Light" at an ICP.

K. SCADA System shall monitor communication with each PLC. If a communication failure with a PLC is detected, an alarm shall be generated and logged.

1.04 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS General Requirements: 405000.

B. Instrumentation Equipment: 405020.

C. Programmable Logic Controller and Operator Interface: 405040.

D. Remote Process Panel (RPP): 405080.

PART 2 - MATERIALS

2.01 RATE OF FLOW CONTROL VALVE

A. The primary function of the turnout facility is to set and control a constant rate of flow from the Coastal Branch Pipeline and limit downstream pressure from exceeding preset values. The rate of flow control valve package shall operate in conjunction with the magnetic flow meter specified in Section 409115 which shall provide a 4 mA – 20 mA signal for the measured control variable. The valve controller specified in this section shall be furnished with the rate of flow control valve specified in Section 331000. The valve controller shall set a local flow set point or accept a 4 to 20 mAdc remote set point signal from the PLC. The controller shall modulate the control valve to maintain a constant rate of flow. In the event of a power failure, the rate of flow control valve shall remain in the last current position.

B. The flow control valve shall have pressure override to prevent downstream pressure from exceeding preset values. A pressure relief valve downstream of the rate of flow control valve shall be provided per Section 331000 to further protect the downstream turnout piping.

C. If the discharge pressure rises above a high-high setpoint, the PLC will command the rate of flow control valve to close by forcing the flow setpoint to zero (0) gpm until a

desired pressure has been reached. Adjustable delay timers will be added to the circuit to provide adjustability to the rate of flow control valve override closure rate. The minimum time to operate the rate of flow control valve from full open to full close position shall be one (1) minute. After a desired downstream pressure has been reached, the system will return to the normal flow control mode.

D. The upstream , midstream, and downstream pressure transmitters PIT-101, PIT-103, and PIT-105 will provide pressure monitoring and alarm signals at the central control facility via the RTU/PLC. When upstream or downstream pressure falls below an adjustable minimum pressure, an alarm will annunciate and an override signal will be sent to the valve controller to automatically close the rate of flow control valve.

E. Failure Modes:

1. If there is a communications failure, defined as no signal received at the PLC/RTU for an adjustable time, the local PLC/RTU will control the rate of flow control valve position from the last "good" signal. Communication failure alarms will annunciate at the control center.

2. If there is a power failure at the turnout, the rate of flow control valve will hold in the last position. By remote or local manual command, the operator shall only be able to close the valve.

3. If the local PLC/RTU fails, the valve will automatically close.

4. Loss of valve hydraulic package pressure will automatically close the valve via the valve actuator fail close spring.

2.02 MISCELLANEOUS MONITORING

A. The PLC will monitor the following parameters and transmit to the SCS for indication and recording:

1. Seismic Sensor Alarm

2. RPP Instrusion Alarm

3. Control Room Door Intrusion Alarm

4. Loss of Power Alarm

5. Vault Hatch Instrusion Alarm

6. Vault Flood Alarm

7. Rate of Flow Control Valve Position

## 2.03 FLOW MONITORING

A. Flow rate signal from flow meter FIT-131 shall be will be monitored by the PLC and valve controller using an I-to-I signal splitter. Signal will be transmitted to the SCS, via PLC, for indication and recording. Pulse signal shall be monitored by the PLC and totalized.

B. Upon detection of a flowmeter "Fail" signal, the PLC will transmit the alarm to the SCS for indication and logging.

## PART 3 - EXECUTION

See Section 405000.

END OF SECTION

SECTION 40 50 20

INSTRUMENTATION EQUIPMENT

## PART 1 - GENERAL

### 1.01 DESIGNATIONS OF COMPONENTS

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

### 1.02 SIGNAL CHARACTERISTICS

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

### 1.01 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS General Requirements: 40 50 00.

## PART 2 - PRODUCTS

### 2.01 PRESSURE TRANSMITTER

A. The pressure transmitter shall be of the microprocessor-based type 2-wire system. The transmitter shall operate from a 24 V dc source. The output signal shall be 4 mA to 20 mA dc. The transmitter shall be housed in a NEMA 4 enclosure.

B. Configuration data shall be stored in nonvolatile EEPROM memory in the transmitter electronics module. This data shall be retained in the transmitter when power is interrupted, so the transmitter shall be functional immediately upon power up. The transmitter shall perform continuous self-tests. In the event of a problem, the transmitter shall activate the user-selected analog output warning. The Owner's existing HART Communicator shall be able to interrogate the transmitter to determine the problem. The transmitter shall output specific information to the communicator identifying the problem for fast and easy corrective action.

C. The pressure transmitter shall provide an electronic signal proportional to the calibrated pressure range. The pressure-sensing element shall be silicone oil filled with a process media operating temperature range of -40 °F to 250 °F. An integral stainless steel block/bleed manifold (pre-assembled to the transmitter and leak checked) shall be provided for each transmitter. The manifold shall have a block and a vent/test valves.

D. Provide the pressure transmitter with the following features:

1. Independent external zero and span adjustments.

2. Overrange protection.

3. Integral digital indicator, calibrated in engineering units.

E. Accuracy of the pressure transmitter shall be ±0.075% of calibrated span.

F. The block and bleed manifold shall be manufactured by Anderson Greenwood Model M9, or equal.

G. See Section 405000 Appendix A for pressure transmitter manufacturer and model number.

| PRESSURE TRANSMITTER | | | | |
|---|---|---|---|---|
| | GENERAL | | | |
| 1. | Tag No. | PIT-101 | PIT-103 | PIT-105 |
| 2. | Service | Coastal Branch Pipeline Pressure | PRV Downstream Pressure | Shandon System Pressure |
| 3. | Type | Strain Gage | Strain Gage | Strain Gage |
| 4. | Function | Transmit Pressure | Transmit Pressure | Transmit Pressure |
| | | | | |
| | ELEMENT | | | |
| 5. | Element Material | 316 SST | 316 SST | 316 SST |
| 6. | Body Material Mfg. | Std. | Std. | Std. |
| 7. | Connection Size | 1/2-inch NPT | 1/2-inch NPT | 1/2-inch NPT |
| | | | | |
| | TRANSMITTER | | | |
| 8. | Location | Meter Vault | Meter Vault | Meter Vault |
| 9. | Mounting | On Pipe | On Pipe | On Pipe |
| 10. | Area Class | NEMA 4 | NEMA 4 | NEMA 4 |
| 11. | Calibration | 0- 500 psi | 0- 300 psi | 0- 120 psi |
| 12. | Output | 4 mA - 20 mA dc | 4 mA - 20 mA dc | 4 mA - 20 mA dc |
| 13. | Indication | Yes | Yes | Yes |
| 14. | Output to | PLC | PLC | PLC |
| 15. | Power | 24 V dc | 24 V dc | 24 V dc |
| 16. | Install. Detail | Sht No. 14, Detail 3 | Sht No. 14, Detail 3 | Sht No. 14, Detail 3 |

2.02 Flood Level Switch, Float Type

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

B. The flood level switch shall be Gems Model LS-270 or equal.

## 2.03 SPARE PARTS

A. The Contractor shall furnish to the Owner all necessary spare parts of components required to maintain the system. Prior to final acceptance of work, the Contractor shall provide a spare parts listing of all necessary spare parts and quantities for review by the Owner's Representative. The spare parts shall include one (1) pressure transmitter.

B. The Contractor shall deliver to the Owner all the required spare parts upon final acceptance of the work. The spare parts shall not be used as replacement parts during the guarantee period.

END OF SECTION

SECTION 40 50 40

PROGRAMMABLE LOGIC CONTROL SYSTEM

## PART 1 - GENERAL

### 1.01 DESCRIPTION

This section includes requirements for materials, testing, and installation of a control system.

### 1.02 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS General Requirements: 40 50 00.

## PART 2 - MATERIALS

### 2.01 DESIGNATIONS OF COMPONENTS

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

### 2.02 PROGRAMMABLE LOGIC CONTROL SYSTEM

A. A fully integrated programmable logic control system shall be furnished as specified in this section. The programmable logic control system hardware shall be intelligent process control units with analog and discrete I/O for process interface.

B. The a-c power of the control system will be 120-volt ±10% a-c, 60 hertz, single phase derived from line power. The system shall be designed to operate satisfactorily from 0°C to 60°C ambient temperature for the PLC.

### 2.03 PROGRAMMABLE LOGIC CONTROLLER (PLC)

A. The PLC shall be a 16-bit programmable logic controller microprocessor-based stand-alone device. It shall be a process and logic controller designed for industrial environments. It shall be capable of a mix of logic, timing, counting, computation, library of preprogrammed subroutines, and PID loop control capabilities necessary for the unit process application. The PLC shall utilize a "prepackaged"/"preprogrammed" approach to functionality to allow its use by personnel who have no formal training in digital equipment, digital communications, or software programming.

B. The PLC shall come complete with chassis, central processor, memory, power supply, interconnecting cables, and discrete and analog I/O interfaces.

C. The logic and variable memory shall be read/write RAM. All RAM shall have integral battery backup that will maintain the memory for a minimum of six months upon a utility power failure. The logic and variable memory shall have a sufficient ladder logic location for programming all specified functions plus 25% spare memory.

D. The PLC shall have the following features:

1. Logic Control: The PLC shall be capable of performing the same functions as conventional logic systems including on delay timers, off delay timers, counters, and drum sequencers.

2. Compare Function: The PLC shall perform the compare function that compares two integers or floating point numbers for less than, equal to, greater than, and not equal to. The programmed function shall energize when true and de-energize it when false.

3. Move Function: The PLC function shall move an integer or floating point value from one memory location to another memory location when an internal permissive is enabled.

4. Math Function: The PLC shall be capable of performing addition, subtraction, multiplication, and division on integer or floating point numbers.

5. Analog Controllers: The PLC processor shall perform all the functions of the conventional three-mode (PID) analog controller. The controller shall perform proportional only control, proportional plus reset, and proportional plus reset plus derivative and integral only control. The controller shall be the conventional three-mode controller.

6. The PLC shall be able to generate PID loops with a minimum sample time of 1.0 seconds. PID tuning constants shall have the following adjustable range:

| | |
|---|---|
| Proportional Gain | 0.0% to 99.99% |
| Reset Time | 0.01 to 999.99 minutes |
| Derivative Time | 0.00 to 999.99 minutes |

7. Time Proportional Control (TPC): The PLC processor shall be capable of modulating a valve by using time proportional control. When the process variable is above set point, the controller shall pulse a discrete output on/off, closing the valve. When the process variable is below set point, the controller shall pulse a second discrete output on/off opening the valve. When the set point and process variable are equal and within dead band, both discrete outputs shall be off. The controller "on" pulse time shall proportionally increase as the error between process variable and set

point increases. A PLC preset cycle timer shall monitor and reset the controller's "on" time intervals. The controller set points shall be accessed via the SCS.

8. Time-of-Day Clock: The PLC shall have an internal time-of day clock/calendar running independently of the CPU.

9. PLC System Alarm: The PLC processor shall monitor the internal operation of the PLC system for failures. If a failure is detected, the system shall shut down and freeze all inputs and outputs in their last states until the error is cleared. As a minimum, the following failures shall cause the PLC to shut down:

    a. Memory failure.

    b. Memory parity error.

    c. I/O cycle failure.

    d. Operating system error.

10. Input/Output: The PLC discrete input 16-channel modules shall be 24-volt DC or 120-volt AC and have noise filters or use other techniques to reject short-time constant noise and 60-Hz pickup.

    a. The PLC discrete output modules shall be relay type, 120-volt AC, or 24-volt DC solid-state drivers suitable for operating control relays. Each discrete output module shall include fuses and fuse blown indicators. Relay module is preferred and shall be used when a single normally open contact is required.

    b. The PLC analog inputs shall be suitable for accepting 4 mA to 20 mA from either 2- or 4-wire transmitters. The input power shall be from an external 24-volt DC power supply. The analog to digital converter shall have a 12-bit minimum resolution with an overall accuracy of 0.5% at 60 °C.

    c. Discrete PLC I/O modules shall have individual LED status lights for each I/O point. All discrete and analog modules shall have terminal blocks for termination of the I/O wires. Individual I/O points shall be capable of withstanding low energy common mode transients to 1,500 volts. Each PLC mounting base shall provide a minimum capability of 16 analog I/O and 64 discrete I/O. The PLC shall be capable of communicating with up to 1,000 remote I/O points on a single 15,000-foot data link.

11. Unused I/O: Provide PLCs with the following minimum unused prewired I/O for future facility expansion:

    a. Analog Inputs: 50% of used.

    b. Discrete Inputs: 50% of used.

c. Discrete Outputs: 50% of used

12. Each PLC shall have Ethernet communication capabilities.

13. See Section 405000 Appendix A for PLC manufacturer and model numbers.

2.04 ETHERNET SWITCH

A. Ethernet Switch shall meet the following specific requirements:

1. Operation: 10/100 Mbps, full and half duplex, auto-negotiation

2. Switching properties: store & forward

3. Interface: RJ-45 10/100BaseTX ports, 100BaseFX singlemode Port with ST Connectors

4. MDIX auto cable sensing

5. Operating temperature: -40°C to 80°C

6. Power Supply: 120 VAC

B. See Section 405000 Appendix A for Ethernet switch manufacturer and model number.

2.05 Battery Backup System

A. 24VDC battery backup system shall include the following components:

1. Power Supply/Charger

2. Two (2) Batteries

3. Battery Enclosure

B. See Section 405000 Appendix A for battery backup system manufacturers and model numbers.

2.06 SPARE PARTS

A. The Contractor shall furnish to the Owner all necessary spare parts of components required to maintain the system. Prior to final acceptance of work, the Contractor shall provide a spare parts listing of all necessary spare parts and quantities for review by the Owner's Representative. The spare parts shall include the following minimum requirements:

| | Part Description | Quantity |
|---|---|---|
| a. | PLC power supply | 1 each |
| b. | CPU and memory module | 1 each |
| c. | Analog input module | 1 of each type |
| d. | Discrete input module | 1 of each type |
| e. | Discrete output module | 1 of each type |

B. The Contractor shall deliver to the Owner all the required spare parts upon final acceptance of the work. The spare parts shall not be used as replacement parts during the guarantee period.

PART 3 - EXECUTION

Refer to Section 40 50 00.

END OF SECTION

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SECTION 40 50 70

FIBER-OPTIC DATA TRANSMISSION SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes requirements for materials, testing, and installation of Fiber-Optic Data Transmission System.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS General Requirements: 40 50 00.

B. PLC Hardware: 40 50 40.

C. Remote Process Panels: 40 50 80.

1.03 CONTRACTOR SUBMITTALS

A. General: Shop drawings shall be submitted in conformance with the requirements of Section 01 33 00 - Submittals, Section 40 50 00 - PCIS General Requirements, and Section 40 50 80- Control Panels.

B. System Drawings: The following information shall be submitted:

1. Communications system block diagram.

2. Details of connector installations.

3. Details of cable installation, cable entrance into and terminations inside enclosures.

4. Communications splice plan.

C. System drawings shall meet the following requirements:

1. All fiber-optic cables shall be identified by unique numbers.

2. All strands, including spares, shall be identified by unique numbers.

3. All patch panels shall be identified by unique numbers.

4. All couplings shall be identified, including ones with no fiber terminations.

PART 2 - PRODUCTS

2.01 DESIGNATIONS OF COMPONENTS

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

2.02 GENERAL

A. Current Technology: All data communication equipment and materials shall be the most recent field-proven models marketed by their manufacturers at the time of submittal of the shop drawings unless otherwise required to match existing equipment.

B. Transmission Media: Approved manufacturers for all transmission media, including connectors, patch panels, etc. include CommScope, Inc., Corning Cable Systems, or equal.

C. Equipment to be utilized indoors shall be rated for continuous operation under ambient environmental conditions of 0 °C to 50 °C (32 °F to 122 °F) and 10% to 95% relative humidity, noncondensing. Fiber optic cables to be utilized outdoors shall be rated for continuous operation under ambient environmental conditions of -20 °C to 70 °C (-4 °F to 158 °F). Under this requirement fiber cables shall be rated higher than electronics and other equipment to ensure the use of quality performing fibers with minimal performance variation due to temperature fluctuation.

2.03 FIBER PROPERTIES

All multimode fibers in the cable must be usable and meet required specifications. Each optical fiber shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical and environmental requirements of this specification. Each optical fiber shall consist of a doped silica core surrounded by a concentric glass cladding. Each fiber shall be a matched clad design, graded index optical fiber. Each optical fiber shall be proof tested by the fiber manufacturer at a minimum of 100 kpsi (0.7 GN/m2). The fiber shall be coated with a dual layer acrylate protective coating, which shall be in physical contact with the cladding surface. The attenuation specification shall be a maximum value for each cabled fiber at 23 °C ± 5 °C on the original shipping reel. The multimode fiber utilized in the optical fiber cable shall meet EIA/TIA-492AAAA-A-1997, "Detail Specification for 62.5-μm Core Diameter/125-μm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers". The core diameter shall be 62.5 μm ± 2.5 μm. The cladding diameter shall be 125.0 μm ± 2.0 μm. The cladding non-circularity shall be < 1.0%. The core-to-cladding concentricity shall be ≤ 12.0 μm. The coating diameter shall be 245 μm ± 10 μm. The optical fiber shall have a graded refractive index profile. The numerical aperture shall be 0.275 ± 0.015. The maximum attenuation shall be 3.5 dB/km at 850 nm and 1.5 dB/km at 1300 nm. In achieving IEEE

802.3 performance, the optical fiber shall support laser-based Gigabit Ethernet (GbE) operation in the 1000BASE-SX operating window (850 nm) at 300 meters, and in the 1000BASE-LX operating window (1300 nm) at 550 meters. The minimum LED bandwidth shall be 200/500 MHz•km at 850/1300 nm, and the minimum cabled restricted mode launch (RML) bandwidth shall be 220 MHz•km at 850 nm. There shall be no point discontinuities greater than 0.1 dB at either 850 nm or 1300 nm. The attenuation coefficient at 1380 nm shall not exceed the attenuation coefficient at 1300 nm by more than 1.0 dB/km. The attenuation due to 100 turns of fiber around a 75 mm ± 2 mm diameter mandrel shall not exceed 0.5 dB at 850 nm.

2.04 OUTDOOR FIBER-OPTIC CABLE

A. Cable shall be armored, loose-tube design with dry waterblocking for outdoor duct and aerial installations. Buffer tubes shall be made from polypropylene. Each buffer tube shall contain a gel-free water-swellable material for water-blocking protection. The gel-free water-swellable material shall be non-nutritive to fungus, electrically non-conductive, and homogenous. It shall also be free from dirt and foreign matter. The buffer tubes shall be gel-free and be manufactured to a standard 3.0 mm in size, regardless of fiber count, to reduce the number of required installation and termination tools. Cable shall be comprised of water-swellable yarns and/or tapes, central strength members, co-polymer coated corrugated steel tape armor, dielectric strength members (as required), ripcord(s) and MDPE jacket. Cable shall have a storage temperature range of -40 °C to 70 °C, an installation temperature range of -30 °C to +70 °C, and an operating temperature range of -40 °C to +70 °C. The outdoor fiber-optic cable shall be designed to be used in underground conduits and direct buried applications. The cable shall contain eight (8) optical fibers. The cable shall have a steel armored jacket and a medium-density polyethylene outer jacket.

A. Cable shall be listed with Rural Utilities Service (RUS) 7 CFR 1755.900 and be fully compliant with ICEA S-87-640 "Standard for Optical Fiber Outside Plant Communications Cable". Manufacturer shall be ISO 9001 registered. Cable and fiber manufacturer shall be vertically integrated to ensure long-term reliability of the cabled fiber and to ensure the availability of fully integrated technical support.

B. Cables shall be rated to withstand an installation tensile load of not less than 2700 N (600 lb) as defined under EIA/TIA FOTP-33 and a long-term tensile rating of 890 N.

C. The cable shall be tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables." The cable shall withstand a minimum compressive load of 220 N/cm (125 lbf/in) applied uniformly over the length of the sample. The 220 N/cm (125 lbf/in) load shall be applied at a rate of 2.5 mm (0.1 in) per minute. The load shall be maintained for a period of 10 minutes. The change in attenuation shall not exceed 0.3 dB at 1300 nm for multimode fiber.

D. Cable shall be as follows, or equal:

Multimode:

1. CommScope Catalog Number O-012-LA-6F-F12NS,

2. Corning Cable P/N 012KWC-14130D20

2.05 FIBER ENCLOSURES (PATCH PANELS)

A. Fiber enclosures housings finish color shall be the manufacturer's standard, unless otherwise indicated. Housings shall be wall mounted. Provide a minimum of 24 fiber connection points. Each patch panel shall include an area for spare cable and splice trays.

B. Wall mounted fiber enclosures shall be CommScope Catalog Number WFE-024-BK with 2Type WFE-PNL fiber panels, Corning Cable WCH series fully loaded with Corning Cable CCH-CP style single-mode or multi-mode adapter panels, dependent on fiber and connector type. If single-mode ST-compatible adapters, Corning Cable P/N WCH-02P-1219T; if multimode ST-compatible adapters, Corning Cable P/N WCH-02P-1215T.

2.06 FIBER-OPTIC CONNECTORS

A. Unless otherwise noted, fiber-optic connectors shall be the straight tip (ST type), bayonet style, field installable, self-aligning and centering. Fiber-optic connectors shall match the fiber core and cladding diameters. The connector alignment ferrule shall be ceramic. The connector shall have a short boot for strain relief. Fiber-optic equipment and cable shall use the same type connectors for correct mating. Typical connector insertion loss shall be 0.3 dB. The connector shall meet the requirements of TIA/EIA-568B.3.

B. Connectors shall be CommScope Catalog Number MFC-STU-09 (multimode), SFC-STU-09 (single mode); Corning Cable P/N 95-101-52-SP (multimode), 95-201-52-SP (single-mode), or equal.

C. If loose tube, outside plant cable is to be directly terminated, buffer tube fan-out kits shall be used to build the fiber diameter to 900 μm, allowing for fiber protection and strain relief. Buffer tube fan-out kit shall be CommScope Catalog Number KIT-090-012, Corning Cable P/N FAN-BT25-12, or equal.

2.07 FIBER PATCH CORDS

A. Multimode patch cord connectors shall be measured for insertion loss with the following values for each connector: typical of 0.3 dB and maximum of 0.5 dB. Connectors shall be multimode ST compatible. Optical fiber cable types shall be suitable for use in indoor spaces and shall contain a riser-rated jacket. Patch cord shall contain 62.5/125

μm graded-index, multimode fiber compliant with TIA/EIA-568-B.3. Patch cord jacket color shall be orange.

B. Patch cord shall be available in different lengths.

C. Patch cord shall be CommScope Catalog Number RFJ-01SP29-6F-STE-01-STE, Corning Cable P/N 505001K3141001M, or equal.

2.08 SPLICE CLOSURE

A. Splice closure shall be designed for splicing fibers in aerial, duct and buried applications. The sealed canister closures shall be available in single-fiber loose tube configurations. The consolidation of multiport tails for up to 24 flat cables shall be accomplished with add-a-cable kits. Closure shall provide slack storage, various tray heights and mass platform storage. Provide a splice tray for each cable splice.

B. Splice closure shall be manufactured by Corning Model Splice Closure Fiber (SCF), or equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Execution requirements of Section 405000 - Process Control and Instrumentation Systems apply to the WORK of this Section.

B. All necessary interconnections, services, and adjustments required for a complete and operable data transmission system shall be provided as shown on the drawings. The Contractor shall verify the complete operation of the data transmission system in conjunction with field testing associated with systems supported by the fiber-optic data transmission system. Prior to formal acceptance testing, field tests shall include a power attenuation test and a gain margin test. These tests shall be performed on each link and repeated from the opposite end of each link.

3.02 INSTALLATION

A. All system components and appurtenances shall be installed in accordance with the manufacturer's instructions and as shown. Conduits shall be used for installation of fiber-optic cables. All fibers (including spares) of fiber-optic cables entering a RPP shall be terminated at a patch panel. Interfacing between a fiber-optic cable and a PLC fiber-optic communications module or a fiber-optic repeater shall be through a patch panel.

B. A short cable slack of 10 feet minimum for repair shall be provided for all pullboxes along the Fiber-Optic Cable Segments (FOCS).

3.03 TESTING

A. Power attenuation test shall be performed at the light wavelength of the transmitter to be used on the circuit being tested. The flux shall be measured at the receiver end and shall

be compared to the flux injected at the transmitter end. There shall be a jumper added at each end of the circuit under test so that end connector loss shall be validated. Rotational optimization of the connectors will not be permitted. If the circuit loss exceeds the calculated circuit loss by more than 2 dB, the circuit is unsatisfactory and shall be examined to determine the problem. The Owner's Representative shall be notified of the problem and what procedures the Contractor proposes to eliminate the problem. The Contractor shall prepare a report documenting the results of the test to be submitted to the Owner's Representative.

B. The Contractor shall test and verify that each circuit has a gain margin, which exceeds the circuit loss by at least 6 dB.

END OF SECTION

SECTION 40 50 80

REMOTE PROCESS PANEL (RPP)

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes requirements for materials, testing, and installation of the cabinets and consoles to be provided by the system contractor under Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. PCIS General Requirements: 40 50 00.

B. PLC Hardware: 40 50 40.

PART 2 - PRODUCTS

2.01 REMOTE PROCESS PANEL (RPP)

A. The panel shall be a floor-mounted NEMA 12 enclosure and shall be constructed from 14-gauge formed steel throughout. Access door shall have door bars on inside surface and continuous hinges. All exposed edges and welds on the enclosure shall be ground smooth. No penetration through the cabinet door or exterior with rivets, screws, bolts, or back of panel nuts shall be allowed. The enclosure shall provide protection against dirt, dust, oil, and water. The interior shall be provided with a formed 12-gauge subpanel for attaching surface-mounted components. All components shall be attached with screws, and the subpanel shall be threaded.

B. Rivets or back of panel nuts, screws, or bolts shall not be allowed. No panel penetration is allowed, except for the conduit entry.

C. Provide an 18" LED lamp in the panel. Each interior shall be equipped with a 120-volt, 15-ampere duplex utility outlet and a single-pole, 15-ampere, 120-volt circuit breaker protecting the outlet and the lamp. The utility outlet and the lamp shall be powered by utility power.

D. A folding shelf at least 18 inches wide and a documentation pocket shall be provided at the panel. The shelf shall be secured to the door bars in a way to allow vertical adjustment of the shelf location.

E. Provide a door switch to detect enclosure intrusion. Door switch shall be normally closed, snap action, contact type. Door switch shall be a Cutler-Hammer Cabinet Door Interlock (Type PS) limit switch, or equal

F. Temperature Control:

1. Contractor shall provide temperature control equipment listed in Section 405000 Appendix A.

2. Submit cooling system sizing calculations, as part of the enclosure submittal.

3. Assume an ambient temperature of 115 °F.

G. Refer to instrument drawings for enclosure size, installation details, and layout.

H. The enclosure shall be Hoffman NEMA 12 Quote 144591 or equal.

2.02 PANEL CONTROL CIRCUIT DEVICES AND COMPONENTS

A. General: All components, except those on the front panels, shall be mounted behind on fixed or swing-out panels; terminal blocks for field connections shall be mounted on fixed channels located near the bottom of the sections but clear of the conduit entry area. Fixed panels shall be located so as not to prevent access within the cabinets to other components, wiring, and terminal blocks on fixed panels or front panels.

B. All electrical devices within the panel shall be identified by tag number, machine printed on a label visible from the panel interior. Labels shall be made of durable plastic tape with an adhesive backing. The labels shall have rounded corners and shall be consistent in size throughout the panel.

C. Control Relays:

1. Control relays shall have 120-volt AC or 24-volt DC coils, except as noted; contacts shall be rated for the various circuit applications shown on the drawings. Control relays shall be 10-ampere, multiple-contact, 300-volt, plug-in type with dust cover and sockets. The relays shall be equipped with the following features:

a. Retaining clip.

b. Test button lockable in "ON" position.

c. Mechanical flag for contact status indication.

d. Pilot light for coil power indication.

2. If additional contacts are required, they shall be ganged.

3. The relays shall be Releco General Purpose Relays, Allen-Bradley Bulletin 700-HA, IDEC series RU, Telemecanique RXM relay (Zelio Plug-in), or equal. All control relays shall be products of one manufacturer.

D. Circuit Breakers: See Section 405000 Appendix A.

E. Feed-Through Terminal Blocks: Feed-through terminal blocks shall be modular DIN rail mounted with plastic insulating housings and screw secured cage clamp wire termination

and shall be rated 20 amperes at 300 volts. Current carrying parts shall be made of at least an 85% copper alloy, nickel-plated for maximum conductivity and resistance to corrosion. Terminal blocks shall provide a secure oxide-film free connection to the wire without the use of spades, ring tongues, or ferrules. Terminals blocks shall have captive screws and a built-in vibration resistance mechanism, which locks the screw connection in place after the wire has been terminated. A bridge bar for cross connection shall be provided. A test adapter for a banana jack shall be provided. The test adapter shall provide a positive test connection to the terminal block and shall lock into place for hands free operation. White marking strips, fastened securely to the molded sections shall be provided and wire (terminal) numbers or circuit identifications shall be marked thereon with permanent marking fluid. Feed-through terminal blocks shall be Phoenix Contact Type UK 4, Allen-Bradley Series 1492-W, ABB (Entrelec) Series M4/6.NC, Sprecher+Schuh Cat. No. V7-W4, or equal.

F. Fuse Terminal Blocks: Fuse terminal blocks shall be the same profile, but different color as the feed through terminal blocks, and shall have blown fuse light indicator. Fuse terminal blocks shall be Phoenix Contact Type UK 4-TG, or equal.

G. Disconnect Terminal Blocks: Disconnect terminal blocks shall be of knife disconnect type. The blocks shall have a universal foot for mounting on DIN rail and a width of the feed through block. Disconnect terminal blocks shall be Phoenix Contact Type UK 5-MTK-P/P, or equal.

H. DC Power Supplies: Provide DC power supplies as required for analog loops and DC circuits. Each power supply shall be enclosed and include internal short-circuit protection. Current requirements shall not exceed 75% of manufacturer maximum rating.

I. Receptacles: See Section 405000 Appendix A.

J. Indicating Lights: Indicating light shall be push-to-test transformer type with LED.

K. Light Switch: See Section 405000 Appendix A.

L. Load Center: See Section 405000 Appendix A.

M. Surge/Noise Supressor: See Section 405000 Appendix A.

2.03 PANEL CONTROL CIRCUIT WIRING

A. Wire Type and Size: Instrumentation signal cables shall be of the type used for process control with shielded pairs or triads with polyvinyl jacket and overall shield over the multiple pairs or triads. The instrumentation cable shall be rated 300 volts at 90 °C or better. The size of the instrumentation cable shall be AWG No. 18 with seven strands minimum, unless otherwise specified elsewhere. All instrumentation cables shall be UL listed.

B. 120-volt AC wiring within the panel shall be AWG No. 14 THHN. Main power (120-volt AC) to the panels shall be wired using color coded AWG No. 12. AC power to all

system power supplies. Wires shall be color coded in accordance with the following table:

| | |
|---|---|
| Black | L1 (hot) |
| White | L2 (neutral) |
| Red | AC control circuits |
| Blue | DC circuits |
| Yellow | Interlock control circuits wired from an external power source |
| Green | Equipment ground |

C. All interfacing between the cabinets and the field shall be accomplished at a terminal strip (TB-1). No internal panel wiring shall be connected to terminals on the "field side" of TB-1. Likewise, no field wiring shall be connected to terminals on the "panel side" of TB-1.

D. All intentionally grounded, grounding, and bonding conductors shall be sized by NEC Article 250 as required.

E. Wires carrying voltage from external devices and one wire from an analog loop shall be terminated at the disconnect terminal block.

F. Only one wire shall be terminated at each side of a terminal block. A bridge bar shall be used for cross connection.

G. Wiring run from components on a swing-out panel to other components on a fixed panel shall be made up in tied bundles. These shall be tied with nylon wire ties and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at terminals.

H. Wiring run to control devices on the front panels shall be tied together at short intervals and secured to the inside face of the panel using Panduit adhesive mounts with Eastman No. 910 adhesive.

I. Wiring to rear terminals on panel-mount instruments shall be run in plastic wireways secured to horizontal brackets run above or below the instruments in about the same plane as the rear of the instruments.

J. Conformance to the above wiring installation requirements shall be reflected by details shown on the shop drawings for the Engineer's review.

K. Signal conditioners and control interface relays shall be provided wherever proper instrument interfacing dictates use of these components. Each auxiliary device shall be assigned a tag number and shall appear on the panel shop drawings.

L. Wire Marking:

1. Each signal and circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all shop drawings. These numbers shall be marked on all conductors at every terminal.

2. For field distribution of a common potential, wire number to each field device shall consist of a common (group) number and individual number, ex. if a wire connected to a "hot" potential on a panel side of a terminal block has tag "5", then field wires should be tagged "5-1", 5-2", etc.

3. The markers shall be permanent sleeve type with machine printed black markings. Markers shall be Thomas & Betts Series EZS, Tyco Series RPS, or equal.

M. Terminal Marking: Each terminal shall be identified by a single unique number. Hand-written labels shall not be allowed. The match between the terminal identification and the wire identification is not required.

N. All electrical devices within the panel shall be identified by tag number, machine printed on a label visible from the panel interior. Labels shall be laminated plastic with an adhesive backing. The labels shall be consistent in size throughout the panel.

2.04 SPARE PARTS

A. The Contractor shall furnish to the Owner all necessary spare parts of components required to maintain the system. Prior to final acceptance of work, the Contractor shall provide a spare parts listing of all necessary spare parts and quantities for review by the Owner's Representative. The spare parts shall include, but not be limited to, the following minimum requirements:

| MINIMUM SPARE PARTS LIST | |
|---|---|
| Part Description | Quantity |
| 1. Power supply | 1 each type |
| 2. Relays | 2 each type |

B. The Contractor shall deliver to the Owner all the required spare parts upon final acceptance of the work. The spare parts shall not be used as replacement parts during the guarantee period.

PART 3 - EXECUTION

Refer to Section 40 50 00.

END OF SECTION

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SECTION 40 91 15

MAGNETIC FLOWMETERS

PART 1 - GENERAL

1.01 DESCRIPTION

This section describes requirements for magnetic flowmeters.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Painting and Coating: 09 91 14.

B. Pressure Testing of Piping: 40 05 15.

C. Equipment, Piping, Duct, and Valve Identification: 40 07 75.

1.03 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 00.

B. Submit manufacturer's catalog data and detail drawings showing dimensions, pressure rating, coatings, and meter parts and describe by material of construction specifications (such as AISI, ASTM, SAE, or CDA) and grade or type. Identify each meter by tag number to which the catalog data and detail sheets pertain.

C. Furnish manufacturer's application performance guarantee with submittals.

D. Show meter laying lengths.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The meter flow tube and transmitter shall be by the same manufacturer.

B. See Section 405000 Appendix A for magnetic flowmeter and transmitter manufacturer and model.

2.02 METER DESIGN

A. The magnetic flowmeter shall be an obstructionless pipeline-mounted instrument to magnetically measure the flow of the process media. The output signal shall not be affected by changes in fluid viscosity or density and shall have zero point stability and auto zeroing functions. Provide the magnetic flowmeter with the following features:

1. Drip- and splash-proof sensor, capable of withstanding temporary submersion of up to 30 feet of water for 48 hours.

2. Integral terminal box with watertight cable seals.

3. Interconnecting cables.

B. Provide stainless steel grounding rings and grounding straps per manufacturer's requirements.

2.03 MATERIALS OF CONSTRUCTION--FLANGELESS METERS

A. The flow tube shall be flangeless wafer construction with cast aluminum enclosure. Provide bolting kit.

B. Liner and electrodes shall be as indicated in the subsection on "Service Conditions."

2.04 MATERIALS OF CONSTRUCTION--FLANGED METERS

A. The flow tube shall be as indicated in the subsection on "Service Conditions" with carbon steel flanges.

B. Liner and electrodes shall be as indicated in the subsection on "Service Conditions."

2.05 INDICATOR/TOTALIZER

The indicator/totalizer shall accept the process flow signal from the magnetic flowmeter and convert its electrical output signals directly proportional to the instantaneous metered flow rate. The housing shall be suitable for field mounting.

2.06 TRANSMITTER

A. The transmitter shall be microprocessor based with flow rate indicator in engineering units, forward, reversed, and net flow totalizer, all in user-selectable engineering units. The display shall also be capable of indicating alarm status and velocity of fluid. The transmitter shall be mounted as indicated in the instrument list.

B. The preamplifier input impedance shall be a minimum of 10E+11 ohms.

C. Power Requirements: 117-volt ac, ±10%, 60 hertz.

D. Totalized flow and programmed configuration shall be maintained in memory for up to 10 years.

2.07 INTERCONNECTING CABLE

The interconnecting cable between the sensor and the transmitter shall be furnished by the magnetic flowmeter manufacturer.

## 2.08 PERFORMANCE

The overall system's performance shall be as follows:

A. Accuracy: 0.25% of flow rate with minimum fluid velocity of 1 fps.

B. Repeatability: ±0.1% of flow rate.

C. The accuracy of each meter shall be verified by calibration in a flow laboratory traceable to the U.S. National Institute of Standards and Technology.

D. Adjustable full-scale range.

E. Outputs: Bidirectional, isolated 4- to 20-mA d-c and either 24-volt d-c scaled pulse, or 0- to 10-KHz frequency.

F. Minimum Conductivity: 5 micromho/centimeter.

G. Power Consumption: 20 watts maximum.

H. Temperature Limits, Ambient: -20°F to +140°F.

I. Temperature Limits, Process: Elastomers +160°F, Teflons +300°F, ceramic 350°F.

J. Field Selectable Low Flow Cutoff: 0% to 10%.

K. The flowmeter shall have a positive zero return (PZR) input controlled by an external dry contact.

L. Environmental Rating: NEMA 6P/IP68 for sensor and NEMA 4X for electronics.

M. The meter shall have empty pipe detection.

N. A common alarm discrete output (a dry contact or a transistor switch) shall be provided for remote indication of fault conditions.

## 2.09 METER IDENTIFICATION

Provide identification tag per Section 40 07 75.

## 2.10 SPARE PARTS

A. The Contractor shall furnish to the Owner all necessary spare parts of components required to maintain the system. Prior to final acceptance of work, the Contractor shall provide a spare parts listing of all necessary spare parts and quantities for review by the Owner's Representative. The spare parts shall include, but not be limited to, the following minimum requirements:

| MINIMUM SPARE PARTS LIST | |
|---|---|
| PART DESCRIPTION | QUANTITY |
| MAGNETIC FLOWMETER | 1 |

B. The Contractor shall deliver to the Owner all the required spare parts upon final acceptance of the work. The spare parts shall not be used as replacement parts during the guarantee period.

# PART 3 - EXECUTION

## 3.01 SERVICE CONDITIONS

MAGNETIC FLOWMETER AND INDICATOR/TOTALIZER

| GENERAL | | |
|---|---|---|
| 1. | P&ID No. | Sheet No. 13 |
| 2. | Service | Measure Flow Rate |

| MAGNETIC FLOWMETER | | |
|---|---|---|
| 3. | Tag No. | FE-131 |
| 4. | Metering Tube | |
| | Size Flg. | 2" |
| | Rating (psi) | 150 |
| 5. | Metering Tube Material | Carbon Steel |
| 6. | Liner Material | Poly-urethane |
| 7. | Electrode Material | 316 SST |
| 8. | Elec. Class. | NEMA 6P / IP68 |

| INDICATOR/TOTALIZER TRANSMITTER | | |
|---|---|---|
| 9. | Tag No. | FIT-131 |
| 10. | Flow Rate Ind. Scale | 0-120gpm |
| 11. | Flow Totalizer Multiplier | 10 gallons |
| 12. | Aux. Output Signal | Transmitter Fail |
| 13. | Aux. Output Signal To | PLC |
| 14. | Elec. Class. | NEMA 4X |
| 15. | Mounting | Integral |

| SERVICE CONDITIONS | | |
|---|---|---|
| 16. | Process Media | Potable Water |
| 20. | Flow (gpm) (min/max) | 23/120 |
| 22. | Press. (psig) (min/max) | 75/90 |

3.02 REPLACEMENT SPOOL

Furnish a flanged stainless steel spool for each magnetic flowmeter. The spool shall be the same length as the meter. Pipe spool shall match adjacent pipe sizing and pressure rating.

3.03 PAINTING AND COATING

Coat exposed carbon steel components of meter tube and sensor the same as the adjacent piping. If the adjacent piping is not coated, then coat per Section 09 91 14, System No. 7. Apply the specified prime coat at the place of manufacture. Apply intermediate and finish coats in field. Finish coat shall match the color of the adjacent piping.

END OF SECTION

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# SECTION 11. AMENDMENTS TO STANDARD SPECIFICATIONS

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## SECTION 5 CONTROL OF WORK
(Issued 06-01-11)

**Add:**

### 5-1.055 SUBCONTRACTING

#### 5-1.055A General

No subcontract releases you from the contract or relieves you of your responsibility for a subcontractor's work.

If you violate Pub Cont Code § 4100 et seq., the Department may exercise the remedies provided under Pub Cont Code § 4110. The Department may refer the violation to the Contractors State License Board as provided under Pub Cont Code § 4111.

Except for a building-construction non-federal-aid contract, perform work equaling at least 30 percent of the value of the original total bid with your employees and with equipment owned or rented by you, with or without operators.

Each subcontract must comply with the contract.

The Department encourages you to include a dispute resolution process in each subcontract.

Each subcontractor must have an active and valid State contractor's license with a classification appropriate for the work to be performed (Bus & Prof Code, § 7000 et seq.).

Submit copies of subcontracts upon request.

Before subcontracted work starts, submit a Subcontracting Request form.

Do not use a debarred contractor; a current list of debarred contractors is available at the Department of Industrial Relations' Web site.

Upon request, immediately remove and not again use a subcontractor who fails to prosecute the work satisfactorily.

### 5-1.116 DIFFERING SITE CONDITIONS (23 CFR 635.109)

#### 5-1.116A Contractor's Notification

Promptly notify the Engineer if you find either of the following:

1. Physical conditions differing materially from either of the following:

    1.1. Contract documents
    1.2. Job site examination

2. Physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract

Include details explaining the information you relied on and the material differences you discovered.

If you fail to notify the Engineer promptly, you waive the differing site condition claim for the period between your discovery of the differing site condition and your notification to the Engineer.

If you disturb the site after discovery and before the Engineer's investigation, you waive the differing site condition claim.

### 5-1.116B Engineer's Investigation and Decision

Upon your notification, the Engineer investigates job site conditions and:

1. Notifies you whether to resume affected work
2. Decides whether the condition differs materially and is cause for an adjustment of time, payment, or both

You may protest the Engineer's decision.

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## SECTION 6 CONTROL OF MATERIALS
## (Issued 05-01-09)

**Replace Section 6-1.05 with:**

### 6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

A reference to a specific brand or trade name establishes a quality standard and is not intended to limit competition. You may use a product that is equal to or better than the specified brand or trade name if approved.

Submit a substitution request within a time period that:

1. Follows Contract award
2. Allows 30 days for review
3. Causes no delay

Include substantiating data with the substitution request that proves the substitution:

1. Is of equal or better quality and suitability
2. Causes no delay in product delivery and installation

### 6-1.075 GUARANTEE

Guarantee the work remains free from substantial defects for 1 year after contract acceptance except for work parts for which you were relieved of maintenance and protection. Guarantee each of these relieved work parts for 1 year after the relief date.

The guarantee excludes damage or displacement caused by an event outside your control including:

1. Normal wear and tear
2. Improper operation

3. Insufficient maintenance
4. Abuse
5. Unauthorized change
6. Act of God

During the guarantee period, repair or replace each work portion having a substantial defect.

The Department does not pay for corrective work.

During corrective work activities, provide insurance coverage specified for coverage before contract acceptance.

The contract bonds must be in full force and effect until the later of:

1. Expiration of guarantee period
2. Completion of corrective work

If a warranty specification conflicts with Section 6-1.075, "Guarantee," comply with the warranty specification.

During the guarantee period, the Engineer monitors the completed work. If the Engineer finds work having a substantial defect, the Engineer lists work parts and furnishes you the list.

Within 10 days of receipt of the list, submit for authorization a detailed plan for correcting the work. Include a schedule that includes:

1. Start and completion dates
2. List of labor, equipment, materials, and any special services you plan to use
3. Work related to the corrective work, including traffic control and temporary and permanent pavement markings

The Engineer notifies you when the plan is authorized. Start corrective work and related work within 15 days of notice.

If the Engineer determines corrective work is urgently required to prevent injury or property damage:

1. The Engineer furnishes you a request to start emergency repair work and a list of parts requiring corrective work
2. Mobilize within 24 hours and start work
3. Submit a corrective work plan within 5 days of starting emergency repair work

If you fail to perform work as specified, the Department may perform the work and bill you.

## SECTION 9 MEASUREMENT AND PAYMENT
## (Issued 03-11-10)

**In Section 9-1.03A replace the 2nd paragraph with:**

To the total of the direct costs computed as provided in Sections 9-1.03A(1), "Labor," 9-1.03A(2), "Materials," and 9-1.03A(3), "Equipment Rental," there will be added a markup of 35 percent to the cost of labor, 15 percent to the cost of materials, and 15 percent to the cost of equipment rental.

**In Section 9-1.03A replace the 4th paragraph with:**

If a subcontractor performs work at force account, accept an additional 10 percent markup to the total cost of that work paid at force account, including markups specified in Section 9-1.03, "Force Account Payment," as reimbursement for additional administrative costs.

**Replace Section 9-1.03B with:**

The Contractor, and all subcontractors obtained before or after contract execution, shall itemize the labor, material, and equipment rental costs, and shall not be deemed specialists unless the selected Contractor or available subcontractors on site are not capable of performing the specialty work and it is not the special service industry's established practice to provide cost itemization. In addition, the Engineer may approve work required to be performed at an off-site manufacturing plant or machine shop to be paid as a non-itemized specialist billing. To obtain approval as a specialist, the Contractor shall submit on behalf of the subcontractor a request to the Engineer prior to the start of the proposed specialist work.

If approval is granted, the Engineer will accept the non-itemized invoices for specialty work performed, provided the invoices are at current market rates. Markup percentages of Section 9-1.03A, "Work Performed by Contractor," will not apply. A markup of 10 percent will be added to the total cost of the extra work. The 10 percent markup shall reimburse the Contractor for additional administrative costs, and no other payment will be made by reason of performance of the extra work by a specialist.

If approval is not granted prior to the start of the proposed specialty work, the Contractor or subcontractor shall itemize labor, material, and equipment rental costs and apply percentage markups as required by Section 9-1.03A, "Work Performed by Contractor."

**In Section 9-1.03C delete the 6th paragraph.**

## SECTION 12 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES
## (Issued 11-07-08)

**In Section 12-1.01 in the 2nd paragraph, replace the 1st sentence with:**

Attention is directed to Part 6 of the California MUTCD.

**Replace Section 12-2.01 with:**

### 12-2.01 FLAGGERS

Flaggers while on duty and assigned to traffic control or to give warning to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof, shall perform their duties and shall be provided with the necessary equipment in conformance with Part 6 of the California MUTCD. The equipment shall be furnished and kept clean and in good repair by the Contractor at the Contractor's expense.

All flaggers shall wear safety apparel meeting the requirements of ANSI/ISEA 107-2004 for Class 2 or 3 garment and complying with 71 Fed Reg 67792.

**In Section 12-3.01 replace the 1st paragraph with:**

In addition to the requirements in Part 6 of the California MUTCD, all devices used by the Contractor in the performance of the work shall conform to the provisions in this Section 12-3.

**In Section 12-3.06 in the 1st paragraph, replace the 2nd sentence with:**

Construction area signs are shown in or referred to in Part 6 of the California MUTCD.

**In Section 12-3.06 in the 4th paragraph, replace the 1st sentence with:**

All construction area signs shall conform to the dimensions, color and legend requirements of the plans, Part 6 of the California MUTCD and these specifications.

**In Section 12-3.06 in the 8th paragraph, replace the 1st sentence with:**

Used signs with the specified sheeting material will be considered satisfactory if they conform to the requirements for visibility and legibility and the colors conform to the requirements in Part 6 of the California MUTCD.

## SECTION 14 (BLANK)
## (Issued 06-01-11)

## Replace Section 14 with:
## SECTION 14 ENVIRONMENTAL STEWARDSHIP
## 14-1 GENERAL

### 14-1.01 GENERAL

Environmental stewardship includes both environmental compliance and environmental resource management.

If an ESA is shown on the plans:

1. The boundaries shown are approximate; the Department marks the exact boundaries on the ground
2. Do not enter the ESA unless authorized
3. If the ESA is breached, immediately:
   3.1. Secure the area and stop all operations within 60 feet of the ESA boundary
   3.2. Notify the Engineer
4. If the ESA is damaged, the Department determines what efforts are necessary to remedy the damage and who performs the remedy; you are responsible for remedies and charges.

## 14-2 CULTURAL RESOURCES

### 14-2.01 GENERAL

Reserved

### 14-2.02 ARCHAEOLOGICAL RESOURCES

If archaeological resources are discovered at the job site, do not disturb the resources and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Protect the discovery area
3. Notify the Engineer

The Department investigates. Do not take archaeological resources from the job site. Do not resume work within the discovery area until authorized.

If, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of an archaeological find, or investigation or recovery of archeological materials, you will be compensated for resulting losses, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays."

If ordered, furnish resources to assist in the investigation or recovery of archaeological resources. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

### 14-2.03 ARCHAEOLOGICAL MONITORING AREA

Section 14-2.03 applies if an AMA is described in the Contract.

The Department assigns an archaeological monitor to monitor job site activities within the AMA. Do not work within the AMA unless the archeological monitor is present.

The Engineer and the Department archaeological monitor conduct an AMA location field review with you at least 5 business days before start of work. The Department marks the exact boundaries of the AMA on the ground.

If temporary fence (Type ESA) for an AMA is described in the Contract, install temporary fence (Type ESA) to define the boundaries of the AMA during the AMA location field review.

At least 5 business days before starting work within an AMA, submit a schedule of days and hours to be worked for the Engineer's approval. If you require changes in the schedule, submit an update for the Engineer's approval at least 5 business days before any changed work day.

If archaeological resources are discovered within an AMA, comply with Section 14-2.02, "Archaeological Resources."

### 14-2.04 HISTORIC STRUCTURES

Reserved

## 14-3 COMMUNITY IMPACTS AND ENVIRONMENTAL JUSTICE

Reserved

## 14-4 NATIVE AMERICAN CONCERNS

Reserved

## 14-5 AESTHETICS

Reserved

## 14-6 BIOLOGICAL RESOURCES

### 14-6.01 GENERAL

Reserved

### 14-6.02 BIRD PROTECTION

Protect migratory and nongame birds, their occupied nests, and their eggs.

The Department anticipates nesting or attempted nesting from February 15 to September 1.

The federal Migratory Bird Treaty Act, 16 USC § 703–711, and 50 CFR Pt 10 and Fish & Game Code §§ 3503, 3513, and 3800 protect migratory and nongame birds, their occupied nests, and their eggs.

The federal Endangered Species Act of 1973, 16 USC §§ 1531 and 1543, and the California Endangered Species Act, Fish & Game Code §§ 2050–2115.5, prohibit the take of listed species and protect occupied and unoccupied nests of threatened and endangered bird species.

The Bald and Golden Eagle Protection Act, 16 USC § 668, prohibits the destruction of bald and golden eagles and their occupied and unoccupied nests.

If migratory or nongame bird nests are discovered that may be adversely affected by construction activities or an injured or killed bird is found, immediately:

1. Stop all work within a 100-foot radius of the discovery.
2. Notify the Engineer.

The Department investigates. Do not resume work within the specified radius of the discovery until authorized.

When ordered, use exclusion devices, take nesting prevention measures, remove and dispose of partially constructed and unoccupied nests of migratory or nongame birds on a regular basis to prevent their occupation, or perform any combination of these. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

Prevent nest materials from falling into waterways.

Bird protection that causes a delay to the controlling activity is a condition unfavorable to the suitable prosecution of work as specified in Section 8-1.05, "Temporary Suspension of Work."

## 14-7 PALEONTOLOGICAL RESOURCES

If paleontological resources are discovered at the job site, do not disturb the material and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Protect the area
3. Notify the Engineer

The Department investigates and modifies the dimensions of the protected area if necessary. Do not take paleontological resources from the job site. Do not resume work within the specified radius of the discovery until authorized.

## 14-8 NOISE AND VIBRATION

### 14-8.01 GENERAL

Reserved

### 14-8.02 NOISE CONTROL

Do not exceed 86 dBa at 50 feet from the job site activities from 9 p.m. to 6 a.m.

Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

## 14-9 AIR QUALITY

### 14-9.01 AIR POLLUTION CONTROL

Comply with air pollution control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including air pollution control rules,

regulations, ordinances, and statutes provided in Govt Code § 11017 (Pub Cont Code § 10231).

Do not burn material to be disposed of.

### 14-9.02 DUST CONTROL

Prevent and alleviate dust by applying water, dust palliative, or both under Section 14-9.01.

Apply water under Section 17, "Watering."

Apply dust palliative under Section 18,"Dust Palliative."

If ordered, apply water, dust palliative, or both to control dust caused by public traffic. This work will be paid for as extra work as specified in Section 4-1.03D, "Extra Work."

## 14-10 SOLID WASTE DISPOSAL AND RECYCLING

### 14-10.01 SOLID WASTE DISPOSAL AND RECYCLING

Submit an annual Solid Waste Disposal and Recycling Report between January 1 and 15 for each year work is performed under the Contract at any time during the previous calendar year. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 through December 31 of the previous calendar year.

Submit a final annual Solid Waste Disposal and Recycling Report within 5 business days after Contract acceptance. Show the types and amounts of project-generated solid waste taken to or diverted from landfills or reused on the project from January 1 to Contract acceptance.

For each failure to submit a completed form, the Department withholds $10,000.

## 14-11 HAZARDOUS WASTE AND CONTAMINATION

### 14-11.01 GENERAL

Reserved

### 14-11.02 ASBESTOS AND HAZARDOUS SUBSTANCES

Upon discovery, immediately stop working in and notify the Engineer of areas where asbestos or a hazardous substance is present if the:

1. Contractor reasonably believes the substance is asbestos as defined in Labor Code § 6501.7 or a hazardous substance as defined in Health & Safety Code §§ 25316 and 25317
2. Presence is not described in the Contract
3. Substance has not been made harmless

## 14-12 OTHER INTERAGENCY RELATIONS

Reserved

## 14-13 PAYMENT

Payment for work specified in Section 14 is included in the payment for the bid items involved unless:

1. Bid item for the work is shown in the verified Bid Item List
2. Work is specified as paid for as extra work

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## SECTION 15 EXISTING HIGHWAY FACILITIES
## (Issued 05-01-09)

**In Section 15-1.02 replace the 1st paragraph with:**

Existing facilities which are to remain in place shall be protected in conformance with the provisions in Sections 5-1.18, "Property and Facility Preservation," and 7-1.12, "Indemnification and Insurance."

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## SECTION 19 EARTHWORK
## (Issued 09-16-11)

**Replace Section 19-1.02 with:**

**19-1.02 (BLANK)**

**Replace Section 19-1.03 with:**

**19-1.03 GRADE TOLERANCE**

Immediately prior to placing subsequent layers of material thereon, the grading plane shall conform to one of the following:

A. When hot mix asphalt is to be placed on the grading plane, the grading plane at any point shall not vary more than 0.05 foot above or below the grade established by the Engineer.
B. When subbase or base material to be placed on the grading plane is to be paid for by the ton, the grading plane at any point shall not vary more than 0.10 foot above or below the grade established by the Engineer.
C. When the material to be placed on the grading plane is to be paid for by the cubic yard, the grading plane at any point shall be not more than 0.05 foot above the grade established by the Engineer.

**In Section 19-3.025C replace the 1st paragraph with:**

Cementitious material used in soil cement bedding shall conform to the provisions in Section 90-2.01, "Cementitious Materials." Supplementary cementitious material will not be required.

**In Section 19-3.025C replace the 4th paragraph with:**

The aggregate, cementitious material, and water shall be proportioned either by weight or by volume. Soil cement bedding shall contain not less than 282 pounds of cementitious material per cubic yard. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

**In Section 19-3.06 replace the 9th paragraph with:**

Unless otherwise shown on the plans or specified in these specifications or the special provisions, material for structure backfill to be compacted to a relative compaction of not less than 90 percent, except material to be placed behind retaining walls, shall consist of material free of rocks, broken concrete, other solid material exceeding 3 inches in greatest dimension, or organic or other unsatisfactory material.

**In Section 19-3.062 replace the 1st paragraph with:**

Slurry cement backfill shall consist of a fluid, workable mixture of aggregate, cementitious material, and water.

**In Section 19-3.062 replace the 5th paragraph with:**

Cementitious material shall conform to the provisions in Section 90-2.01, "Cementitious Materials." Supplementary cementitious material will not be required.

**In Section 19-3.062 replace the 8th paragraph with:**

The aggregate, cementitious material, and water shall be proportioned either by weight or by volume. Slurry cement backfill shall contain not less than 188 pounds of cementitious material per cubic yard. The water content shall be sufficient to produce a fluid, workable mix that will flow and can be pumped without segregation of the aggregate while being placed.

## SECTION 26 AGGREGATE BASES
## (Issued 02-16-07)

**In Section 26-1.02A replace the 1st paragraph with:**

Aggregate must be clean and free from organic matter and other deleterious substances. Aggregate must consist of any combination of:

1. Broken stone
2. Crushed gravel
3. Natural rough surfaced gravel
4. Sand
5. Up to 100 percent of any combination of processed:

    5.1. Asphalt concrete
    5.2. Portland cement concrete
    5.3. Lean concrete base
    5.4. Cement treated base

**In Section 26-1.02B replace the 1st paragraph with:**

Aggregate must be clean and free from organic matter and other deleterious substances. Aggregate must consist of any combination of:

1. Broken stone
2. Crushed gravel
3. Natural rough surfaced gravel
4. Sand
5. Up to 100 percent of any combination of processed:

    5.1. Asphalt concrete
    5.2. Portland cement concrete
    5.3. Lean concrete base
    5.4. Cement treated base

## SECTION 50 PRESTRESSING CONCRETE
## (Issued 04-20-12)

**In Section 50-1.02 replace the 2nd paragraph with:**

The working drawings of the prestressing system shall show complete details and substantiating calculations of the method and materials the Contractor proposes to use in the prestressing operations, including any additions or rearrangement of reinforcing steel from that shown on the plans. The details shall outline the method and sequence of stressing and shall include complete specifications and details of the prestressing steel and anchoring devices, jacking stresses, elongation calculations, type of ducts and all other data pertaining to the prestressing, including the proposed arrangement of the prestressing steel in the members. The drawings shall also show (1) the exact location of anchorage system components, ducts, and other related elements and (2) the duct location data, including elevations at least every 1/8th point of the span for each span.

**In Section 50-1.05 replace the 1st paragraph with:**

Prestressing steel shall be high-tensile wire conforming to the requirements in ASTM Designation: A 421, including Supplement I; high-tensile seven-wire strand conforming to the requirements in ASTM Designation: A 416; or uncoated deformed (Type II) high-strength steel bars conforming to the requirements in ASTM Designation: A 722, including all supplementary requirements. The maximum weight requirement of ASTM Designation: A 722 will not apply.

**In Section 50-1.05 in the 3rd paragraph, delete item A.**

**In Section 50-1.05 in the 3rd paragraph, replace item E with:**

E. In addition to the requirements in Section 50-1.10, "Samples for Testing," four 4-foot-long samples of coated strand and one 5-foot-long sample of uncoated strand of each size and reel shall be furnished to the Engineer for testing. These samples, as selected by the Engineer, shall be representative of the material to be used in the work.

**In Section 50-1.05 between the 3rd and 4th paragraphs, add:**

The Contractor shall furnish to the Transportation Laboratory a representative 8-ounce sample from each batch of epoxy patching material to be used. Each sample shall be packaged in an airtight container identified with the manufacturer's name and batch number.

**In Section 50-1.07 replace the 2nd paragraph with:**

Ducts shall be fabricated with either welded or interlocked seams. Galvanizing of the welded seam will not be required. Ducts shall have sufficient strength to maintain their correct alignment during placing of concrete. Joints between sections of duct shall be positive metallic connections which do not result in angle changes at the joints. Waterproof tape shall be used at the connections. Ducts shall be bent without crimping

or flattening. Transition couplings connecting the ducts to anchoring devices shall be either ferrous metal or polyolefin. Ferrous metal transition couplings need not be galvanized.

Ducts shall have an inside cross-sectional area of at least:

1. 2.5 times the net area of the prestressing steel for multistrand tendons that will be placed by the pull-through method.
2. 2.0 times the net area of the prestressing steel for multistrand tendons that will not be placed by the pull-through method.

Ducts shall have an outside diameter not exceeding 50 percent of the girder web width.

**In Section 50-1.07 replace the 7th paragraph with:**

All ducts having a vertical duct profile change of 6 inches or more shall be vented. Vents shall be placed within 6 feet of every high point in the duct profile. Vents shall be 1/2 inch minimum diameter standard pipe or suitable plastic pipe. Connections to ducts shall be made with metallic or plastic structural fasteners. Plastic components, if selected, shall not react with the concrete or enhance corrosion of the prestressing steel and shall be free of water soluble chlorides. The vents shall be mortar tight, taped as necessary, and shall provide means for injection of grout through the vents and for sealing the vents. Ends of vents shall be removed one inch below the roadway surface after grouting has been completed.

**In Section 50-1.08 replace the 2nd paragraph with:**

The maximum temporary tensile stress (jacking stress) in prestressing steel of post-tensioned members shall not exceed 75 percent of the specified minimum ultimate tensile strength of the prestressing steel.

**In Section 50-1.08 delete the 4th, 5th, and 6th paragraphs.**

**In Section 50-1.08 replace the 11th paragraph with:**

Prestressing forces shall not be applied to cast-in-place concrete until at least 10 days after the last concrete has been placed in the member to be prestressed and until the concrete compressive strength has reached the strength shown on the plans or specified in the specifications.

**In Section 50-1.08 replace the 15th paragraph with:**

When prestressing steel in pretensioned members is tensioned at a temperature appreciably lower than the estimated temperature of the concrete and the prestressing steel at the time of initial set of the concrete, the calculated elongation of the prestressing steel shall be increased to compensate for the loss in stress.

The maximum temporary tensile stress in the prestressing steel of pretensioned members shall not exceed 80 percent of the specified minimum ultimate tensile strength of the prestressing steel.

Pretensioned prestressing steel shall be anchored at stresses that will result in the ultimate retention of working forces at not less than those shown on the plans.

**In Section 50-1.09 replace the 2nd and 3rd paragraphs with:**

Grout shall consist of cement and water and may contain an admixture if approved by the Engineer.

Cement shall conform to the provisions in Section 90-2.01A, "Cement."

**In Section 50-1.10 between the 3rd and 4th paragraphs, add:**

Each sample shall be identified by location and Contract number with weatherproof markings. A completed Sample Identification Card shall also be attached to each sample. The card is available from the Transportation Laboratory.

**In Section 50-1.10 in the 5th paragraph, replace item A with:**

A. For wire or bars, one 7-foot-long sample and for strand, one 4-foot-long sample, of each size shall be furnished for each heat or reel.

**In Section 50-1.11 replace the 1st paragraph with:**

No separate payment will be made for pretensioning precast concrete members. Payment for pretensioning precast concrete members shall be considered as included in the contract price paid for furnish precast members as provided for in Section 51, "Concrete Structures."

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## SECTION 51 CONCRETE STRUCTURES
## (Issued 08-05-11)

**In Section 51-1.05 in the 11th paragraph, replace the 1st sentence with:**

Form panels for exposed surfaces shall be furnished and placed in uniform widths of not less than 3 feet and in uniform lengths of not less than 6 feet, except at the end of continuously formed surfaces where the final panel length required is less than 6 feet.

**In Section 51-1.06A(3) in the 1st paragraph, replace items E and F with:**

E. When timber members are used to brace falsework bents which are located adjacent to roadways or railroads, all connections for the timber bracing shall be of the bolted type using 5/8-inch diameter or larger bolts or coil rod with a root diameter equal to that of the shank of a 5/8-inch diameter bolt.

F. Falsework member clearances must be at least those shown in the following table:

| Falsework member | Clearances | |
|---|---|---|
| | To railing members, barriers, and anchored temporary railings | To unanchored temporary railings |
| Footings | 0'-3" | 2'-0" |
| Piles | 1'-0" | 2'-9" |
| Other members | 2'-0" | 2'-9" |

**In Section 51-1.06C in the 11th paragraph, replace the 1st sentence with:**

Falsework for box culverts and other structures with decks lower than the roadway pavement and with span lengths of 14 feet or less shall not be released until the last placed concrete has attained a compressive strength of 1,600 psi, provided that curing of the concrete is not interrupted.

**In Section 51-1.11 replace the 6th paragraph with:**

Construction methods and equipment employed by the Contractor shall conform to the provisions in Section 7-1.02, "Load Limitations."

**In Section 51-1.12D replace the 4th paragraph with:**

Expanded polystyrene shall be a commercially available polystyrene board. Expanded polystyrene shall have a minimum flexural strength of 35 psi determined in conformance with the requirements in ASTM Designation: C 203 and a compressive yield strength of between 16 and 40 psi at 5 percent compression. Surfaces of expanded polystyrene against which concrete is placed shall be faced with hardboard. Hardboard shall be 1/8 inch minimum thickness, conforming to ANSI A135.4, any class. Other facing materials may be used provided they furnish equivalent protection. Boards shall be held in place by nails, waterproof adhesive, or other means approved by the Engineer.

**In Section 51-1.12F replace the 3rd paragraph with:**

Type A and AL joint seals shall consist of a groove in the concrete that is filled with field-mixed silicone sealant.

**In Section 51-1.12F in the 6th paragraph, replace the table with:**

| Movement Rating (MR) | Seal Type |
|---|---|
| MR ≤ 1 inch | Type A or Type B |
| 1 inch < MR ≤ 2 inches | Type B |
| 2 inches < MR ≤ 4 inches | Joint Seal Assembly (Strip Seal) |
| MR > 4 inches | Joint Seal Assembly (Modular Unit) or Seismic Joint |

**In Section 51-1.12F(3)(a) replace the 1st and 2nd paragraphs with:**

The sealant must consist of a 2-component silicone sealant that will withstand up to ±50 percent movement.

Silicone sealants must be tested under California Test 435 and must comply with the following:

| Specification | Requirement |
|---|---|
| Modulus at 150 percent elongation | 8-75 psi |
| Recovery | 21/32 inch max. |
| Notch Test | Notched or loss of bond 1/4 inch, max. |
| Water Resistance | Notched or loss of bond 1/4 inch, max. |
| Ultraviolet Exposure<br>ASTM Designation: G 154, Table X2.1,Cycle 2. | No more than slight checking or cracking. |
| Cone Penetration | 4.5-12.0 mm |

**In Section 51-1.12F(3)(a) delete the 3rd and 8th paragraphs.**

**In Section 51-1.12F(3)(a) replace the 10th paragraph with:**

A Certificate of Compliance accompanied by a certified test report must be furnished for each batch of silicone sealant in conformance with the provisions in Section 6-1.07, "Certificates of Compliance."

**In Section 51-1.12F(3)(b) replace the 2nd paragraph with:**

The preformed elastomeric joint seal must conform to the requirements in ASTM D 2628 and the following:

1. The seal must consist of a multichannel, nonporous, homogeneous material furnished in a finished extruded form.
2. The minimum depth of the seal measured at the contact surface must be at least 95 percent of the minimum uncompressed width of the seal as designated by the manufacturer.
3. When tested in conformance with the requirements in California Test 673 for Type B seals, joint seals must provide a movement rating (MR) of not less than that shown on the plans.
4. The top and bottom edges of the joint seal must maintain continuous contact with the sides of the groove over the entire range of joint movement.
5. The seal must be furnished full length for each joint with no more than 1 shop splice in any 60-foot length of seal.
6. The Contractor must demonstrate the adequacy of the procedures to be used in the work before installing seals in the joints.
7. One field splice per joint may be made at locations and by methods approved by the Engineer. The seals are to be manufactured full length for the intended joint, then cut at the approved splice section and rematched before splicing. The Contractor must submit splicing details prepared by the joint seal manufacturer for approval before beginning splicing work.
8. Shop splices and field splices must have no visible offset of exterior surfaces and must show no evidence of bond failure.

9. At all open ends of the seal that would admit water or debris, each cell must be filled to a depth of 3 inches with commercial quality open cell polyurethane foam or closed by other means subject to approval by the Engineer.

**In Section 51-1.12F(3)(b) replace the 7th paragraph with:**

The joint seal must be installed full length for each joint with equipment that does not twist or distort the seal, elongate the seal longitudinally, or otherwise cause damage to the seal or to the concrete forming the groove.

**In Section 51-1.12F(3)(b) in the 11th paragraph, replace the 1st sentence with:**

Samples of the prefabricated joint seals, not less than 3 feet in length, will be taken by the Engineer from each lot of material.

**In Section 51-1.12H(1) in the 6th paragraph, replace the 4th and 5th sentences with:**

Each ply of fabric shall have a breaking strength of not less than 800 pounds per inch of width in each thread direction when 3" x 36" samples are tested on split drum grips. The bond between double plies shall have a minimum peel strength of 20 pounds per inch.

**In Section 51-1.12H(1) in the 8th paragraph in the table, replace the hardness (Type A) requirements with:**

| | | |
|---|---|---|
| Hardness (Type A) | D 2240 with 2kg mass. | 55 ±5 |

**In Section 51-1.12H(2) in the 1st paragraph in item A, replace the 1st and 2nd sentences with:**

The bearings shall consist of alternating steel laminates and internal elastomer laminates with top and bottom elastomer covers. Steel laminates shall have a nominal thickness of 0.075 inch (14 gage).

**In Section 51-1.13 replace the 2nd, 3rd, and 4th paragraphs with:**

Surfaces of fresh concrete at horizontal construction joints shall be thoroughly consolidated without completely removing surface irregularities. Additionally, surfaces of fresh concrete at horizontal construction joints between girder stems and decks shall be roughened to at least a 1/4-inch amplitude.

Construction joint surfaces shall be cleaned of surface laitance, curing compound, and other foreign materials using abrasive blast methods before fresh concrete is placed against the joint surface.

Construction joint surfaces shall be flushed with water and allowed to dry to a surface dry condition immediately before placing concrete.

**In Section 51-1.135 replace the 1st paragraph with:**

Mortar shall be composed of cementitious material, sand, and water proportioned and mixed as specified in this Section 51-1.135.

**In Section 51-1.135 replace the 3rd paragraph with:**

The proportion of cementitious material to sand, measured by volume, shall be 1 to 2 unless otherwise specified.

**In Section 51-1.17 in 4th paragraph, replace the 3rd sentence with:**

The surfaces shall have a profile trace showing no high points in excess of 0.25 inch, and the portions of the surfaces within the traveled way shall have a profile count of 5 or less in any 100 foot section.

**Add:**

**51-1.17A Deck Crack Treatment**

The Contractor shall use all means necessary to minimize the development of shrinkage cracks.

The Contractor shall remove all equipment and materials from the deck and clean the surface as necessary for the Engineer to measure the surface crack intensity. Surface crack intensity will be determined by the Engineer after completion of concrete cure, before prestressing, and before the release of falsework. In any 500 square foot portion of deck within the limits of the new concrete deck, should the intensity of cracking be such that there are more than 50 feet of cracks whose width at any location exceeds 0.02 inch, the deck shall be treated with a high molecular weight methacrylate (HMWM) resin system. The area of deck to be treated shall have a width that extends for the entire width of new deck inside the concrete barriers and a length that extends at least 5 feet beyond the furthest single continuous crack outside the 500 square foot portion, measured from where that crack exceeds 0.02 inch in width, as determined by the Engineer.

Deck crack treatment shall include furnishing, testing, and applying the HMWM resin system, with sand and absorbent material. If grinding is required, deck crack treatment shall take place before grinding.

**51-1.17A(1) Submittals**

Submit a HMWM resin system placement plan. When HMWM resin is to be applied within 100 feet of a residence, business, or public space including sidewalks under a structure, also submit a public safety plan. Submit plans under Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The review time is 15 days.

The HMWM resin system placement plan must include:

1. Schedule of work and testing for each bridge
2. Description of equipment for applying HMWM resin
3. Range of gel time and final cure time for HMWM resin
4. Absorbent material to be used

5. Description of equipment for applying and removing excess sand and absorbent material
6. Procedure for removing HMWM resin from the deck, including equipment
7. Storage and handling of HMWM resin components and absorbent material
8. Disposal of excess HMWM resin and containers

The public safety plan must include:

1. A public notification letter with a list of delivery and posting addresses. The letter must state HMWM resin work locations, dates, times, and what to expect. Deliver the letter to residences and businesses within 100 feet of HMWM resin work locations and to local fire and police officials at least 7 days before starting work. Post the letter at the job site.
2. An airborne emissions monitoring plan prepared and executed by a certified industrial hygienist (CIH) certified in comprehensive practice by the American Board of Industrial Hygiene. The plan must have at least 4 monitoring points including the mixing point, application point, and point of nearest public contact. Monitor airborne emissions during HMWM resin work and submit emissions monitoring results after completing the work.
3. An action plan for protection of the public when airborne emissions levels exceed permissible levels.
4. A copy of the CIH's certification.

If the measures proposed in the safety plan are inadequate to provide for public safety associated with the use of HMWM resin, the Engineer will reject the plan and direct the Contractor to revise the plan. Directions for revisions will be in writing and include detailed comments. The Engineer will notify the Contractor of the approval or rejection of a submitted or revised plan within 15 days of receipt of that plan.

**51-1.17A(2) Quality Control and Assurance**

Submit samples of HMWM resin components 15 days before use under Section 6-3, "Testing," of the Standard Specifications. Notify the Engineer 15 days before delivery of HMWM resin components in containers over 55 gallons to the job site.

Complete a test area before starting work. Results from airborne emissions monitoring of the test area must be submitted to the Engineer before starting production work.

The test area must:

1. Be approximately 500 square feet
2. Be placed within the project limits outside the traveled way at an approved location
3. Be constructed using the same equipment as the production work
4. Replicate field conditions for the production work
5. Demonstrate proposed means and methods meet the acceptance criteria
6. Demonstrate production work will be completed within the time allowed
7. Demonstrate suitability of the airborne emissions monitoring plan

The test area will be acceptable if:

1. The treated deck surface is tack free and non-oily
2. The sand cover adheres and resists brushing by hand
3. Excess sand and absorbent material has been removed
4. The coefficient of friction is at least 0.35 when tested under California Test 342

### 51-1.17A(3) Materials

HMWM resin system consists of a resin, promoter, and initiator. HMWM resin must be low odor and comply with the following:

**HMWM Resin**

| Property | Requirement | Test Method |
|---|---|---|
| Volatile Content* | 30 percent, maximum | ASTM D 2369 |
| Viscosity* | 25 cP, maximum, (Brookfield RVT with UL adaptor, 50 RPM at 77°F) | ASTM D 2196 |
| Specific Gravity* | 0.90 minimum, at 77°F | ASTM D 1475 |
| Flash Point* | 180°F, minimum | ASTM D 3278 |
| Vapor Pressure* | 1.0 mm Hg, maximum, at 77°F | ASTM D 323 |
| Tack-free Time | 400 minutes, maximum, at 25°C | Specimens prepared per California Test 551 |
| PCC Saturated Surface-Dry Bond Strength | 3.5 MPa, minimum at 24 hours and 21 ± 1°C | California Test 551 |

*Test must be performed before adding initiator.

Sand for abrasive sand finish must:

1. Be commercial quality dry blast sand
2. Have at least 95 percent pass the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested under California Test 205

Absorbent material must be diatomaceous earth, abrasive blast dust, or substitute recommended by the HMWM resin supplier and approved by the Engineer.

### 51-1.17A(4) Construction

HMWM resin system applied by machine must be:

1. Combined in volumetric streams of promoted resin to initiated resin by static in-line mixers
2. Applied without atomization

HMWM resin system may be applied manually. Limit the quantity of resin mixed for manual application to 5 gallons at a time.

Prepare the area to be treated by abrasive blasting. Curing compound, surface contaminants, and foreign material must be removed from the bridge deck surface.

Sweep the deck surface clean after abrasive blasting and blow loose material from cracks using high-pressure air.

The deck surface must be dry when abrasive blast cleaning is performed. When abrasive blast cleaning within 10 feet of public traffic, remove dust and residue from abrasive blast cleaning using a vacuum attachment operating concurrently with blasting equipment . If the deck surface becomes contaminated before placing HMWM, abrasive blast clean the contaminated area and sweep the deck clean.

The deck must be dry before applying HMWM resin. The concrete surface must be at least 50 degrees F and at most 100 degrees F. Relative humidity must be expected to be at most 85 percent during the work shift.

Thoroughly mix all components of the HMWM resin system. Apply HMWM resin to the deck surface within 5 minutes of mixing at approximately 90 sq ft per gallon. The Engineer determines the exact application rate. The resin gel time must be between 40 and 90 minutes. HMWM resin that thickens during application is rejected.

Spread the HMWM resin system uniformly. Completely cover surfaces to be treated and fill all cracks. Redistribute excess resin using squeegees or brooms within 10 minutes of application. For textured or grooved deck surfaces, excess resin must be removed from the texture indentations.

Apply the abrasive sand finish of at least 2 pounds per square yard or until saturation as determined by the Engineer no sooner than 20 minutes after applying resin. Apply absorbent material before opening lane to traffic. Remove excess sand and absorbent material by vacuuming or power sweeping.

Traffic or equipment will be allowed on the overlay after the Engineer has determined:

1. The treated deck surface is tack free and non-oily
2. The sand cover adheres and resists brushing by hand
3. Excess sand and absorbent material has been removed
4. No material will be tracked beyond limits of treatment by traffic

**In Section 51-1.18C replace the 2nd paragraph with:**

When Class 2 surface finish (gun finish) is specified, ordinary surface finish shall first be completed. The concrete surfaces shall then be abrasive blasted to a rough texture and thoroughly washed down with water. While the washed surfaces are damp, but not wet, a finish coating of machine applied mortar, approximately 1/4 inch thick, shall be applied in not less than 2 passes. The coating shall be pneumatically applied and shall consist of either (1) sand, cementitious material, and water mechanically mixed prior to its introduction to the nozzle, or (2) premixed sand and cementitious material to which water is added prior to its expulsion from the nozzle. The use of admixtures shall be subject to the approval of the Engineer as provided in Section 90, "Portland Cement Concrete." Unless otherwise specified, supplementary cementitious materials will not be required. The proportion of cementitious material to sand shall be not less than one to 4, unless otherwise directed by the Engineer. Sand shall be of a grading suitable for the purpose intended. The machines shall be operated and the coating shall be applied in conformance with standard practice. The coating shall be firmly bonded to the concrete surfaces on which it is applied.

**In Section 51-1.18C replace the 5th paragraph with:**

When surfaces to be finished are in pedestrian undercrossings, the sand shall be silica sand and the cementitious material shall be standard white portland cement.

**In Section 51-1.23 add:**

Full compensation for deck crack treatment, including the public safety plan, shall be considered as included in the contract price paid per cubic yard for structural concrete, bridge, and no additional compensation will be allowed therefor.

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## SECTION 52 REINFORCEMENT
## (Issued 06-05-09)

**In Section 52-1.02(B) between the 3rd and 4th paragraphs, add:**

The epoxy powder coating shall be selected from the Department's Pre-Qualified Products List.

**In Section 52-1.02(B) replace the 14th paragraph with:**

Except for lap splices, splices for epoxy-coated reinforcement shall be coated with a corrosion protection covering that is selected from the Department's Pre-Qualified Products List. The covering shall be installed in accordance with the manufacturer's recommendations.

**In Section 52-1.07 in the 11th paragraph, replace the table with:**

| Height Zone (H) (Feet above ground) | Wind Pressure Value (psf) |
|---|---|
| $H \leq 30$ | 20 |
| $30 < H \leq 50$ | 25 |
| $50 < H \leq 100$ | 30 |
| $H > 100$ | 35 |

**In Section 52-1.08B(1) replace the 1st paragraph with:**

Mechanical splices to be used in the work shall be selected from the Department's Pre-Qualified Products List.

**In Section 52-1.08B(1) in the 2nd paragraph, replace the table with:**

| Reinforcing Bar Number | Total Slip |
|---|---|
| 4 | 0.020-inch |
| 5 | 0.020-inch |
| 6 | 0.020-inch |
| 7 | 0.028-inch |
| 8 | 0.028-inch |
| 9 | 0.028-inch |
| 10 | 0.036-inch |
| 11 | 0.036-inch |
| 14 | 0.048-inch |
| 18 | 0.060-inch |

**In Section 52-1.08B(1), in the 6th paragraph, delete item C.**

**In Section 52-1.08B(2) in the 6th paragraph, replace the subparagraph with:**

The minimum preheat and interpass temperatures shall be 400° F for Grade 40 bars and 600° F for Grade 60 bars. Immediately after completing the welding, at least 6 inches of the bar on each side of the splice shall be covered by an insulated wrapping to control the rate of cooling. The insulated wrapping shall remain in place until the bar has cooled below 200° F.

**Replace Section 52-1.08B(3) with:**

**52-1.08B(3) Resistance Butt Welds**

Shop produced resistance butt welds shall be produced by a fabricator who is selected from the Department's Pre-Qualified Products List.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of splice material. The Certificate of Compliance shall include heat number, lot number and mill certificates.

**In Section 52-1.08C replace the 3rd paragraph with:**

Testing on prequalification and production sample splices shall be performed at an approved independent testing laboratory. The laboratory shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors who will provide other services or materials for the project.

The independent testing laboratory shall be selected from the Department's Pre-Qualified Products List.

**In Section 52-1.08C replace the 5th paragraph with:**

Prequalification and production sample splices and testing shall conform to California Test 670 and these specifications.

**In Section 52-1.08C delete the 6th paragraph.**

**In Section 52-1.08C replace the 8th paragraph with:**

Each sample splice, as defined herein, shall be identified as representing either a prequalification or production test sample splice.

**In Section 52-1.08C in the 10th paragraph, delete the last sentence.**

**Replace Section 52-1.08C(1) with:**

**52-1.08C(1) Splice Prequalification Report**

Before using any service splices or ultimate butt splices in the work, the Contractor shall submit a Splice Prequalification Report. The report shall include the following:

A. A copy of the manufacturer's product literature giving complete data on the splice material and installation procedures.
B. Names of the operators who will be performing the splicing.
C. Descriptions of the positions, locations, equipment, and procedures that will be used in the work.
D. Certifications from the fabricator for prequalification of operators and procedures based on sample tests performed no more than 2 years before submitting the report. Each operator shall be certified by performing 2 sample splices for each bar size of each splice type that the operator will be performing in the work. For deformation-dependent types of splice devices, each operator shall be certified by performing 2 additional samples for each bar size and deformation pattern that will be used in the work.

Prequalification sample splices shall be tested by an approved independent testing laboratory and shall conform to the appropriate production test criteria and slip requirements specified herein. When epoxy-coated reinforcement is required, resistance butt welded sample splices shall have the weld flash removed by the same procedure as will be used in the work, before coating and testing. The Splice Prequalification Report shall include the certified test results for all prequalification sample splices.

The QCM shall review and approve the Splice Prequalification Report before submitting it to the Engineer for approval. The Contractor shall allow 2 weeks for the review and approval of a complete report before performing any service splicing or ultimate butt splicing in the work.

**In Section 52-1.08C(2)(a) replace the 1st, 2nd, 3rd, 4th, and 5th paragraphs with:**

Production tests shall be performed by an approved independent testing laboratory for all service splices used in the work. A production test shall consist of testing 4 sample splices prepared for each lot of completed splices. The samples shall be prepared by the Contractor using the same splice material, position, operators, location, and equipment, and following the same procedure as used in the work.

At least one week before testing, the Contractor shall notify the Engineer in writing of the date and location where the testing of the samples will be performed.

The 4 samples from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the approved independent testing laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 samples of splices shall not be tested.

Before performing any tensile tests on production test sample splices, one of the 4 samples shall be tested for, and shall conform to, the requirements for total slip in Section 52-1.08B(1), "Mechanical Splices." Should this sample not meet the total slip requirements, one retest, in which the 3 remaining samples are tested for total slip, will be allowed. Should any of the 3 remaining samples not conform to the total slip requirements, all splices in the lot represented by this production test will be rejected.

If 3 or more sample splices from a production test conform to the provisions in this Section 52-1.08C(2), "Service Splice Test Criteria," all splices in the lot represented by this production test will be considered acceptable.

**Replace Section 52-1.08C(2)(b) with:**

**52-1.08C(2)(b) Quality Assurance Test Requirements for Service Splices**

In addition to the required production tests, the Contractor shall concurrently prepare 4 service quality assurance sample splices for:

A. The first production test performed.
B. One of every 5 subsequent production tests, or fraction thereof, randomly selected by the Engineer.

These service quality assurance sample splices shall be prepared in the same manner as specified herein for service production sample splices.

The service quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. Each set of 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), "Mechanical Splices," for mechanical splices, or in Section 52-1.08B(3), "Resistance Butt Welds," for resistance butt welds, will not be tested.

Quality assurance testing will be performed in conformance with the requirements for service production sample splices in Section 52-1.08C(2)(a), "Production Test Requirements for Service Splices."

**Replace Section 52-1.08C(3) with:**

**52-1.08C(3) Ultimate Butt Splice Test Criteria**

Ultimate production and quality assurance sample splices shall be tensile tested in conformance with the requirements described in ASTM Designation: A 370 and California Test 670.

Each sample splice shall be identified as representing a prequalification, production, or quality assurance sample splice.

The portion of hoop reinforcing bar, removed to obtain a sample splice, shall be replaced using a prequalified ultimate mechanical butt splice, or the hoop shall be replaced in kind.

Reinforcing bars, other than hoops, from which sample splices are removed, shall be repaired using ultimate mechanical butt splices conforming to the provisions in Section 52-1.08C(1), "Splice Prequalification Report," or the bars shall be replaced in kind. These bars shall be repaired or replaced such that no splices are located in any "No Splice Zone" shown on the plans.

Ultimate production and quality assurance sample splices shall rupture either: 1) in the reinforcing bar but outside of the affected zone, provided that the sample splice has visible necking or 2) anywhere, provided that the sample splice has achieved the strain requirement for necking.

When tested in conformance with the requirements in California Test 670, "Necking (Option I)," the visible necking shall be such that there is a visible decrease in the sample's cross-sectional area at the point of rupture.

When tested in conformance with the requirements in California Test 670, "Necking (Option II)," the strain requirement for necking shall be such that the largest measured strain is not less than 6 percent for No. 11 and larger bars, or not less than 9 percent for No. 10 and smaller bars.

The affected zone is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered by fabrication or installation of the splice. The weld and one inch adjacent to the weld will be considered part of the affected zone.

**In Section 52-1.08C(3)(a) replace the 1st paragraph with:**

Production tests shall be performed for all ultimate butt splices used in the work. A production test shall consist of testing 4 sample splices removed from each lot of completed splices.

**In Section 52-1.08C(3)(a) replace the 3rd paragraph with:**

After notification has been received, the Engineer will randomly select the 4 sample splices to be removed from the lot and place tamper-proof markings or seals on them. These ultimate production sample splices shall be removed by the Contractor, and tested by an approved independent testing laboratory.

**In Section 52-1.08(C)(3)(a) replace the 5th, 6th, and 7th paragraphs with:**

A sample splice will be rejected if a tamper-proof marking or seal is disturbed before testing.

The 4 sample splices from each production test shall be securely bundled together and identified with a completed sample identification card before shipment to the approved independent testing laboratory. The card will be furnished by the Engineer. Bundles of samples containing fewer than 4 sample splices shall not be tested.

Before performing any tensile tests on production test sample splices, one of the 4 sample splices shall be tested for, and shall conform to, the requirements for total slip in Section 52-1.08B(1), "Mechanical Splices." Should this sample splice not meet these requirements, one retest, in which the 3 remaining sample splices are tested for total

slip, will be allowed. Should any of the 3 remaining sample splices not conform to these requirements, all splices in the lot represented by this production test will be rejected.

**Replace Section 52-1.08C(3)(b) with:**

**52-1.08C(3)(b) Quality Assurance Test Requirements for Ultimate Butt Splices**

In addition to the required production tests, the Contractor shall concurrently prepare 4 ultimate quality assurance sample splices for:

A. The first production test performed.
B. One of every 5 subsequent production tests, or fraction thereof, randomly selected by the Engineer.

These ultimate quality assurance sample splices shall be prepared in the same manner as specified herein for ultimate production sample splices.

The ultimate quality assurance sample splices shall be shipped to the Transportation Laboratory for quality assurance testing. Each set of 4 sample splices shall be securely bundled together and identified by location and contract number with weatherproof markings before shipment. Bundles containing fewer than 4 samples of splices will not be tested. Sample splices not accompanied by the supporting documentation required in Section 52-1.08B(1), "Mechanical Splices," for mechanical splices, or in Section 52-1.08B(3), "Resistance Butt Welds," for resistance butt welds, will not be tested.

Quality assurance testing will be performed in conformance with the requirements for ultimate production sample splices in Section 52-1.08C(3)(a), "Production Test Requirements for Ultimate Butt Splices."

**Replace Section 52-1.08D with:**

A Production Test Report for all testing performed on each lot shall be prepared by the approved independent testing laboratory performing the testing and submitted to the QCM for review and approval. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include, as a minimum, the following information for each test: contract number, bridge number, lot number and location, bar size, type of splice, length of mechanical splice, length of test specimen, physical condition of test sample splice, any notable defects, total measured slip, and ultimate tensile strength of each splice. In addition, the report shall include location of visible necking area and largest measured strain for ultimate butt splices.

The QCM must review, approve, and forward each Production Test Report to the Engineer for review before the splices represented by the report are encased in concrete. The Engineer will have 3 working days to review each Production Test Report and respond in writing after a complete report has been received. Should the Contractor elect to encase any splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection.

Quality assurance test results for each bundle of 4 samples of splices will be reported in writing to the Contractor within 3 working days after receipt of the bundle by the Transportation Laboratory. In the event that more than one bundle is received on the same day, 2 additional working days shall be allowed for providing test results for each additional bundle received. A test report will be made for each bundle received. Should the Contractor elect to encase splices before receiving notification from the Engineer, it is expressly understood that the Contractor will not be relieved of the responsibility for incorporating material in the work that conforms to the requirements of the plans and specifications. Material not conforming to these requirements will be subject to rejection.

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## SECTION 55 STEEL STRUCTURES
## (Issued 08-05-11)

**In Section 55-1.01 replace the 4th paragraph with:**

Design details, fabrication, and workmanship for steel railway bridges shall conform to the provisions in Chapter 15, "Steel Structures," of the AREMA Manual for Railway Engineering.

**In Section 55-1.05 replace the 3rd paragraph with:**

Construction methods and equipment employed by the Contractor shall conform to the provisions in Section 7-1.02, "Load Limitations."

**In Section 55-2.01 replace the table in the 5th paragraph with:**

| Material Conforming to ASTM Designation: A 709/A 709M | CVN Impact Value (Ft. Lbs at Temp.) |
|---|---|
| Grade 36 | 15 at 40° F |
| Grade 50* (2 inches and under in thickness) | 15 at 40° F |
| Grade 50W* (2 inches and under in thickness) | 15 at 40° F |
| Grade 50* (Over 2 inches to 4 inches in thickness) | 20 at 40° F |
| Grade 50W* (Over 2 inches to 4 inches in thickness) | 20 at 40° F |
| Grade HPS 50W* (4 inches and under in thickness) | 20 at 10° F |
| Grade HPS 70W (4 inches and under in thickness) | 25 at -10° F |
| Grade 100 ($2^1/_2$ inches and under in thickness) | 25 at 0° F |
| Grade 100W (Over $2^1/_2$ inches to 4 inches in thickness) | 35 at 0° F |

* If the yield point of the material exceeds 65,000 psi, the temperature for the CVN impact value for acceptability shall be reduced 15° F for each increment of 10,000 psi
above 65,000 psi

## In Section 55-2.01 replace the Structural Steel Materials table with:

Structural Steel Materials

| Material | Specification |
|---|---|
| Structural steel: | |
| Carbon steel | ASTM: A 709/A 709M, Grade 36 or {A 36/A 36M}[a] |
| High strength low alloy columbium vanadium steel | ASTM: A 709/A 709M, Grade 50 or {A 572/A 572M, Grade 50}[a] |
| High strength low alloy structural steel | ASTM: A 709/A 709M, Grade 50W, Grade HPS 50W, or {A 588/A 588M}[a] |
| High strength low alloy structural steel plate | ASTM: A 709/A 709M, Grade HPS 70W |
| High-yield strength, quenched and tempered alloy steel plate suitable for welding | ASTM: A 709/A 709M, Grade 100 and Grade 100W, or {A 514/A 514M}[a] |
| Steel fastener components for general applications: | |
| Bolts and studs | ASTM: A 307 |
| Anchor bolts | ASTM: F 1554 or A 307, Grade C |
| High-strength bolts and studs | ASTM: A 449, Type 1 |
| High-strength threaded rods | ASTM: A 449, Type 1 |
| High-strength nonheaded anchor bolts | ASTM: F 1554, Grade 105, Class 2A |
| Nuts | ASTM: A 563, including Appendix X1[b] |
| Washers | ASTM: F 844 |
| Components of high-strength steel fastener assemblies for use in structural steel joints: | |
| Bolts | ASTM: A 325, Type 1 |
| Tension control bolts | ASTM: F 1852, Type 1 |
| Nuts | ASTM: A 563, including Appendix X1[b] |
| Hardened washers | ASTM : F 436, Type 1, Circular, including S1 supplementary requirements |
| Direct tension indicators | ASTM: F 959, Type 325, zinc-coated |
| Carbon steel for forgings, pins and rollers | ASTM: A 668/A 668M, Class D |
| Alloy steel for forgings | ASTM: A 668/A 668M, Class G |
| Pin nuts | ASTM: A 36/A 36M |
| Carbon-steel castings | ASTM: A 27/A 27M, Grade 65-35, Class 1 |
| Malleable iron castings | ASTM: A 47/A 47M, Grade 32510 (Grade 22010) |
| Gray iron castings | ASTM: A 48, Class 30B |
| Carbon steel structural tubing | ASTM: A 500, Grade B or A 501 |
| Steel pipe (Hydrostatic testing will not apply) | ASTM: A 53, Type E or S, Grade B; A 106, Grade B; or A 139, Grade B |
| Stud connectors | AASHTO/AWS D1.5 |

a Grades that may be substituted for the equivalent ASTM Designation: A 709 steel, at the Contractor's option, subject to the modifications and additions specified and to the requirements of A 709.

b Zinc-coated nuts that will be tightened beyond snug or wrench tight shall be furnished with a dry lubricant conforming to Supplementary Requirement S2 in ASTM Designation: A 563.

## In Section 55-2.04 delete the 1st paragraph.

## Delete Section 55-2.05.

**In Section 55-3.05 replace the 1st paragraph with:**

Surfaces of bearing and base plates and other metal surfaces that are to come in contact with each other or with ground concrete surfaces shall be flat to within 1/32-inch tolerance in 12 inches and to within 1/16-inch tolerance overall. Surfaces of bearing and base plates and other metal bearing surfaces that are to come in contact with preformed fabric pads, elastomeric bearing pads, or mortar shall be flat to within 1/8-inch tolerance in 12 inches and to within 3/16-inch tolerance overall.

**In Section 55-3.07 in the 1st paragraph, replace item B with:**

B. The radius of bend measured to the concave face shall conform to the requirements in ASTM Designation: A6/A6M

**In Section 55-3.10 in the 1st paragraph, replace item B with:**

B. Internal threads shall conform to the requirements in ASTM Designation: A 563.

**In Section 55-3.19 replace the 3rd paragraph with:**

Immediately before setting bearing assemblies or masonry plates directly on ground concrete surfaces, the Contractor shall thoroughly clean the surfaces of the concrete and the metal to be in contact and shall apply a coating of nonsag polysulfide or polyurethane caulking conforming to the requirements in ASTM Designation: C 920 to contact areas to provide full bedding.

**In Section 55-4.01 in the 1st paragraph, replace item D with:**

D. To determine the pay quantities of galvanized metal, the weight to be added to the calculated weight of the base metal for the galvanizing will be determined from the table of weights of zinc coatings specified in ASTM Designation: A 153/A 153M.

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## SECTION 56 SIGNS
## (Issued 07-20-12)

**In Section 56-1.01 in the 2nd paragraph, replace the 1st sentence with:**

Sign structures shall be of the following types: truss, tubular, lightweight and bridge mounted.

**In Section 56-1.02A replace the 1st paragraph with:**

Bars and plates shall be structural steel complying with one or more of the following:

1. ASTM Designation: A36/A36M
2. ASTM Designation: A709/A709M, Grade 36 or 50
3. ASTM Designation: A572/A572M, Grade 50

Other open shapes shall be structural steel complying with one or more of the following:

1. ASTM Designation: A36/A36M
2. ASTM Designation: A709/A709M, Grade 36 or 50
3. ASTM Designation: A992/A992M

Light fixture mounting channel shall be a continuous slot channel made from one of the following:

1. Steel complying with ASTM Designation: A1011/A1011M, Designation SS, Grade 33
2. Extruded aluminum of alloy 6063-T6 complying with ASTM Designation: B221 or B221M

**In Section 56-1.02B delete the 2nd paragraph.**

**In Section 56-1.02E replace the 1st paragraph with:**

Pipe posts shall be welded or seamless steel pipe conforming to the requirements in ASTM Designation: A 53/A 53M, Grade B; ASTM Designation: A 106/A 106M, Grade B; or API Specification 5L PSL2 Grade B or Grade X42R or Grade X42M. At the option of the Contractor, posts may be fabricated from structural steel conforming to the requirements in ASTM Designation: A 36/A 36M.

Pipe posts shall not be spiral seam welded.

**In Section 56-1.02F replace item B of the 1st paragraph with:**

B. Material for gratings shall be structural steel conforming to the requirements in ASTM Designation: A 1011/A 1011M, Designation CS, Type B or Designation SS, Grade 36, Type 1.

**In Section 56-1.03 replace the 5th paragraph with:**

Clips, eyes, or removable brackets shall be affixed to all signs and all posts and shall be used to secure the sign during shipping and for lifting and moving during erection as necessary to prevent damage to the finished galvanized or painted surfaces. Brackets on tubular sign structures shall be removed after erection. Details of the devices shall be shown on the working drawings.

**In Section 56-1.03 delete the 12th paragraph.**

**In Section 56-1.05 replace the 1st paragraph with:**

Excepting tubular type, all ferrous metal parts of sign structures shall be galvanized and not painted, unless otherwise specified in the special provisions.

**In Section 56-1.05 replace the 2nd paragraph with:**

Except as herein provided, all exterior surfaces including those areas to be covered by sign panels of tubular type of sign structures shall be cleaned and painted as provided in Section 59-5, "Painting Sign Structures," and as provided in the special provisions. There shall be no chemical treatment of galvanized surfaces prior to cleaning and painting. Walkway gratings, walkway brackets, gutters, safety railings, steel mountings for light fixtures, and all nuts, bolts, and washers for sign structures shall be galvanized after fabrication and shall not be painted.

**In Section 56-1.05 replace the 3rd paragraph with:**

Galvanizing shall conform to the provisions in Section 75-1.05, "Galvanizing," except that when permission is granted by the Engineer, surfaces may be coated with zinc by the metalizing process. Metalizing shall be performed in conformance with the AWS requirements. The thickness of the sprayed zinc coat shall be 10 ± 2 mils. The thickness of the sprayed zinc coat on faying surfaces shall not be more than 10 mils.

**In Section 56-1.05, add:**

Zinc solders or zinc alloys that contain tin shall not be used to repair a damaged galvanized surface.

**In Section 56-1.07, add:**

Bridge-mounted signs shall not be fastened to concrete elements of bridges or railings before the concrete attains a compressive strength of 2,500 psi.

**In Section 56-1.10 replace the 4th paragraph with:**

The contract price paid per pound for install sign structure of the type or types designated in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in installing sign structures, complete in place, including installing anchor bolt assemblies, removable sign panel frames, and sign panels and performing any welding, painting or galvanizing required during installation, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

**In Section 56-2.03 replace the 4th paragraph with:**

Backfill material for metal posts shall consist of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete," and shall contain not less than 463 pounds of cementitious material per cubic yard.

## SECTION 59 PAINTING
## (Issued 10-19-12)

### In Section 59-1.01 add:

Coatings selected for use shall conform to the volatile organic compound limits specified for the air quality district where the project is located.

### In Section 59-1.03 replace the 3rd paragraph with:

Painting shall be done in a neat and workmanlike manner. Unless otherwise specified, paint shall be applied by brush, or spray, or roller, or any combination of these methods. Gun extensions shall not be used.

### In Section 59-1.03 replace the 5th paragraph with:

Unless otherwise specified, should 7 days elapse between paint applications, the painted surface shall be pressure rinsed prior to the next paint application. Pressure rinsing is defined as a pressurized water rinse with a minimum nozzle pressure of 1,160 psi. During rinsing, the tip of the pressure nozzle shall be placed between 12 inches and 18 inches from the surface to be rinsed. The nozzle shall have a maximum fan tip angle of 30°.

### In Section 59-2.01 replace the 2nd paragraph with:

Unless otherwise specified, no painting Contractors or subcontractors will be permitted to perform work without having the following current "SSPC: The Society for Protective Coatings" (formerly the Steel Structures Painting Council) certifications in good standing throughout the duration of the contract:

A. For cleaning and painting structural steel in the field, certification in conformance with the requirements in Qualification Procedure No. 1, "Standard Procedure For Evaluating Painting Contractors (Field Application to Complex Industrial Structures)" (SSPC-QP 1).
B. For removing paint from structural steel, certification in conformance with the requirements in Qualification Procedure No. 2, "Standard Procedure for the Qualification of Painting Contractors (Field Removal of Hazardous Coatings from Complex Structures)" (SSPC-QP 2, Category A).
C. For cleaning and painting structural steel in a permanent painting facility, certification in conformance with the requirements in AISC-420-10/SSPC-QP 3, "Certification Standard for Shop Application of Complex Protective Coating Systems." All cleaning and painting of structural steel shall be performed in an Enclosed Shop.

**In Section 59-2.03 replace the 3rd paragraph with:**

Exposed steel or other metal surfaces to be blast cleaned shall be cleaned in conformance with the requirements in SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave all surfaces with a dense, uniform, angular anchor pattern of not less than 1.5 mil as measured in conformance with the requirements in ASTM Designation: D 4417.

**Replace Section 59-2.05 with:**

**59-2.05 CLEANING PAINTED SURFACES**

All previously painted surfaces shall be cleaned by pressure washing or steam cleaning before other cleaning or painting activities are performed. Gloss on the existing paint shall be removed without removing sound paint. Areas of gloss remaining after cleaning shall be roughened using 100 to 200-grit sandpaper. Any paint that becomes loose, curled, lifted, or that loses its bond after cleaning shall be removed to sound paint or metal.

Pressure washing includes cleaning surfaces using a pressure wash system with a nozzle pressure from 2,500 to 5,000 psi and a maximum fan tip angle of 45 degrees.

Steam cleaning includes cleaning dirt, grease, loose chalky paint, and other foreign material from surfaces using steam. The steam temperature at the nozzle shall be from 265 to 375 degrees F. A biodegradable detergent shall be used during steam cleaning. After steam cleaning, cleaned surfaces shall be rinsed clean with fresh water. Steam cleaning shall not be performed more than 2 weeks before painting or other phases of cleaning. Steam-cleaned surfaces shall not be painted until they are thoroughly dry and 24 hours have elapsed after steam cleaning.

**In Section 59-2.12 replace the 3rd and 4th paragraphs with:**

Contact surfaces of stiffeners, railings, built up members or open seam exceeding 6 mils in width that would retain moisture, shall be caulked with polysulfide or polyurethane sealing compound conforming to the requirements in ASTM Designation: C 920, Type S, Grade NS, Class 25, Use O, or other approved material.

The dry film thickness of the paint will be measured in place with a calibrated Type 2 magnetic film thickness gage in conformance with the requirements in SSPC-PA 2, "Measurement of Dry Coating Thickness with Magnetic Gages," of the "SSPC: The Society for Protective Coatings," except that there shall be no limit to the number or location of spot measurements to verify compliance with specified thickness requirements.

**In Section 59-5.01 replace the 1st paragraph with:**

Tubular sign structures shall be cleaned and painted in conformance with the provisions in Section 59-1, "General," and this Section 59-5. Sign structures, other than tubular sign structures, shall not be painted unless otherwise specified in the special provisions.

## SECTION 64 PLASTIC PIPE
## (Issued 06-05-09)

### In Section 64-1.02 replace the 5th paragraph with:

HDPE compounds used in the manufacture of corrugated polyethylene pipe and fittings shall comply with AASHTO M 294 except that the mix shall contain not less than 2 nor greater than 4 percent well dispersed carbon black. HDPE compounds used in the manufacture of ribbed profile wall polyethylene pipe shall comply with ASTM F 894 except that Type E ultraviolet stabilizers shall not be allowed and carbon black shall be well dispersed in an amount not less than 2 percent nor greater than 4 percent.

Manufacturers of corrugated polyethylene pipe shall:

1. Participate in the National Transportation Product Evaluation Control Program (NTPEP) for each plant supplying corrugated polyethylene pipe and fittings for the project.
2. Conduct and maintain a quality control program under NTPEP.
3. Submit a copy to the Engineer of manufacturing plant audits and NTPEP test results from the current cycle of NTPEP testing for all pipe diameters supplied.

Type D corrugated polyethylene pipe is not allowed. Corrugated polyethylene pipe greater than 60 inches in nominal diameter is not allowed.

### In Section 64-1.05 replace the 1st paragraph with:

Excavation, backfill, and shaped bedding shall comply with Section 19-3, "Structure Excavation and Backfill," except the following:

1. At locations where pipe is to be backfilled with concrete, the backfill shall comply with Section 64-1.06, "Concrete Backfill."
2. Corrugated polyethylene pipe that is greater than 48 inches in nominal diameter but not exceeding 60 inches in nominal diameter shall be backfilled with either controlled low strength material under the special provisions or slurry cement backfill under Section 19-3.062, "Slurry Cement Backfill."
3. Where cementitious or flowable backfill is used for structure backfill, the backfill shall be placed to a level not less than 12 inches above the crown of the pipe.

### In Section 64-1.06 replace the 1st paragraph with:

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete conforming to the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item or shown on the plans.

**In Section 64-1.06 replace the 3rd paragraph with:**

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

## SECTION 65 REINFORCED CONCRETE PIPE
## (Issued 07-20-12)

**In Section 65-1.02 replace the 1st paragraph with:**

Cementitious material and aggregate shall conform to the provisions in Section 90-2, "Materials" except that grading requirements shall not apply to the aggregate. Use of supplemental cementitious material shall conform to AASHTO Designation: M 170.

**In Section 65-1.02A(1) in the 11th paragraph, replace item c with:**

c. Cementitious material and aggregate for non-reinforced concrete pipe shall conform to the provisions in Section 65-1.02, "Materials."

**In Section 65-1.035 replace the 1st paragraph with:**

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete in conformance with the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item.

**In Section 65-1.035 replace the 3rd paragraph with:**

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

**Replace Section 65-1.05 with:**

**65-1.05 (BLANK)**

**In Section 65-1.06 in the 2nd paragraph, replace the 1st subparagraph with:**

Cement Mortar. - Mortar shall be composed of one part cementitious material and 2 parts sand by volume. Supplementary cementitious material will not be required.

**In Section 65-1.10 in the 1st paragraph in the 1st sentence, delete "jacked reinforced concrete pipe."**

**In Section 65-1.10 delete the 2nd paragraph.**

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## SECTION 66 CORRUGATED METAL PIPE
**(Issued 07-20-12)**

**In Section 66-1.045 replace the 1st paragraph with:**

At locations where pipe is to be backfilled with concrete as shown on the plans, the concrete backfill shall be constructed of minor concrete or Class 4 concrete conforming to the provisions in Section 90, "Portland Cement Concrete." Minor concrete shall contain not less than 380 pounds of cementitious material per cubic yard. The concrete to be used will be designated in the contract item or shown on the plans.

**In Section 66-1.045 replace the 3rd paragraph with:**

The surface of the concrete backfill shall be broomed with a heavy broom to produce a uniform rough surface if hot mix asphalt is to be placed directly thereon.

**Replace Section 66-3.10 with:**

**66-3.10 (BLANK)**

**In Section 66-4.02 delete the 2nd paragraph.**

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## SECTION 68 SUBSURFACE DRAINS
**(Issued 07-31-07)**

**In Section 68-3.02D replace the 1st and 2nd paragraphs with:**

Concrete for splash pads shall be produced from minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

Mortar placed where edge drain outlets and vents connect to drainage pipe and existing drainage inlets shall conform to the provisions in Section 51-1.135, "Mortar."

**In Section 68-3.03 replace the 13th paragraph with:**

Cement treated permeable material, which is not covered with hot mix asphalt within 12 hours after compaction of the permeable material, shall be cured by either sprinkling the material with a fine spray of water every 4 hours during daylight hours or covering the material with a white polyethylene sheet, not less than 6 mils thick. The above curing requirements shall begin at 7:00 a.m. on the morning following compaction of the cement treated permeable material and continue for the next 72 hours or until the material is covered with hot mix asphalt, whichever is less. The cement treated permeable material shall not be sprayed with water during the first 12 hours after compacting, but may be covered with the polyethylene sheet during the first 12 hours or prior to the beginning of the cure period.

**In Section 68-3.03 replace the 17th and 18th paragraphs with:**

Hot mix asphalt for backfilling trenches in existing paved areas shall be produced from commercial quality aggregates and asphalt and mixed at a central mixing plant. The aggregate shall conform to the 3/4 inch grading, or the 1/2 inch grading for Type A and Type B hot mix asphalt specified in Section 39-1.02E, "Aggregate." The amount of asphalt binder to be mixed with the aggregate shall be between 4 percent and 7 percent by weight of the dry aggregate, as determined by the Engineer.

Hot mix asphalt backfill shall be spread and compacted in approximately 2 equal layers by methods that will produce a hot mix asphalt surfacing of uniform smoothness, texture and density. Each layer shall be compacted before the temperature of the mixture drops below 250 °F. Prior to placing the hot mix asphalt backfill, a tack coat of asphaltic emulsion conforming to the provisions in Section 94, "Asphaltic Emulsions," shall be applied to the vertical edges of existing pavement at an approximate rate of 0.05 gallon per square yard.

**In Section 68-3.03 replace the 20th paragraph with:**

Type A pavement markers conforming to the details shown on the plans and the provisions in Section 85, "Pavement Markers," shall be placed on paved shoulders or dikes at outlet, vent and cleanout locations as directed by the Engineer. The waiting period for placing pavement markers on new hot mix asphalt surfacing will not apply.

**Replace Section 68-3.05 with:**

**68-3.05 PAYMENT**

The contract price paid per linear foot for plastic pipe (edge drain) of the size or sizes shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing edge drains complete in place, including excavation (and removal of any concrete deposits that may occur along the lower edge of the concrete pavement in Type 1 installations) and hot mix asphalt backfill for Type 1 edge drain installation, tack coat, filter fabric, and treated permeable material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The contract price paid per linear foot for plastic pipe (edge drain outlet) of the size or sizes shown in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved

in installing edge drain outlets, vents and cleanouts complete in place, including outlet and vent covers, expansion plugs, pavement markers, concrete splash pads, connecting outlets and vents to drainage facilities, and excavation and backfill [aggregate base, hot mix asphalt, tack coat, and native material] for outlets, vents, and cleanouts to be installed in embankments and existing shoulders, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

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## SECTION 70 MISCELLANEOUS FACILITIES
## (Issued 01-20-12)

### In Section 70-1.02C replace the 2nd paragraph with:

Precast concrete flared end sections shall conform to the requirements for Class III Reinforced Concrete Pipe in AASHTO Designation: M 170M. Cementitious materials and aggregate shall conform to the provisions in Section 90-2, "Materials," except that grading requirements shall not apply to the aggregate. Use of supplementary cementitious material shall conform to the requirements in AASHTO Designation: M 170. The area of steel reinforcement per linear foot of flared end section shall be at least equal to the minimum steel requirements for circular reinforcement in circular pipe for the internal diameter of the circular portion of the flared end section. The basis of acceptance of the precast concrete flared end section shall conform to the requirements of Section 5.1.2 of AASHTO Designation: M 170.

### In Section 70-1.02C replace the 3rd paragraph with:

Plastic flared end sections shall conform to the requirements in ASTM Designation: D 3350.

### In Section 70-1.02H replace the 1st paragraph with:

Precast concrete pipe risers and pipe reducers, and precast concrete pipe sections, adjustment rings and tapered sections for pipe energy dissipators, pipe inlets and pipe manholes shall conform to the requirements in AASHTO Designation: M 199M/M 199, except that the cementitious material and aggregate shall conform to the provisions in Section 90-2, "Materials," except that grading requirements shall not apply to the aggregate. Use of supplementary cementitious material shall conform to the requirements in AASHTO Designation: M 170.

### In Section 70-1.03 replace the 2nd paragraph with:

Cutoff walls for precast concrete flared end sections shall be constructed of minor concrete conforming to the provisions in Section 90-10, "Minor Concrete." Minor concrete shall contain not less than 470 pounds of cementitious material per cubic yard.

# SECTION 12

# ENVIRONMENTAL PERMIT SUMMARY FORM

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SAN LUIS OBISPO COUNTY
# DEPARTMENT OF PUBLIC WORKS
Paavo Ogren, Director

County Government Center, Room 206 • San Luis Obispo CA 93408 • (805) 781-5252
Fax (805) 781-1229 email address: pwd@co.slo.ca.us

## ENVIRONMENTAL PERMIT SUMMARY FORM

**Date:** May 5, 2014

**To:** Jeff Lee, Project Manager

**From:** John Farhar, Environmental Programs Division

**Subject:** **Environmental Review & Permit Status for the** Shandon State Water Turn Out Project; ED 90-649 (WBS 300463)

The environmental review and regulatory permit processes for the above referenced project are complete. The following is a summary of the environmental requirements for the project:

| Permit | Status | Attachments |
|---|---|---|
| CEQA Review | EIR Addendum dated November 7, 2012 | N |
| NEPA Review | N/A | N |
| Coastal Permit | N/A | N |
| CZMA | N/A | N |
| CDFW | N/A | N |
| USACOE 404 | N/A | N |
| NMFS ESA | N/A | N |
| USFWS ESA | N/A | N |
| RWQCB 401 | N/A | N |
| NPDES | N/A – site disturbance under one acre. | N |

| *Measure #* | **Special Environmental Conditions** | **Responsibility: Contractor, County or Both** |
|---|---|---|
| | **Pre-Construction** | |
| 1 | Please notify the Environmental Programs Manager if the project description changes. | County |

******* A COPY OF THIS PERMIT SUMMARY FORM AND ALL OF ITS ATTACHMENTS MUST BE ON THE WORK SITE WHEN ANY WORK IS UNDERWAY**

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# SECTION 13. RULES GOVERNING BID PROTESTS AND OTHER CHALLENGES TO AWARDS OF CONSTRUCTION CONTRACTS

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# SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

## Rules Governing Bid Protests And Other Challenges to Awards of Construction Contracts

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The requirements set forth in these "Rules Governing Bid Protests And Other Challenges to Awards of Construction Contracts" ("Rules") are mandatory and are a Bidder's sole and exclusive remedy in the event a Bidder desires to challenge, protest or contest the award of any Construction Contract. A Bidder's failure to comply with these requirements shall constitute a waiver of any right to challenge, protest or contest the award of a Construction Contract in any subsequent proceeding, including but not limited to, the filing of a court action.

A Bidder may not rely upon another Bidder's compliance with the requirements of these Rules. Any Bidder that does not independently comply with the requirements set forth herein shall be deemed to have waived any right to challenge, protest or contest the award of a Construction Contract.

Nothing in these Rules affects the right of the District to reject all bids at any time prior to the award of a Construction Contract.

1.1 <u>Definitions.</u>

1.1.1 Bidder - The contractor submitting a bid in response to a District solicitation for bids on a Construction Contract.

1.1.2 Protestor - A Bidder who files a Protest in accordance with the provisions of these Rules.

1.1.3 Board – Board of Supervisors of the San Luis Obispo County Flood Control and Water Conservation District (hereinafter, also "District").

1.1.4 Construction Contract - Any Construction Contract which is formally or informally advertised for bids in which the District is, or will be, a party.

1.1.5 Protest – Any challenge, objection, or protest to the award of a Construction Contract to any Bidder.

1.1.6 Response – Any response to a Protest that is filed by an Interested Party in accordance with the provisions of these Rules.

1.1.7 Public Works Department - The District department responsible for the preparation of the bid documents for the Construction Contract and the administration of the Construction Contract.

1.1.8 Director - The person appointed to be the head of the Department of Public Works and Transportation, or that person designated by the Director to

assume the powers, duties, and responsibilities conferred upon the Director under the terms of these Rules.

1.1.9 Initial Determination – A written notice by the Director that notifies a Bidder of the reasons why the Director believes that a bid is nonresponsive, or that a Bidder is not a responsible Bidder.

1.1.10 Interested Parties - For the purpose of these Rules, Interested Parties are defined as:

1.1.10.1 The Pubic Works Department and/or its Director.

1.1.10.2 Any Bidder that filed a Protest or whose bid is the subject of an Initial Determination.

1.1.10.3 Any Bidder whose eligibility for having the Construction Contract awarded to it as a responsible Bidder with the lowest responsive bid would be affected by the outcome of a Protest or Initial Determination.

1.2 Director's Independent Authority to Determine Bid Responsiveness and Bidder Responsibility.

1.2.1 Regardless of whether a Protest is submitted under these Rules, the Director is authorized to determine whether any bid is a responsive bid and whether any Bidder is a responsible Bidder. In the event the Director issues an Initial Determination, the Director shall provide the Interested Parties with written notice of the Initial Determination at least five (5) business days before the Director renders a final decision addressing the grounds stated in the Initial Determination. A final decision of the Director under this section 1.2 shall be the final decision of the District with no provision for reconsideration or appeal to the Board.

1.2.2 The Director need not issue an Initial Determination in order to make a final decision on whether a bid is a responsive bid or a Bidder is a responsible Bidder. A final decision can also be issued by the Director through the processing of a Protest pursuant to the procedures set forth in these Rules.

1.2.3 The Diretor reserves the right to amend or withdraw an Initial Determination at any time before the Director renders a final decision addressing the grounds stated in the Initial Determination. When an Initial Determination is withdrawn, it shall have the same effect as if the Initial Determination had never been made.

1.3 Basis for Protest.

1.3.1 Grounds for Protest – The grounds for a Protest may include any grounds a Protestor may have for contesting or challenging the award of a Construction Contract to any Bidder, including but not limited to the following grounds:

1.3.1.1 A Protestor objects to a Construction Contract being awarded to another Bidder on the grounds that the other Bidder's bid is nonresponsive.

1.3.1.2 A Protestor objects to a Construction Contract being awarded to another Bidder on the grounds that the other Bidder is not a responsible Bidder.

1.3.1.3 A Protestor objects to a Construction Contract being awarded to the Protestor on the grounds that the Protestor made a mistake in its bid that entitles the Protestor to be relieved of its bid under Public Contract Code Sections 5100 et seq.

1.3.1.4 A Protestor objects to the Director's Initial Determination issued under section 1.2.1 above.

1.3.2 Required Form of Protest - All Protests shall be made in writing, containing the information listed below, and shall be filed with the Public Works Department as identified in the solicitation package. Protests shall contain the following information:

1.3.2.1 The name, address, telephone, facsimile numbers, and email address of the Protestor.

1.3.2.2 The signature of the Protestor or its representative.

1.3.2.3 The bid, solicitation, and/or contract number.

1.3.2.4 The Protest must contain a complete statement of all grounds for the Protest, and must refer to the specific portion of the bid documents that are the basis of the Protest. The Protest must set forth all supporting facts and documentation. If Protestor believes there are some facts relevant to its Protest that Protestor cannot adequately present in writing, Protestor must describe such facts in its Protest under the heading "Facts Requiring Oral Presentation", and state therein the reasons why the Bid Protestor believes it cannot adequately present those facts through documentation.

1.3.2.5 All information establishing that the Protestor is a Bidder for the purpose of filing a Protest.

1.3.2.6 The form of relief requested.

1.4 <u>Protest Requirements and Procedure.</u>

1.4.1 Standing to Protest - Protests shall be filed only by a Bidder.

1.4.2 Time for Filing a Protest:

1.4.2.1 Except as provided in sections 1.4.2.2 and 1.4.2.3 below, all Protests must be submitted in writing to the Director before 5 p.m. PST of the sixth (6) business day following the date upon which the bids on the Construction Contract were opened.

1.4.2.2 When a Protestor objects to a Construction Contract being awarded to the Protestor on the grounds that the Protestor made a mistake in its bid that entitles the Protestor to be relieved of its bid under Public Contract Code Sections 5100 et seq., the Protest must be submitted in writing to the Director before 5 p.m. PST of the fifth (5) business day following the date upon which the bids on the Construction Contract were opened pursuant to Public Contract Code Section 5103.

1.4.2.3 When the Protestor objects to an Initial Determination made by the Director under section 1.2.1 above, the Protest must be submitted in writing to the Director before 5 p.m. PST of the fifth (5) business day following the date upon which the Initial Determination was first delivered to Protestor (either electronically or otherwise).

1.4.3 Written Responses of Interested Parties - If any Interested Party desires to respond to the Protest, the Response must be submitted in writing to the Director within five (5) business days of the date the Protest was first delivered to the Interested Party (either electronically or otherwise). If an Interested Party believes there are some facts relevant to its Response that the Interested Party cannot adequately present in writing, the Interested Party must describe such facts in its Response under the heading "Facts Requiring Oral Presentation", and state therein the reasons why the Interested Party believes it cannot adequately present those facts through documentation.

1.4.4 Proof of Transmittal - All Protests, Responses, and Replies shall include documentation evidencing that all Interested Parties were concurrently sent a complete copy of the respective Protest, Response or Reply in a manner that would provide all Interested Parties with a complete copy of the respective Protest, Response or Reply no later than one (1) business day after it was sent to the Director. The means of transmission chosen must also provide the sending party a means of verifying the date and time the copy was received by each Interested Party. Transmission by email may be an acceptable means of transmittal.

1.4.5 No Ex Parte or Unilateral Communications on the Merits of a Protest - No Bidder shall have any written communications regarding the merits of a Protest with the Public Works Department or its Director that are not concurrently sent to all of the other Interested Parties. No Bidder shall have any oral communications regarding the merits of a Protest with the Public Works Department or its Director other than during an oral presentation properly noticed by the Director under these Rules.

1.4.6 Suspension of Process for Proposed Rejection of all Bids - At any time during the processing of a Protest, the Director may elect to indefinitely suspend any further processing of the Protest by providing written notice to all Interested Parties that the Director intends to recommend to the Board that all bids be rejected. All time deadlines provided in these Rules shall be tolled during any such suspension period. If the Board decides to not reject all bids, or if the Director otherwise decides to lift the suspension, the requirements of these Rules shall be reactivated upon the Director providing all Interested Parties with written notice thereof.

1.5 <u>Summary Dismissal of Protest.</u>

The Director may summarily dismiss a Protest, or specific Protest allegations, at any time that the Department Head determines that the Protest is untimely, frivolous, or without merit; is not submitted in the required form of Protest, as set forth above in section 1.3.2., "Required Form of Protest;" or is submitted by a non-

Bidder. In such cases, a notice of summary dismissal will be furnished to the Interested Parties. Such a summary dismissal shall be the final decision of the District with no provision for reconsideration or appeal to the District.

1.6 Decision by the Director Based on Written Submissions Only.

In reaching a decision on the merits of a Protest, the Director may consider relevant documentation submitted by the Protestor and any other Interested Party. If the Director wishes to have additional information submitted that was not included in the Protest or in any documentation from other Interested Parties, the Director may make a request specifying the information sought and time for submittal. Submissions of additional information that have not been specifically requested by the Director may not be considered at the Director's sole discretion. If the Director does not provide an opportunity for an oral presentation under section 1.7 below, the Director will issue a written decision without any oral presentation. The Director's decision shall be the final decision of the District with no provision for reconsideration or appeal to the Board.

1.7 Decision by the Director Following Oral Presentation.

1.7.1 The Director may, at his or her discretion, elect to provide an opportunity for the Protestor and other Interested Parties to make an oral presentation to the Director regarding the Protest. In such event. oral presentations shall be conducted in accordance with the following procedure:

1.7.1.1 Notice of Oral Presentation - The Director will set a date, time, and place for an oral presentation. Written notice will be sent to Interested Parties not less than five (5) business days in advance of the oral presentation unless it is agreeable to all parties that an earlier date be established. Continuances may be granted by the Director for good cause.

1.7.1.2 Guidelines for Oral Presentation - Oral presentations are informal in nature and shall be made by the Protestor or its authorized representative. Technical rules of evidence shall not apply. The Director will determine how the oral presentations will be conducted and may set time limits for the presentation. The Director may question Interested Parties or provide an opportunity for Interested Parties to make an oral presentation. The Director may request additional documentation or information prior to, during or after the oral presentation. Unless requested by the Director, additional documentation or information may not be accepted.

1.7.1.3 Record of Oral Presentation - Any Interested Party may request, and in the Director's sole discretion, the Director may allow recording of the presentation. If the Director allows the presentation to be recorded, the Interested Party requesting that the presentation be recorded must pay the cost of recording, including the costs to make and distribute copies of the recording

to the Director and other Interested Parties. There shall be no cost to the District.

1.7.1.4 Decisions - The Director will issue a written decision within 30 calendar days of the oral presentation; however, the time for issuing the written decision may be extended by the Director. A copy of the decision will be furnished to the Interested Parties. The decision shall be the final decision of the District with no provision for reconsideration or appeal to the Board.

1.8 Effect on Contracts.

The failure of a District employee to comply with the provisions stated in these Rules shall in no way affect the validity of any Construction Contract entered into by the District.

1.9 Director Decisions on Protests Seeking Relief from a Bidder's Mistake under Public Contract Code Section 5103.

When a Protestor objects to a Construction Contract being awarded to the Bid Protestor on the grounds that the Protestor made a mistake in its bid that entitles the Protestor to be relieved of its bid under Public Contract Code Sections 5100 et seq., a final decision of the Director that relieves the Protestor of its bid on the grounds of mistake must be approved by the Board before it can become a final decision of the District. Any other final decision of the Director regarding a Protestor's request to be relieved of its bid on the grounds of mistake under Public Contract Code Sections 5100 et seq., shall be the final decision of the District with no provision for reconsideration or appeal to the Board.

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# SECTION 14

# PROJECT GEOLOGY REPORT

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STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING

# STATE WATER FACILITIES
# CALIFORNIA AQUEDUCT
# COASTAL BRANCH-PHASE II

## FINAL CONSTRUCTION GEOLOGY REPORT
## COASTAL BRANCH-PHASE II
## REACH 2 PIPELINE,
## CHOLAME VALLEY TO SHEDD CANYON

**SAN LUIS OBISPO COUNTY**
**CALIFORNIA**

APPENDIX TO FINAL CONSTRUCTION REPORTS
Contract No. C51017
Specification 93-33

# PROJECT GEOLOGY REPORT C-112

JULY 2001

STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING

FINAL CONSTRUCTION GEOLOGY REPORT
COASTAL BRANCH - PHASE II
CHOLAME VALLEY TO SHEDD CANYON

## ENGINEERING GEOLOGY CERTIFICATION

This report has been prepared under my direction as the professional geologist in direct responsible charge of the work, in accordance with the provisions of the Geologist Act of the State of California.

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Date 7/9/01

State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

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**DIVISION OF ENGINEERING**

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39,009 cubic yards of 2-sacks-per-yard slurry cement up to within four inches of the top of pipe between Stations 872+00 and 1125+00. Between Stations 1125+00 and the end of the reach at Station 1754+00, 40,600 cubic yards of imported sand and gravel sized consolidated backfill, was placed in the lower 1.5 feet of the trench and compacted to 95 percent. Compacted backfill consisted of 111,208 cubic yards of as-excavated material compacted to 95 percent and was placed above consolidated backfill up to four inches below the top of the pipe. In addition, 919,253 cubic yards of common backfill was placed above both the sand slurry and compacted backfill up to finished ground contour. This common backfill was compacted 80 percent on slopes less than 20 percent and 85 percent on slopes steeper than 20 percent. Slurry-cement and compacted backfill were used in widened trench sections to add strength to the pipe in low soil strength (low E') areas (Table 3). The pipeline is 48 inches in diameter including a 1/2-inch thick mortar lining. The pipe was made from 36,000-psi minimum tensile strength steel. It has a minimum wall thickness of 1/4-inch with a 1/2-inch mortar lining.

Anode wells, 260 feet deep, were installed for cathodic protection: one well at Bitterwater Road at Station 964+75 and the other near Toby Way at Station 1246+05.

Work for the pipeline was accomplished under Specification Number 93-33, Contract Number C-51017. The contract was awarded on February 22, 1994, to W. M. Lyles Company with a bid of $31,436,690. The notice to begin was issued on March 8, 1994.

## Purpose of Report

The purpose of this report is to record all significant geologic and engineering geologic conditions encountered during construction of the pipeline from the western terminus of Reach 1 pipeline to the end of Reach 2. This report supplements the Engineer's Final Construction Report.

## Previous Geologic Investigations and Reports

Geologic investigation began in the 1960s with planning studies conducted by the Department of Water Resources regarding the feasibility of Phase II of the Coastal Aqueduct. These investigations consisted of general alignment studies without significant field investigations. An extensive analysis of the published geologic mapping and reports listed below were made for the preparation of Project Geology Branch Design Reports.


Dibblee, T. W., 1978, Geologic Maps of Cholame and Orchard Peak Quadrangles: U. S. Geological Survey Open File 72-89

Dibblee, T. W., 1974, Geologic Map of The Shandon and Orchard Peak Quadrangles, San Luis Obispo and Kern Counties, California; U. S. Geological Survey Miscellaneous Investigations Series Map I-788

Brown, R. D. et al, 1967, The Parkfield-Cholame California, Earthquakes of June-August 1966-Surface Effects, Water-Resources Aspects, and Preliminary Seismic Data: U. S. Geological Survey Professional Paper 579


During the Spring, Summer, and Fall of 1987, Project Geology Branch performed geologic investigations along the Reach 2 alignment as part of an engineering and environmental study to determine the feasibility of the Phase II Coastal Aqueduct

Project. The geologic investigations provided geologic data needed for evaluating engineering feasibility and for estimating construction costs. The geologic investigations included reconnaissance mapping of the entire route, during which published geologic mapping was verified and supplemented by onsite inspections. Geologic studies were also made regarding faulting and seismicity, land subsidence, slope stability, groundwater, and construction conditions. These investigations were reported in Project Geology Branch Report 55-02-01, dated April 1990.

Subsurface exploration started in the Spring of 1992 and continued into the Summer of 1993. This consisted of electrical resistivity and seismic refraction studies, hollow-stem auger borings, rotary core borings, and cone penetrometer tests. The results of this exploration are reported in Project Geology Reports D-144 and 55-02-02 dated May 1993. The Project Geology Reports and a consulting report that were used in the preparation of this report are listed below:


Project Geology Branch Report 55-02-01, Draft Environmental Impact Report, Geologic Study on the Feasibility of Coastal Aqueduct - Phase II, April 1990

Project Geology Branch Report 55-02-02, Coastal Branch - Phase II, Preliminary Geologic Data, Reaches 1 and 2, Seismic Refraction Data, May 1993

Project Geology Report D-144, Geology and Construction Materials Data, Coastal Branch - Phase II, Pipeline Reach No. 2, Cholame Valley to Shedd Canyon, November 1993

Fugro West Inc., Estimated Modulus of Soil Reaction (E') Values, Coastal Aqueduct Branch - Phase II, San Luis Obispo County, California for Central Coast Water Authority, August 1993

Project Geology Branch Report 55-02-15, Geologic Data, Coastal Branch - Phase II, Reach 2 Construction Claim Investigation, Additional Geologic Investigation for the San Juan Creek Crossing, September 1995

## GEOLOGY

### General

The Reach No. 2 pipeline begins in the Cholame Valley in the northeast corner of San Luis Obispo County and proceeds westward roughly parallel to State Highway 46 to Shandon and then southward to Shedd Canyon (see Plate 1, Location Map). Between Cholame Valley and Shedd Canyon the geologic units that were exposed in the pipeline trench consisted of Recent, or Holocene, alluvial deposits in the valley lowlands and sediments of the Plio-Pleistocene Paso Robles Formation in the hills. The Paso Robles Formation and often the alluvium were generally covered by a few feet of residual soil that developed atop the bedrock and/or the alluvial deposits.

### Geologic Units

#### Paso Robles Formation

The Paso Robles Formation is Plio-Pleistocene in age. The Paso Robles generally does not possess the appearance or characteristics of a "typical bedrock" formation. It consists of consolidated sediments of mostly lean clay (CL), fat clay (CH), silty sand (SM), clayey sand (SC), and poorly graded sand (SP), with occasional beds or lenses of poorly graded gravel (GP).

However, there were zones within the Paso Robles, as shown on the As-Excavated Geology Plan and Profile Sheets (Plate 3, Sheets 1-35) in which the materials were consolidated sufficiently to be classified a shale, claystone, or sandstone. Examples of these areas are in the vicinities of Stations 1171+00, 1172+00,

1699+50, and 1708+00. But even in these zones the consolidated materials could be broken down by hand manipulation and classified as a soil according to the Unified Soil Classification System.

Additionally, on the high ground just east of Shedd Canyon (Stations 1670+75 to 1698+33), a moderately hard to hard, resistant, flat-lying, 4- to 12-foot-thick marly unit within the Paso Robles ($Qpr_m$) was mapped. It consists of white, chalky, calcareous clays, silts, and well-cemented clayey sands capped by a hard, slabby, caliche layer up to a few feet thick.

The fine-grained soils within the Paso Robles Formation (CL, CH & ML) tended to be firm to stiff and the coarse-grained soils (SP, SM & GP) tended to be compact to dense although occasional loose, poorly graded sand and poorly graded gravel (SP and GP) beds were encountered. The colors varied from olive-brown and light brown to reddish-brown and gray. Calcareous streaks and orange oxidation streaks were occasionally found in the silty sand and lean clay.

The shale, claystone, and sandstone of the Paso Robles are brown to gray, intensely to moderately weathered, low hardness, weak to friable, and intensely to closely fractured. Bedding was difficult to discern at some locations.

The extent of the Paso Robles Formation is shown in Table 1.

Structures within the Paso Robles Formation include bedding that was commonly horizontal, to gently dipping, or disturbed. Bedding attitudes within the Paso Robles

## Excavation Characteristics

Common excavation methods were utilized on Reach 2. Blasting was not performed for any of the excavation.

## Groundwater

Over the entire 17-mile-length of the Reach 2 Pipeline, groundwater was encountered at six discrete locations. These location descriptions can be found in Table 2, Groundwater Locations. Included in Table 2 are the locations of groundwater encountered during construction at Davis Road and Bitterwater Road. The cause of the abrupt rise in the local groundwater table was due to the intense rainfall occurring in January and March 1995. These areas became the subject of claims submitted by the contractor for dewatering costs, and are discussed in the section "Claims Related to Geology."

Notable groundwater flows were observed at Stations 972+80 and 974+00 respectively, where water from these two prominent seeps ponded 6 inches deep over a 20-foot length of trench as initially observed; and at Station 990+00, where a flow of 5 to 10 gpm was observed from a sand and gravel lens (Photo 1) associated with an old stream channel.

Groundwater seeps combined to produce saturated conditions in the trench excavation from Stations 971+00 to 992+00 (See Plate 3, Sheets 4 and 5), a 2100-foot length of Reach 2 that parallels Cholame Creek and at which shallow groundwater conditions might be expected. These conditions posed a serious construction problem

for the Contractor. The Contractor hired a groundwater consultant who installed well points that turned out to be generally unsuccessful in the mostly fine-grained silty sand soils present in this area.

Trench dewatering was ultimately performed from Stations 971+00 to 992+00 through the installation of a six-inch-diameter, perforated subdrain encased in geofabric with pea gravel along with the use of sump pumps. The Contractor later submitted a claim for dewatering costs in this area that is discussed in further detail under the "Claims Related to Geology" section.

Faulting

The Reach 2 Pipeline traverses an area of active faulting. Earthquakes are common and the geomorphic expressions of recent faulting are clear and unmistakable. Documented ground ruptures have occurred in historic time as late as 1966, with fault movement in this area occurring as fault creep.

San Andreas Fault Crossing

The most prominent tectonic feature in the Reach 2 area is the San Andreas fault, which the pipeline crosses at right angles between approximately Stations 882+35 and 882+70 (Photo 2), eight-tenths of a mile south of Highway 46 in Cholame Valley (See Plate 3, Sheet 1). The San Andreas is a right-lateral strike-slip fault that shows evidence of creep movement ranging from about 18 mm per year in the Parkfield area, 15 miles north of the alignment, to about 3 mm per year at the alignment. In conjunction

with creep, this section of the San Andreas fault is subject to a magnitude 5.5+ event about every 21 years. The most recent event occurred between June 27 and August 3, 1966 and included ground rupture mostly to the north but also about one mile south of Highway 46, including the San Andreas Fault Crossing of the Reach 2 Pipeline.

In order to accommodate movement on the San Andreas Fault, the pipeline at the fault crossing is exposed in an open trench about six feet deep for 1350 feet. It is joined with flexible couplings, and is mounted on concrete pedestals using pin and expansion supports (Photo 3).

At the San Andreas Fault Crossing, the fault is represented by about a 70-foot wide zone between Stations 882+00 to 882+70 (see Plate 3, Sheet 1). The topographic and geomorphic expression of the fault crosses the pipe at Joint No. 14 (Photos 2 and 3); however, in the pipe trench excavation, a cut of approximately 6 feet on a 1:1 slope, reveals only subtle evidence of the fault. No structural features or contacts are visible. Although the geologic plan map shows Quaternary alluvium (Qal) faulted up against the Plio-Pleistocene Paso Robles (Qpr), no marked difference in soil types were observed. A minor amount of groundwater associated with seeps in the Paso Robles west of the fault was encountered during construction. Initially, in December 1994, when the trench was excavated the seeps were not present. They appeared after the excessive precipitation that occurred in January and March 1995. A seep was found in the trench invert at approximately Station 882+40 (Photo 4); its flow was observed to be about 0.5 gallons per minute in late April 1995 and decreased to about 0.1 gallons per minute

one month later. Additionally, several localized damp zones and minor seeps were found exposed in the south trench wall upslope and west of the fault in the Paso Robles Formation (See Plate 3, Sheet 1).

White Canyon Fault

The White Canyon fault is located about one mile west of the San Andreas fault. It is associated with and roughly parallels the San Andreas. This fault has a slip rate of approximately two to three millimeters per year (personal communication with John Sims). Where the pipeline crosses normal to the fault at approximately Station 945+00 (See Plate 3, Sheet 3), the fault is concealed by Quaternary alluvium. No recognizable fault feature was observed in these alluvial sediments that could be directly correlated with the White Canyon Fault.

Red Hills Extension Fault

The Red Hills Extension fault, located about four miles west of the San Andreas Fault, is also associated with and trends subparallel to the San Andreas. It is known to be active in Late Quaternary or Holocene time. The Reach 2 Pipeline alignment crosses nearly normal to this fault. At this location the fault consists of about a 700-foot wide zone, from Stations 1092+18 to 1099+10 (See Plate 3, sheet 9). Dramatic fault features were observed in the trench excavation in this area. These included highly contorted and convoluted beds of the Paso Robles Formation, offset clay beds and lenses, a large, isolated, faulted block of claystone, and sharply defined individual

shear planes, one of which is the contact of the northeastern limit of the fault zone (See Photos 5, 6, 7, and 8).

No groundwater associated with this fault was encountered during construction.

Landslides

Two rotational slump failures occurred near Station 10+60 after the Reach 2 Pipeline trench was excavated (Photo 9 and Figure 1). Exact locations of these slumps can be found on Figure 1 and on Plate 3, Sheet 8. The initial failures occurred on or about September 21, 1995. The trench had remained opened for three months since initially being excavated on July 21, 1995. The slump failures were mapped and analyzed by Project Geology Branch personnel, slope-stability analysis was performed by the Dams and Canals Section of the Civil Design Branch, and recommendations for mitigation were presented.

The smaller of the two failures occurred in the left trench wall at about Station 1061+20, some sixty feet downstream from a steeply incised drainage, which the alignment crosses at Station 1060+60. This slump measured about 15 feet wide at its toe, sliding out into the existing trench invert about five feet. A prominent headwall scarp was present at the top of the approximately 15-foot-high excavated pipe-trench slope (See "Slump 2" on Figure 1).

The larger, more problematical slump failure initially occurred between about Stations 1059+40 and 1060+20 in the left trench wall, upstream from and adjacent to the drainage crossing at Station 1060+60. This slump measured about 85 feet wide at

its toe, extending completely across the existing 22-foot-wide trench invert to abut the opposite trench wall to a point some two feet above the existing invert. It should be noted that this slump occurred prior to the excavation of the shallow slurry trench. The slump exhibited a prominent headwall scarp some 50 feet upslope of the original top of cut, which at the time of failure was excavated to a depth of about 35 feet (See Photo 10 and "Slump 1" on Figure 1).

The alignment in this area traverses across a large, old landslide that had been previously mapped by both Dibblee and Project Geology. The large slide extended between Stations 1051+50 and 1080+00. The Paso Robles Formation consisted of interbedded tan and gray, mostly lean to sandy clays with some clean sands (SP). The clays consistently showed highly convoluted bedding planes representing a disturbed appearance, such as slump blocks from apparent older landslide movements.

The pipe trench in this landslide area was initially excavated on July 21, 1995. The trench remained open for some 60 days with no pipe being placed, and the moist clays of the trench walls desiccated. The failures occurred on September 21, 1995. Geologic mapping of the failures was performed on September 25 and October 6, 1995. As-excavated trench slopes were measured at 0.75:1. Design slopes called for 1:1. Tension cracks were observed upslope after the failures, indicating that the landslide was continuing to move towards the pipe trench excavation. Recommendations for remediation included: (1) slide material should be left in place to support the upslope remaining slide material until pipe placement neared that location; and (2) slide material

should be removed at least beyond the limits of noted cracking and replaced with compacted backfill.

The site was inspected again on November 8, 1995. An additional two to four feet of downslope slide movement was noted, as well as continued opening of desiccation cracks in the trench walls. The previous recommendations were reiterated with the additional statement that the pipe and compacted backfill be placed as soon as possible in this area to prevent additional movement of the slide upslope from the trench.

On November 29, 1995, the contractor began excavation of the four-foot-deep slurry trench below the existing invert of the trench in the vicinity of the larger slump. This effectively removed the buttressing support from the slide toe and the slide failed a second time, collapsing the left wall of the slurry trench and filling in most of the slurry trench (See Photo 11). Prior to this failure the Contractor had attempted to lay back the slope from 0.75:1 about halfway up the trench wall transitioning to about a 2:1 up to the original top of cut (Photo 12). These observations were made on a December 5, 1995 inspection by Project Geology Branch personnel.

Finally, a layback of the entire left pipe trench slope to 2:1 from pipe invert to a catchpoint of original ground surface was proposed to remediate additional landslide movement during construction. A slope stability analysis of the slide material and a wedge downslope of the right side of the trench were performed by the Civil Design Branch. The results showed that the 2:1 slope had a factor of safety approximately 20 percent greater than what it had before failure, which was marginally satisfactory.

The slope was overexcavated and laid back to 2:1 with bench cuts. Final as-excavated conditions were mapped by Project Geology personnel on January 16, 1996 and shown on Plate 3, Sheet 8A. No further instability of the slide occurred during pipe installation or backfill operations. No further downslope movement of the slide in this vicinity is anticipated during operations and maintenance.

Low E' Soils

The design of the pipeline depended upon gaining lateral support from the surrounding soil to prevent "egging" or flattening of the pipe by vertical overburden pressure. Prevention of pipe deflection was necessary to avoid cracking the mortar lining. The potential for pipe deflection was especially high where the pipeline traversed areas of weak soils. These weak soils have been termed "low E' soils" (E' is for the modulus of soil reaction). To prevent pipe deflection in these low E' soil areas, the pipe trench was widened, thereby allowing replacement of the weak soil with cement slurry up to six inches from top of pipe.

As stated in the Fugro report of August 3, 1995, "the E' number is an estimate of soil stiffness and the ability of soil to resist deformation when subjected to passive pressures associated with pipeline deflection. E' also includes elements that are based upon pipeline stiffness parameters, thus making E' more of a pipe-soil interaction modulus rather than a soil modulus alone." On that basis, E' for in-situ materials or a composite section, is an empirically estimated value that is currently based on in-situ and backfill soil type, relative compaction, depth of cover, and pipeline diameter. There are currently no generally accepted methods established to test soil samples in a

laboratory to directly estimate E' values. During exploration drilling, Project Geology identified where soils with low Standard Penetration Test results ("N" counts) were present (generally where alluvial soils associated with drainages exist). These areas were mentioned in Project Geology's "D" reports. Department Construction personnel further defined the potential low E' soil areas by excavating test pits and performing in-place densities at springline of the pipe. These density values were utilized in developing the low E' values and establishing the lateral extent of the required over-excavation, as depicted in Table 3. The sections of the alignment where the trench was widened are shown on Plate 3 as shaded and the test pits are shown as a small black square labeled R2- #.

San Juan Creek Crossing

The Reach 2 alignment crosses the ephemeral stream channel of San Juan Creek, some 1000 feet wide, near the town of Shandon. The crossing had been deemed an environmentally sensitive area, requiring a change from the normal design and construction of a trench excavation, pipeline placement, and backfill operations. Instead, the pipeline crossing of San Juan Creek was constructed using the directional drilling method, in which the 42-inch steel pipeline was installed beneath San Juan Creek. The length of the directional drilling would be about 2,000 feet between about Stations 1295+50 and 1315+90 (See Plate 3, Sheets 17 and 18).

At the San Juan Creek Crossing, 50 to 80 feet of Recent Alluvium overlies the Plio-Pleistocene Paso Robles Formation. The Recent alluvium generally consists of

medium-to-fine-grained silty to clayey sands with gravels and an occasional clay bed. At the base of the alluvium immediately overlying the Paso Robles Formation is a thin layer of gravelly sand with discontinuous lenses of silty and poorly graded gravel.

The Plio-Pleistocene Paso Robles Formation consists of consolidated, very dense, medium- to fine-grained sand, silt, and clay.

These descriptions are based on six preconstruction auger borings or combination auger-rotary borings utilizing Standard Penetration Testing (SPT) and Shelby Tube sampling procedures, as well as eight post-construction auger, auger/rotary combination, and rotary boreholes utilizing the same sampling procedures. (See Plate 3, Sheet 18 for location of exploration holes).

The San Juan Creek Crossing was the site of a claim by the Subcontractor, Cherrington Corporation, based on alleged "changed site conditions." This is discussed in the following section on claims and in detail in Project Geology Branch Report 55-02-15 referenced on page 4.

## CLAIMS RELATED TO GEOLOGY

### San Juan Creek Crossing

The Coastal Branch, Phase II, Reach 2 Pipeline original design crossing of San Juan Creek called for an alignment some 1200 feet in length, slightly askew to the drainage, and 200 to 500 feet downstream of the as-excavated alignment. The original alignment was changed during the design review process; the as-excavated

alignment crossing trends normal to San Juan Creek and is about 1000 feet in length (See Plate 3, Sheet 18). During the design review process and prior to the commencement of exploration drilling, the 30-foot-high, near-vertical northern bank of San Juan Creek was declared to be "environmentally sensitive." This creek bank was not to be disturbed, dictating: (1) the change in alignment location; (2) restricted drill rig access for geologic exploration along the new alignment; and (3) a change in method of construction from the normal trench excavation, pipeline placement, and backfill. Because the creek bank was to remain undisturbed, the Department chose to utilize the directional drilling method to install the 42-inch diameter steel pipe beneath San Juan Creek. Because vehicular traffic was not allowed in the "active stream channel" (even though dry) of San Juan Creek between Stations 1308+00 and 1313+00, no preconstruction geologic exploration drilling was performed within this 500-foot length of the as-excavated alignment.

As stated in the Geology section of this report, six preconstruction geologic exploration holes were drilled in the vicinity of the San Juan Creek crossing. Four of the six holes (SJ-2, SJ-3, SJ-4, and SJ-5) were drilled along the initial alignment. Only two additional holes (SJ-6 and SJ-7) could be drilled along the as-excavated alignment due to environmental restrictions denying drill rig access. The exploration holes were drilled with hollow-stem augers driving Standard Penetration Tests every five feet through the alluvium (Qal). The alluvium encountered ranged in thickness from 30 to 80 feet and consisted of predominantly coarse-grained deposits of sand with occasional lenses of clay and silt. The sandy alluvium recovered from sampling contained variable amounts

of gravel ranging from a trace up to 15 per cent with a trace of cobbles. The underlying Paso Robles Formation (Qpr) encountered in the exploration holes consisted of consolidated, very dense, medium- to fine-grained sand, silt, and very stiff clay. The Paso Robles could be augered, but was cored also. Where the Paso Robles Formation could be augered, SPT's were driven.

The Contractor for the Reach 2 Pipeline construction, W.M. Lyles Corporation, subcontracted the construction of the San Juan Creek Crossing. Prior to bidding, the Subcontractor, Cherrington Corporation, met with Department Design Engineers in Sacramento and reviewed the drillhole data. At that time the Contractor stated that the types of strata described in the exploration drillhole logs posed no problem for the directional drilling method.

However, prior to the start of the directional drilling, Cherrington submitted plans to raise the pipe profile to a significantly shallower depth. The original design (Department of Water Resources Plans and Specifications 93-33, Contract C51017) called for about **1,500 feet** of the directional drilling to be completed in the dense Paso Robles Formation, and **500 feet** to be drilled in the less dense alluvium (See Plate 3, Sheet 18). The entry point would have been through the alluvium on the south side of the creek, near Station 1315+00, down through the Paso Robles Formation to a maximum depth of about **97 feet** below ground surface, and back up through the alluvium to the exit point on the north side of the creek near Station 1299+00. Cherrington's proposal called for only **700 feet** of the directional drilling to be in the Paso Robles, reaching a maximum depth of about **66 feet**, and **1,300 feet** in the less

dense alluvium. The Paso Robles strata were much denser and more difficult to drill than the alluvium. The Contractor's proposed change would result in much easier drilling conditions; however, at the shallower depth the probability was much greater that gravel would be encountered and that drill mud could migrate to the ground surface through the less dense alluvium. Additionally, the angle at which the directional drilling would penetrate the dense Paso Robles Formation would now be shallower. Nonetheless, this proposed change was accepted by the Division of Design, Plants and Pipelines Branch.

Drilling of a pilot hole from the south side of San Juan Creek began on November 4, 1994; so did the problems. The driller reported hitting a "hard layer" when the drillhole length reached 120 feet (a depth of about 30 feet) and this hole was abandoned. A second pilot hole was started on November 5. This second pilot hole experienced drill mud migrating to the surface near the base of the "environmentally sensitive" high bank at Station 1313+00 and again at Station 1311+50. At Station 1313+00 the Contractor's proposed alignment was approximately 12 feet higher than the Department's design elevation. This shallower depth increased the probability that mud would migrate to the surface.

The driller reported encountering cobbles from about Station 1312+23 to 1309+12. From this first mention of cobbles at Station 1311+30 to about Station 1306+70, the pilot hole path appears to have skated along the base of the alluvium just above the top of the Paso Robles Formation. At this depth the stratum contained some discontinuous gravel lenses that were confirmed by post-construction

geologic exploration drillholes drilled where the Department was restricted from performing preconstruction drilling. Cherrington's proposed alignment essentially followed along this gravelly layer located on top of the Paso Robles Formation.

On November 8, the Contractor pulled the drill rods to inspect the bit. The bit was reported as being "worn out." On November 9, drilling commenced using a new bit. The driller reported encountering "rock." The pilot hole started to drift upward and could not be corrected. After drilling only 117 additional feet, the second pilot hole was abandoned at about Station 1306+70.

The Contractor next proposed that the pipeline alignment be raised yet again to a shallower maximum depth of 42 feet, also giving notice of a potential claim based on a change of conditions. The Division of Design, Plants and Pipelines Branch approved the shallower depth of about 40 feet, and a 2,062-foot-long, five-inch-diameter hole for fiber-optic cable was successfully completed on November 19, most of it through the alluvium and some through the Paso Robles Formation. Mud migration was noted in the creek bed on November 17.

A third pilot hole was set up for the 42-inch pipeline at the shallower depth of about 40 feet on November 22. It was successfully completed on December 1. Approximately **1,700 feet** of the directional drilling was completed in the alluvium and about **300 feet** was completed through the Paso Robles Formation as shown on Plate 3, Sheet 18. Drill mud migrated to the ground surface during drilling at about Stations 1314+30 and 1312+50.

The third pilot hole was reamed to 60 inches in diameter between December 9, 1994 to February 6, 1995, during which time there were several trip outs for inspecting and replacing worn-out equipment. Reaming was completed with one pass in about 20 days of actual drilling. Initially when Cherrington submitted their proposal, they indicated that multiple reamings would be conducted to enlarge the 8-inch-diameter pilot hole to the finished 60-inch-diameter hole. The Contractor reported encountering a "consolidated and abrasive bedrock formation" at approximately Station 1304+00. No "bedrock formation" exists in the area. Instead, post-exploration drillholes CB-1302 and CB-1302A drilled near Station 1304 encountered the very dense sands of the Paso Robles Formation at the elevation where the directional drilling encountered the "consolidated and abrasive bedrock formation."

Cherrington submitted notices of potential claim from encountering the "unexpected strata" of gravel overlying the Paso Robles Formation as well as alleged "vertical fissures" that were blamed for drilling fluid migrating upward under pressure to the surface of the creekbed. Cherrington claimed that these "differing site conditions" required extra work to overcome the unexpected difficult soils. The Department's initial position was to deny such "differing site conditions," maintaining that the data in the preconstruction geologic report were consistent with the soils that were encountered. To confirm this, Project Geology drilled eight additional exploratory holes right of the alignment associated with the San Juan Creek crossing (See Plate 3, Sheet 18). Drill hole CB-1311 encountered a gravel lens about ten feet thick near Station 1311+00 overlying the Paso Robles Formation. The six initial preconstruction boreholes showed within the sandy alluvium recovered from sampling, variable amounts of gravel ranging

from a trace up to 15 per cent with a trace of cobbles. But none of the preconstruction holes were drilled in this area because of the "environmental restriction" of no vehicular traffic allowed in the "active" stream channel that was imposed on the Department during exploration.

Cherrington's differing site conditions claim was for the amount of $463,293.00. The State estimate was for $265,000.00, which Cherrington agreed to. With a reduction in the estimated quantity of the bid item for the 42-inch pulled steel pipe, the final settlement was for $212,229.35. On November 19, 1996, the Department of Water Resources, Coastal Project Headquarters issued Change Order No. 28 to Contract No. C51017 in that amount.

Compacted Backfill Claim

In October 1997 the Contractor submitted a claim for several disputed construction issues, including difficulties with compacted backfill that involved delays and extra costs in completing the project. The portion of Reach 2 that was involved in this issue stretches for approximately 9.7 miles between about Stations 1172 and 1685. Excluding the approximate 2,100 feet between Stations 1295 and 1316 associated with directional drilling, the total length in question was 49,200 feet.

The Contractor claimed that he encountered problems related to the compacted backfill that greatly increased the cost of not only his operation, but related and subsequent activities as well. The two categories of problems that the Contractor claimed were: (1) failure of the Department to perform contractually obligated testing

functions in the specified manner and on a timely basis, and (2) failure of the Department to direct a change in the compacted backfill specification to utilize either an imported material or a sand-cement slurry/controlled density fill (CDF) in place of the specified native soil materials.

The Contractor went on to specify eight specific Department problems that it blamed on the delay and disruption of the project, including the Department's alleged knowledge of the "troublesome nature of the native soils." All allegations were found to have no basis.

What the Department found was that the Contractor did not pursue the compacted backfill operation in a productive, efficient, or consistent manner. The Contractor chose to disregard the maximum lift thickness requirement and placed the backfill material in layers far in excess of the six-inch loose-lift thickness. Consequently, the compactive effort that was applied, which would have been sufficient to compact a six-inch loose lift, was not sufficient to compact material placed in 12-inch-thick, loose lifts. Inevitably, the result was compaction of soils to a lesser degree than the 95 percent compaction required by the contract, and is what the compaction test results showed.

The Project Geology Section reviewed the as-excavated geologic trench logs of this reach and found that the materials encounterred during construction were consistent with the 13 preconstruction exploration drillholes placed in this area. Within the entire interval of concern, about 60 per cent of the soils encountered were silty and clayey sands, with the remaining 40 per cent comprised of clays and silts. Local gravel

lenses were encountered, but overall represent only a trace of the total material excavated. Wet or saturated soils were rarely encountered in the area in question.

These native soils could achieve proper compaction by utilizing standard means of construction compaction. No fat clay soils or highly expansive soils were encountered.

Some of the alluvium encounterred in the Compacted Backfill Claim area, between Stations 1178 and 1280, was determined to have a low E' modulus (See Table 3). These in-situ soils had a low enough density that the trench excavation was widened to provide for a higher density backfill material to surround the pipe. The excavated low E' soils had been used and properly compacted in the Compacted Backfill portion of the excavation to reach this required higher density. This was demonstrated when the same soil types were encountered in Reaches 1, 3, and 4 and proper compaction was achieved.

Project Geology found that there was no geologic reason to classify the native soils encounterred during construction of the Reach 2 Pipeline as "troublesome" in nature.

The Compacted Backfill issue was one of four construction issues under dispute for which the comprehensive October 1997 claim was filed. The other items involved time/delay and pipe fabrication issues, and extra costs by the concrete subcontractor.

The Contractor filed for arbitration on November 4, 1998. When arbitration appeared stalled, the Contractor and the Department resolved three of the four claim issues, including the compacted backfill, on December 22, 1999. Thus, with the exception of the concrete subcontractor issues, all other claim issues on this contract (C51072) were resolved for the lump sum price of $2,600,000. After the deduction of $182,000 for 91 days of liquidated damages, the adjustment in compensation to the Contractor was $2,418,000. Change Order No. 36 to Contract C51072 was issued for this amount on January 11, 2000.

Davis Road Groundwater Claim

Davis Road crosses the Reach 2 Pipeline near the beginning of Reach 2, at Station 880+00. During construction it was necessary to relocate Davis Road about 200 feet southwest of its permanent location. The Contractor first reported groundwater problems here in its RFI No.72, dated December 7, 1994, in which it described a portion of the detour as failing due to subsurface moisture being drawn up into the subgrade by heavy traffic. It advised the Department that correction of the problem would involve extra cost.

The Contractor reiterated the issue of subgrade water causing failure of the Davis Road detour in a meeting with the Department on December 30, 1994, stating that the failure was due to a problem with design. The Department disagreed, indicating there would have been no problem if the detour had been installed in a timely manner as required by the specifications.

In the initial, December 1994, excavation of the pipe trench immediately west and upslope of Davis Road no groundwater was encountered. After the intense rainfall in January and March 1995, groundwater seeps appeared in the trench walls and were mapped to the west and upslope of Davis Road between Stations 882+40 (Photo 4) and 889+50. In the Contractor's February 23, 1995 letter No.153, he indicated groundwater had been encountered from approximate Stations 878+00 to 896+00. The Contractor pointed out that the Department's "Geology and Construction Materials Data" Report D-144, dated November 1993, did not indicate the presence of groundwater in any of the geologic borings in the area. The exploration boreholes in the area are CV-1, drilled on October 14, 1992 at Station 876+00; CB-880, drilled on December 8, 1992 at Station 880+00; and B-893, drilled on April 15, 1993 at Station 893+50. While none of the holes encountered groundwater at the time they were drilled, at the end of a drought, this was approximately two years before the extraordinary amount of precipitation that occurred. The Contractor advised the Department that dealing with the unexpected groundwater would involve added cost. Subsequently the Contractor installed about 700 feet of 4-inch-diameter pipe between Stations 882+40 and 889+50 to assist in dewatering the trench. A Notice of Potential Claim for dewatering was filed on March 30, 1995.

Project Geology noted that the Paso Robles Formation at this location is represented by sandy soils that are highly permeable. Due to this high permeability, it is not surprising that a rapid rise in the groundwater table occurred after these major storms, as evidenced by the appearance of seeps in the trench walls.

The Contractor maintained that the presence of water in the vicinity of Davis Road was a subsurface physical condition which differed significantly from what was indicated in the Department's Geology Report D-144, and that this condition was not forseen, nor could any bidder have forseen it. The Contractor had not included any costs for dewatering this section of Reach 2 when he submitted his bid.

The Department maintained that the purpose of the bid item for dewatering in the contract is to provide compensation for wherever dewatering is encountered in the work. The geologic investigation is performed at a different time than when the work occurs, and the responsibility belongs to the Contractor.

After initially denying the claim, the Department agreed to compensate the Contractor. It was decided that although groundwater levels are subject to variation, it was reasonable for the Contractor not to expect to incur dewatering costs in the area. Therefore, the dewatering in this area was considered extra work. The Contractor sought an adjustment in compensation of $13, 285.00. The State estimate was $13,000, which the Contractor agreed to. On October 11, 1996, Change Order No. 26 to Contract C51017 was issued in that amount by Coastal Project Headquarters.

Bitterwater Road Groundwater Claim

This claim is very similar to the Davis Road groundwater claim and therefore the two were discussed together with the Contractor. However, the Contractor presented the dewatering costs for these areas as two separate issues.

Near Bitterwater Road, between Stations 972+00 and 991+00, the Contractor claimed that he encountered significant groundwater above the invert of the pipe trench. In similarity to the Davis Road issue, the Contractor claimed that the groundwater conditions differed significantly from those indicated in Project Geology Report D-144 and that they were unforeseen, and no bidder could have forseen them.

The two exploration boreholes in the area, CB-965, drilled on December 9,1992 at Station 965+50, and CB-986, drilled on April 15, 1993 at Station 986+50 did not encounter groundwater. Only boring CB-986 falls within the Contractor's area of "extensive" groundwater. Boring CB-965 is on higher ground about 700 feet upstation to the east.

Project Geology mapped groundwater seeps in this portion of the trench during construction. On August 16, 1995, a prominent seep was noted at Station 989+90 (Photo 1) flowing from a gravel lens associated with a buried stream channel at an estimated five to ten gallons per minute. Seeps were also mapped in the trench wall at Stations 972+80 and 974+00 on August 22, 1995 and water was ponded six inches deep over a 20-foot length of trench at Station 972+80.

The intense rainfall that occurred in January and March of 1995 contributed to heavy flows in Cholame Creek, which parallels the alignment, thereby recharging and causing a rise in the groundwater table, especially in the sandy alluvial sediments. This appears to be the primary contributing factor to the source of groundwater encountered between Stations 972+00 and 990+00. The alluvium encountered within this topographically low portion of the trench profile predominate and are highly permeable.

As with the Davis Road Claim, the Department agreed that it was reasonable for the Contractor not to expect to incur dewatering costs in this area. Therefore, the dewatering in this area was considered extra work. The Contractor sought an adjustment in compensation of $151,078.00. The State estimate was $100,000, which the Contractor agreed to. On October 7, 1996, Change Order No. 22 to Contract C51017 was issued in that amount by Coastal Project Headquarters.

Landslide Claim, Station 10+60

Two rotational slump failures (Photo 9 and Figure 1) occurred near Station 10+60 after the Reach 2 Pipeline trench was excavated. Refer to the "Geology" section of this report, under "Landslides" for a detailed description and a chronology of events.

The slump failures were mapped and analyzed by Project Geology; slope-stability analysis was performed by the Dams and Canals Section of the Civil Design Branch; and recommendations for mitigation were presented. Some time after a partial slope layback was performed at the larger, more problematical slide, a second failure occurred when support of the toe was removed by the slurry trench excavation. Finally, the slope was overexcavated and laid back to 2:1 with bench cuts. Final as-excavated conditions were mapped by Project Geology personnel on January 16, 1996, as shown on Plate 3, Sheet 8A. No further instability of the slide occurred during pipe installation or backfill operations.

The Contractor filed a Notice of Potential Claim for unexpected ground slippage at Station 1060+50. After retaining the services of a geotechnical consultant, the

Contractor blamed the slides on an "unexpected, unstable, black, very moist, plastic clay" at pipeline elevation. Geologists from Project Geology made several detailed inspections of the slides near Station 1060 and did not observe this alleged interbed. However, during the final as-excavated geologic mapping of the landslide reslope, a discontinuous, approximately 30-foot-long block of contorted, black, fat clay bed was mapped in the cutslope near its toe (See Plate 3, Sheet 8A). Project Geology maintained that these discontinuous beds did not represent a slippage plane for the landslides.

The slides that occurred near Station 1060 are only a small portion of an old, extensive landslide present between approximate Stations 1050 and 1080. The Paso Robles Formation in this area consisted of predominantly silty, clayey, and some poorly graded sands with silt and clay interbeds. The fine-grained interbeds are generally not continuous for much more than 20 feet. The soil units at and near Station 1060 exhibit very irregular contacts and appear to be more like individual slump blocks within the entire landslide mass. Project Geology maintained that due to the discontinuous nature and nonuniformity of the fine-grained interbeds, no one soil layer can be attributed to the slide failures. It went on to state that the folowing items were the primary factors leading to the failures:

(1) The original as-excavated trench slopes of 0.75:1 were too steep;

(2) The length of time (6/22/95 to 9/21/95) the trench had remained open with no pipe emplaced, prior to the initial failure, was too long and desiccation of the in-place clays exposed in the trench walls resulted;

(3) Because of the moderately steep topography and a side hill cut that resulted with the left side of the trench having a higher cut than the right (downslope) side.

Negotiations to settle this issue with the Contractor were attempted at two meetings in July and August of 1996, without results. Ultimately, this issue was resolved along with nine other contract work disputes through Change Order No. 31. This Change Order was issued in February 1997 with a lump-sum adjustment in compensation of $780,000 to the Contractor to settle all ten issues. The amount the Contractor had requested specifically for the unexpected ground slippage was $107,492.

# APPENDICES

# APPENDIX A

PHOTOGRAPHS

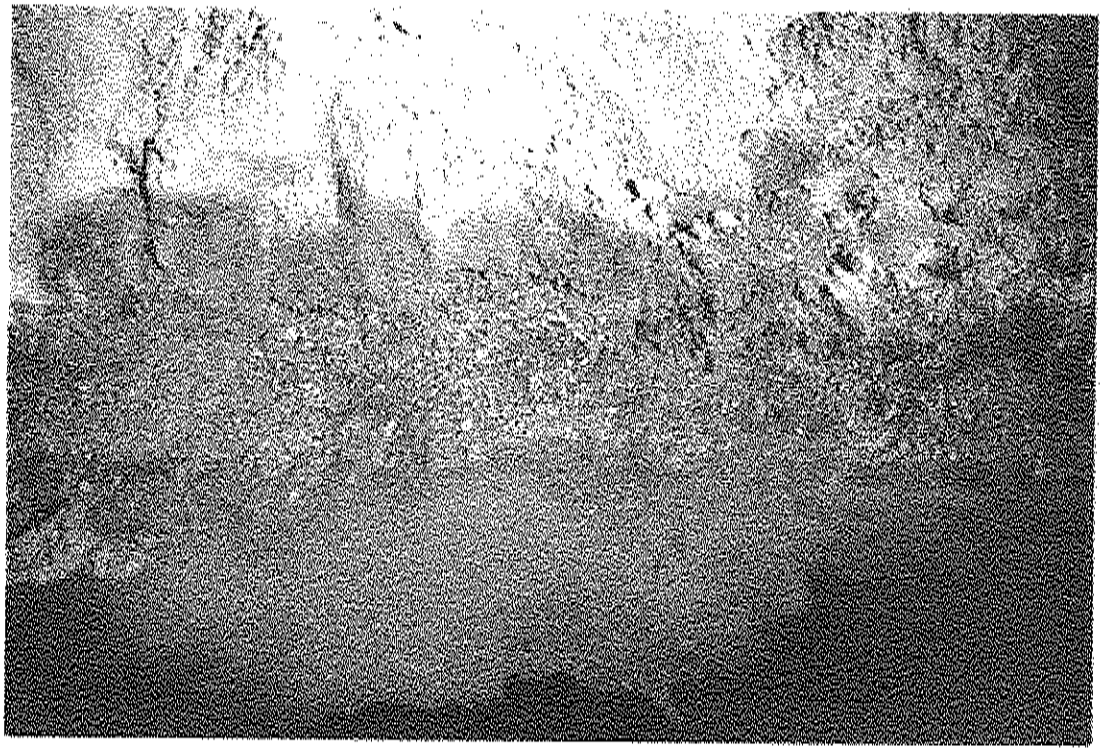


Photo 1. Sand and gravel lens in alluvium (Qal) at Station 990+00 with observed groundwater flow of 5 to 10 gpm. View downward into pipe trench showing left wall.

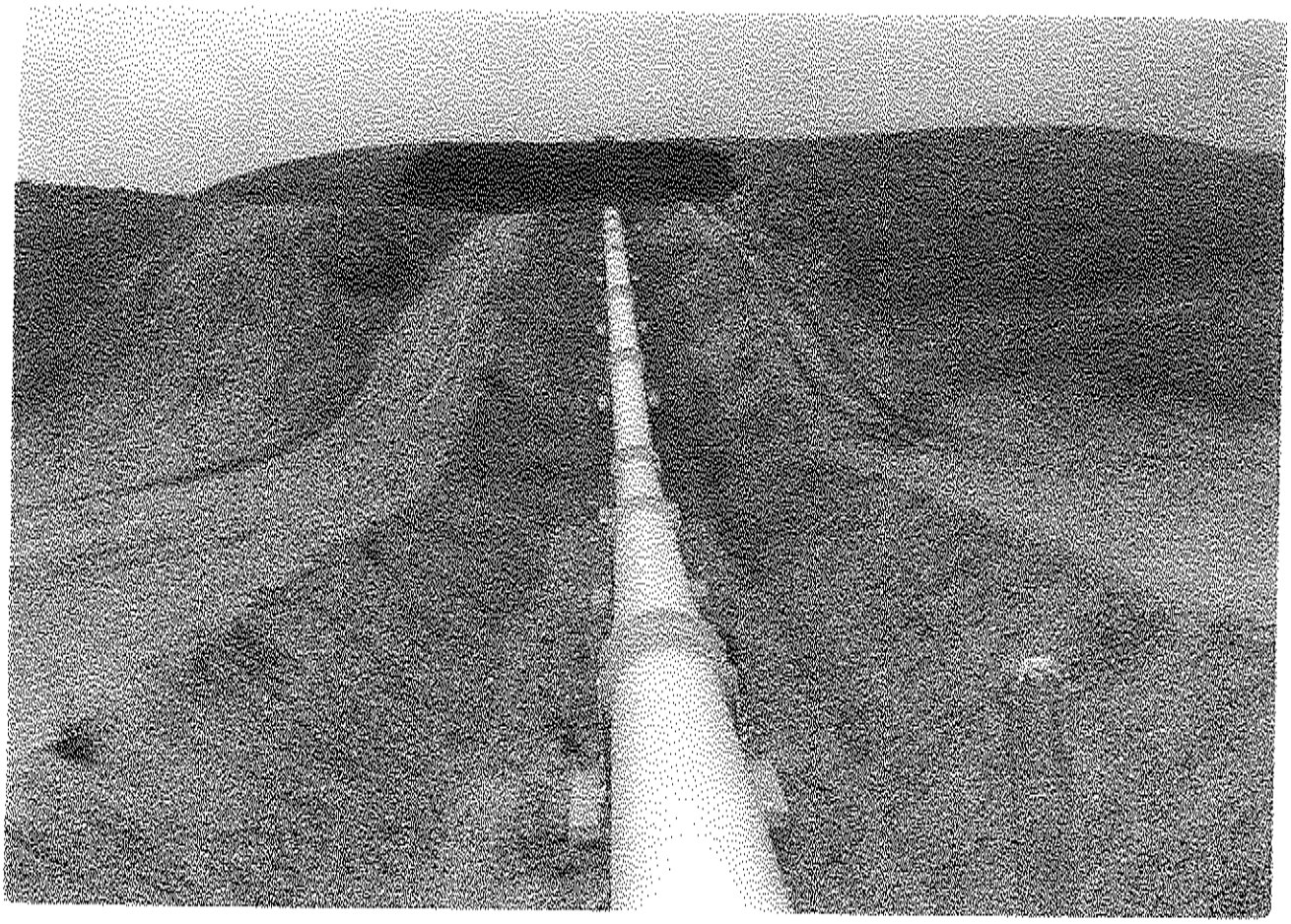


Photo 2. Coastal Branch - Phase II, Reach 2, San Andreas Fault Crossing, Stations 880+50 to 886+00. View southwest. Fault trends from left to right crossing pipeline at bend or break in slope.

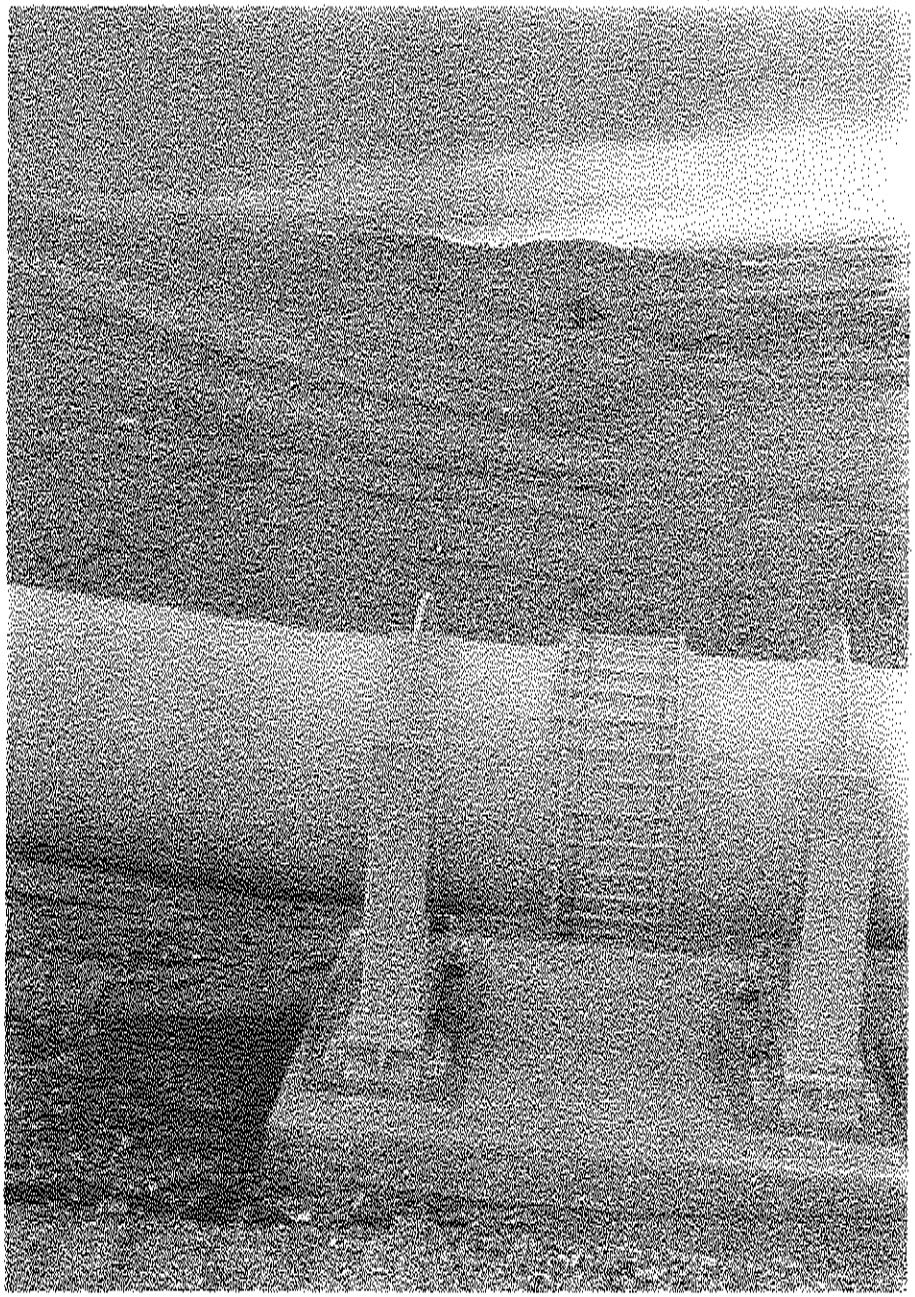


Photo 3. San Andreas Fault Crossing, Support No. 14, Station 882+10. View northwest, along strike of the fault. Note ring girders fastening pipe to concrete pedestal. Pin and expansion supports are utilized.

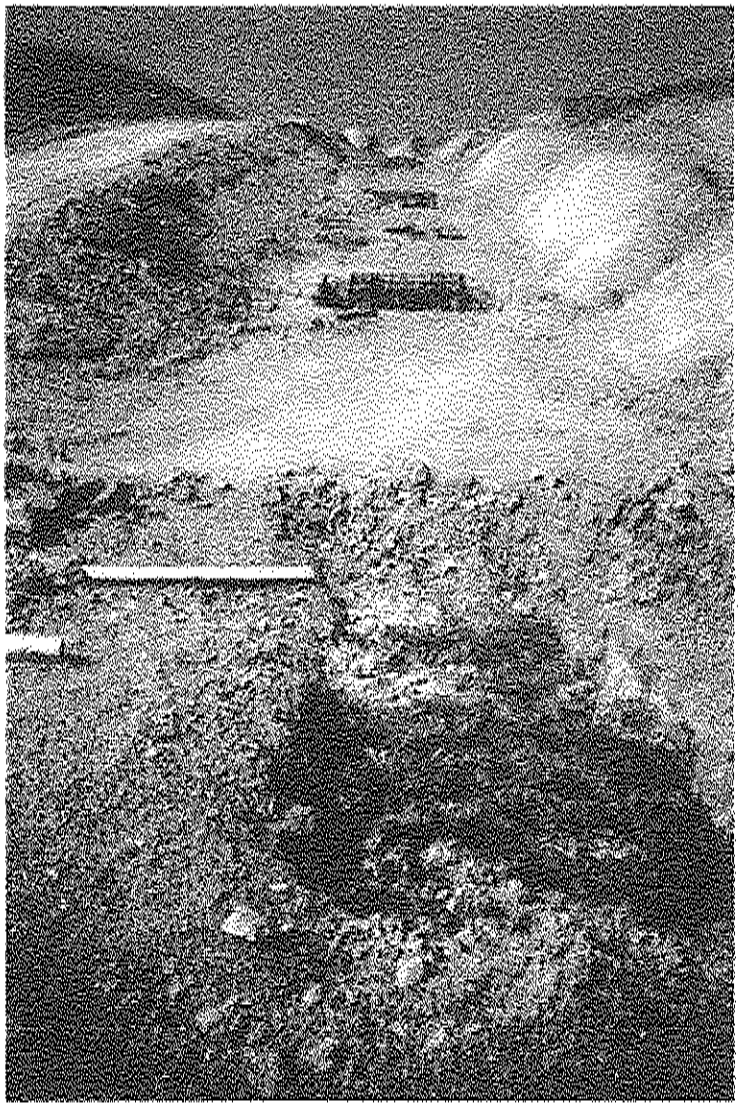


Photo 4. Groundwater seep at Station 882+40, San Andreas Fault Crossing at Davis Road. View southwest.

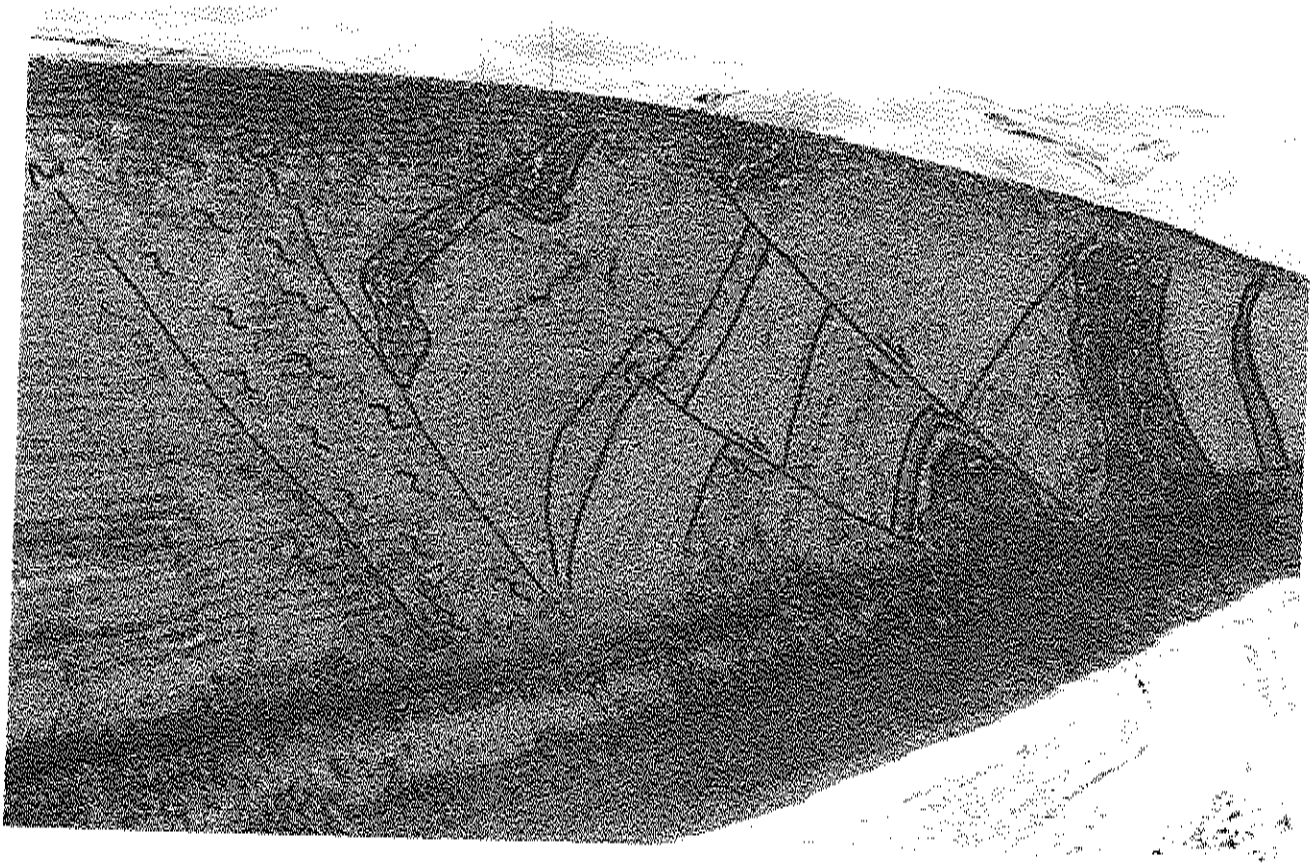


Photo 5. Left wall of trench excavation showing main zone of shearing in the Paso Robles Formation (Qpr) associated with the Red Hills Extension Fault near Station 1090. View south.

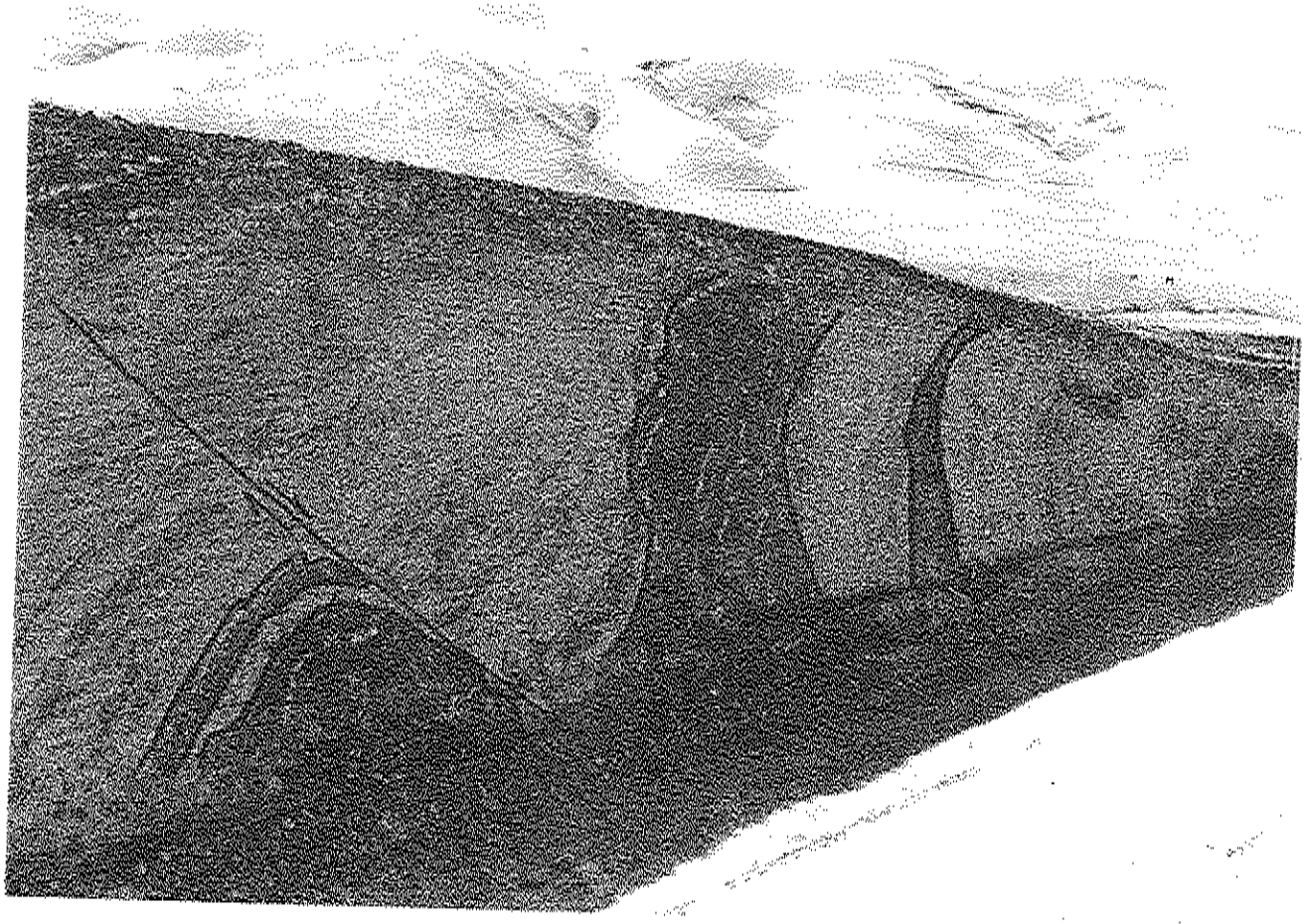


Photo 6. Portion of the Red Hills Extension Fault near Station 1090 (close-up of right portion of Photo 5). Note steeply dipping, contorted clay beds and sand units of the Paso Robles Formation (Qpr) with a branch shear showing apparent down-dip offset indicative of normal faulting.

Photo 7. Main zone of the Red Hills Extension fault at about Station 1090 in left trench wall; same area as shown in Photo 5 but viewed looking east. Note apparent contrast of bedding dip directions either side of the fault.

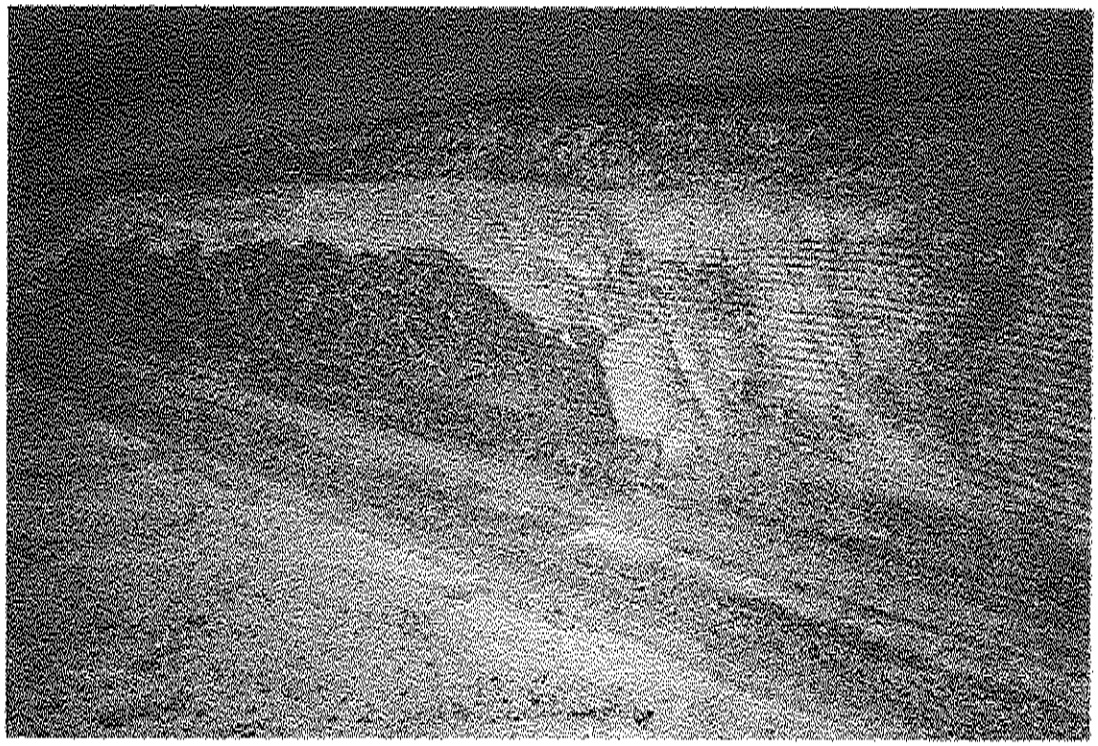


Photo 8. Large, isolated, block of claystone within the Red Hills Extension fault zone at about Station 1098. Also note contorted bedding to the right. View east of left trench wall.

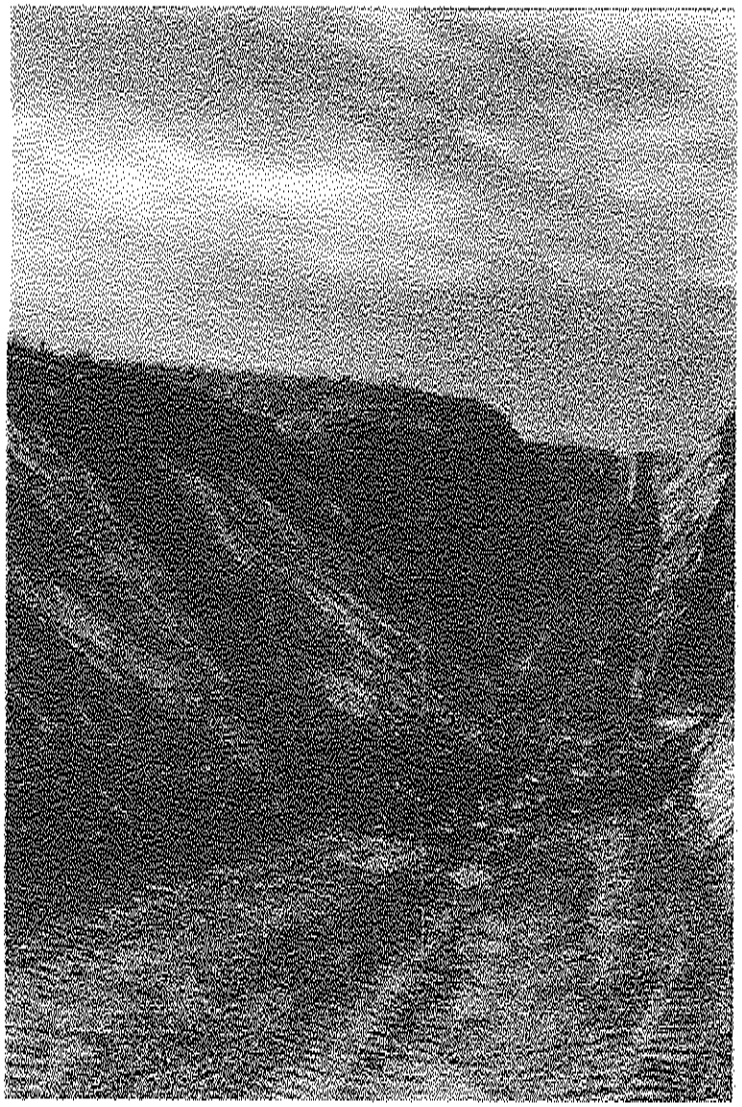


Photo 9. Two initial slump failures within the Paso Robles Formation (Qpr) that occurred near Station 10+60 on September 21, 1995. Slump 1 (larger slump) in foreground and slump 2 in middle distance. View southwest.

Photo 10. Larger of the two initial slump failures (Slump 1) showing left lateral limit and a portion of the prominent headwall scarp, at Station 1059+40. This slump was 85 feet wide at the toe.

Photo 11. Second failure of the larger slump (Slump 1) after excavation of the four-foot-deep slurry trench below the existing invert of the pipe trench removed buttressing support from the slide toe. View is upstation and northeast. Note slurry trench in center of photo with collapsed left wall filling the trench.

Photo 12. Area of larger slump (Slump 1) in the Paso Robles Formation (Qpr) near Station 1060 after initial resloping but before second failure. Contractor attempted to lay back the slope from 0.75:1 about halfway up the trench wall to transitioning to about a 2:1 continuing up to the original top of cut.

# APPENDIX B

TABLES 1, 2, and 3

## Table 1.

## Reach 2 Pipeline, Bedrock Locations Encountered in Invert

| BEDROCK LOCATIONS | | |
|---|---|---|
| Formation | Begin Station | End Station |
| Paso Robles (Qpr) | 882+00 | 925+80 |
| Paso Robles (Qpr) | 967+80 | 971+90 |
| Paso Robles (Qpr) | 990+20 | 997+40 |
| Paso Robles (Qpr) | 1000+50 | 1024+00 |
| Paso Robles (Qpr) | 1030+50 | 1038+00 |
| Paso Robles (Qpr) | 1050+50 | 1077+40 |
| Paso Robles (Qpr) | 1077+90 | 1099+00 |
| Paso Robles (Qpr) | 1166+00 | 1177+10 |
| Paso Robles (Qpr) | 1329+00 | 1338+00 |
| Paso Robles (Qpr) | 1339+20 | 1345+50 |
| Paso Robles (Qpr) | 1406+15 | 1742+50 |

Notes: 1. The Paso Robles Formation does not have a typical bedrock appearance; it is composed mostly of consolidated sands and clays.

2. Alluvium (either Qal or Qol) was encountered at all other stations not listed above.

Table 2.

Reach 2 Pipeline, Groundwater Locations

| GROUNDWATER LOCATIONS | | |
|---|---|---|
| Begin Station | End Station | Description |
| 881+80 | 881+80 | Varied; 0.5 gpm on 4/27/95, 0.1 gpm on 5/23/95. |
| 882+30 | 888+80 | Floor of trench locally damp to wet. |
| 972+80 | 974+00 | Two seeps in left trench wall; water ponded 6" deep. |
| 990+00 | 990+00 | 5-10 gpm from sand and gravel lens. |
| 971+00 | 992+00 | 6"-diameter perforated subdrain installed; encased in geofabric |
| | | and pea gravel. |
| 1501+70 | 1501+70 | Seep in left trench wall. |
| 1503+00 | 1503+00 | Seep in left trench wall. |

Table 3.

Reach 2 Pipeline, Locations of Low E' Soils

| LOCATIONS OF LOW E' SOILS | | |
|---|---|---|
| Station | Width at Springline of Pipe | Soil Type |
| 927+00 to 966+00 | 20 feet | Qal: CL, SP-SC, SC, SP |
| 1037+00 to 1050+00 | 16 feet | Qal: SM and CL |
| 1125+00 to 1170+00 | 16 feet | Qal: SP-SM, SC, CL, SM |
| 1178+00 to 1280+00 | 16 feet | Qal: CL, SP-SM, SC, SM, SP |
| 1731+00 to 1752+00 | 20 feet | Qal: SC, SC-SM, CL/CH, SP-SM |

# APPENDIX C

FIGURE 1

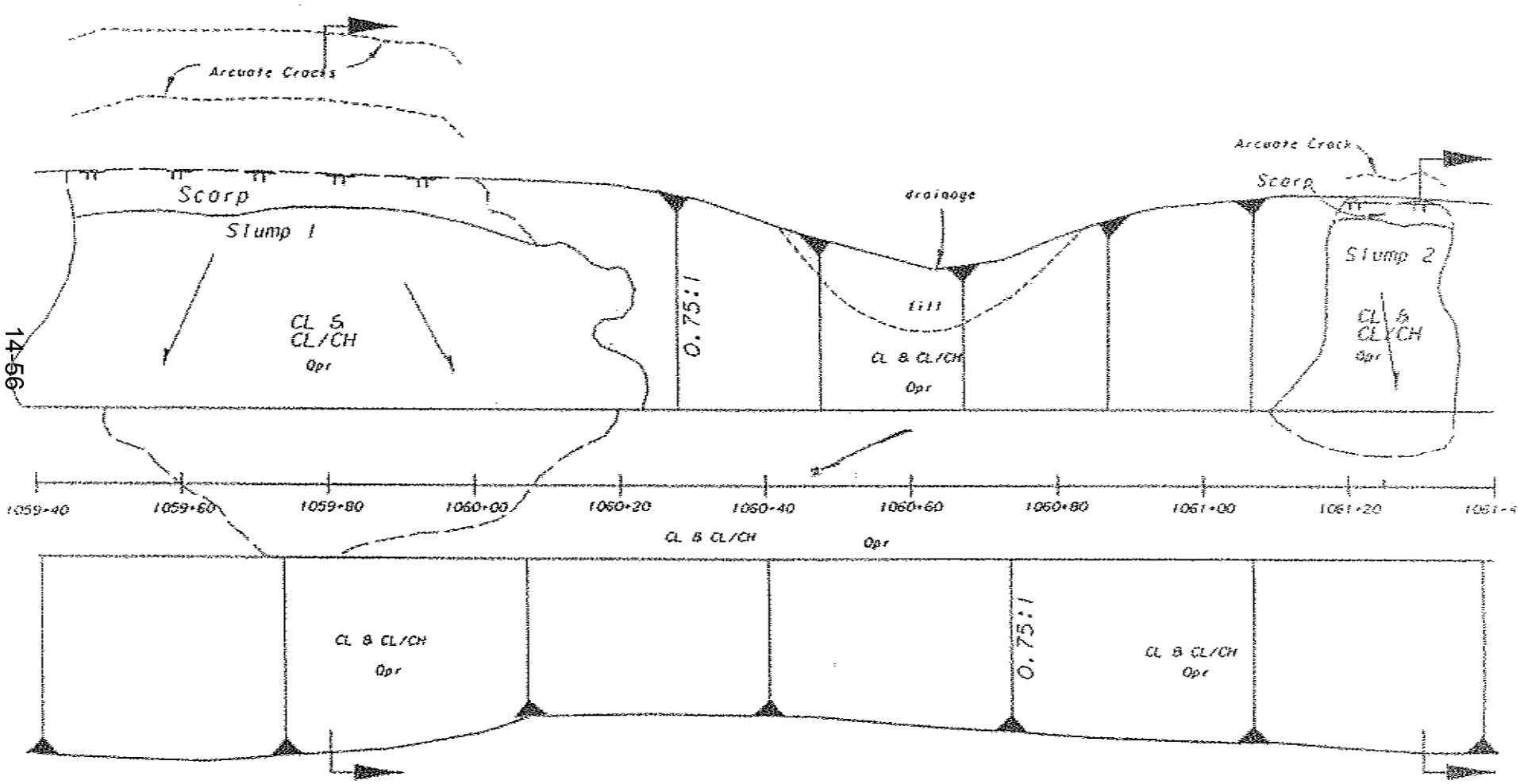
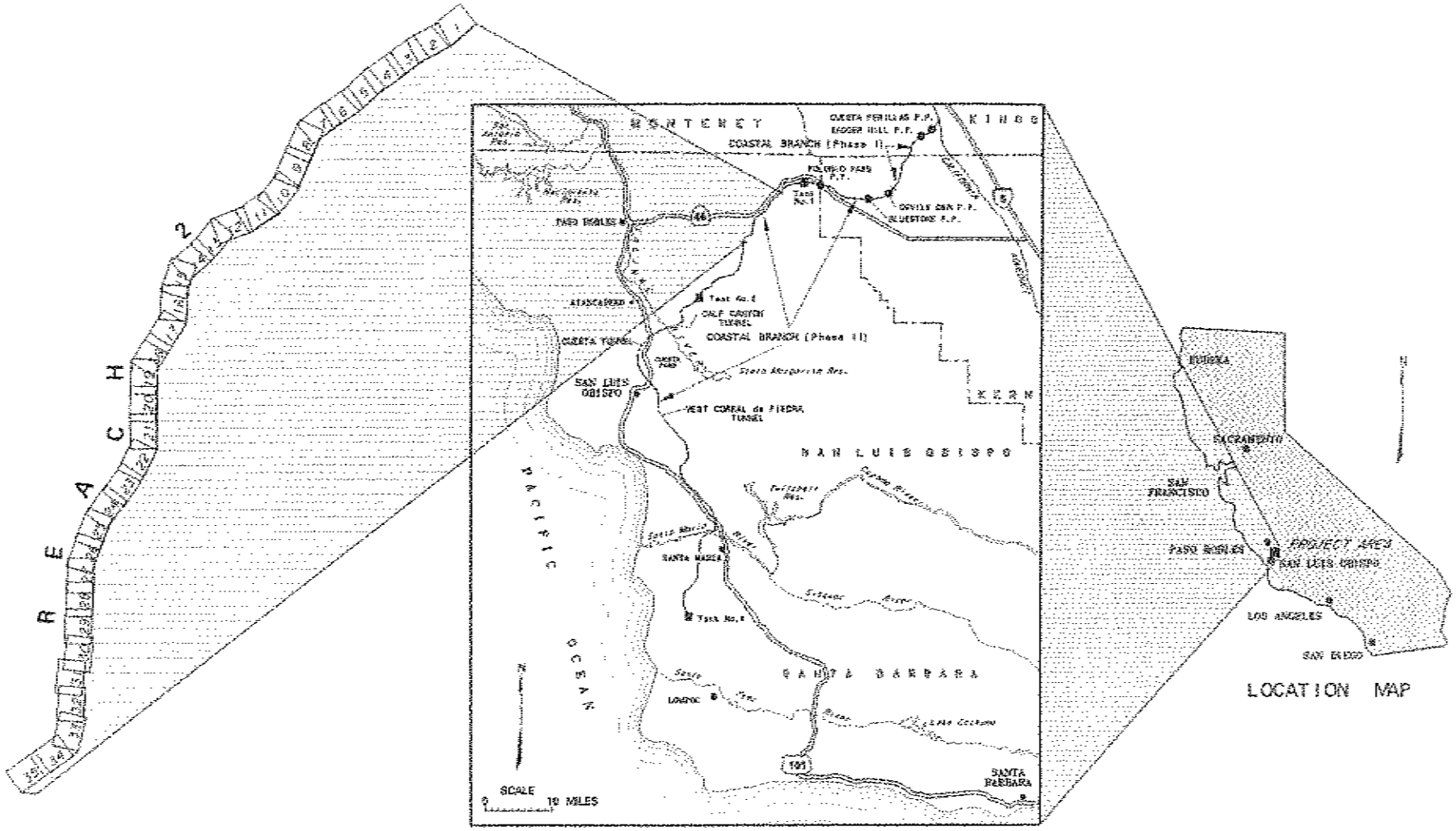



Figure 1. Reach 2 Slump Failures mapped by Project Geology as of 10/6/95.

# PLATES




Note: Numbers correspond to Plate 3 Sheet numbers.

| | | | | | |
|---|---|---|---|---|---|
| DRAWING SCALES | D-144 | | STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES | CALIFORNIA AQUEDUCT COASTAL BRANCH - PHASE II REACH 2 | 7/9/01 |
| | PG-CBB-01 | | STATE WATER FACILITIES | LOCATION AND INDEX MAP GEOLOGIC PLANS AND PROFILES | 1 of 1 PLATE 1 |

# SYMBOLS

## GEOLOGIC COLUMN

QUATERNARY

HOLOCENE

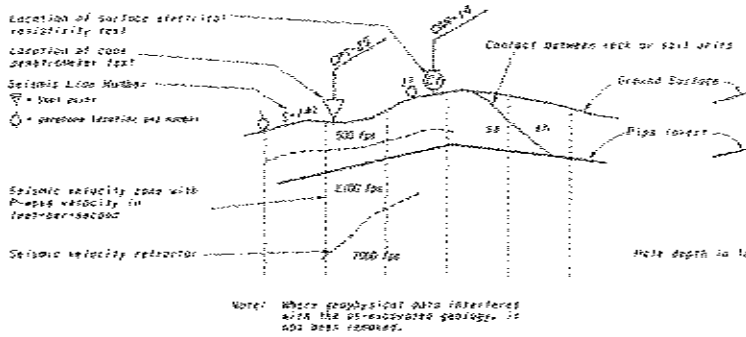
- Qal — Alluvium
- Qls — Landslide

PLIO-PLEISTOCENE

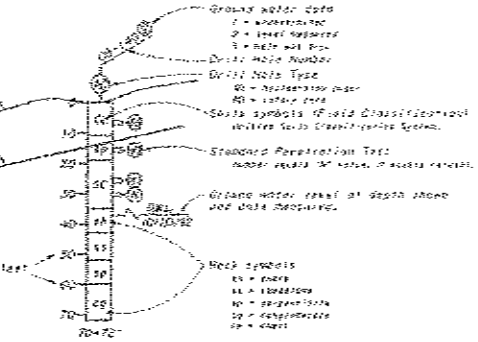
- Qoa — Older Alluvium
- Qpr — Paso Robles Formation

## PROFILE

### GEOPHYSICAL EXPLORATION DATA




### DRILL HOLE DATA




## PLAN

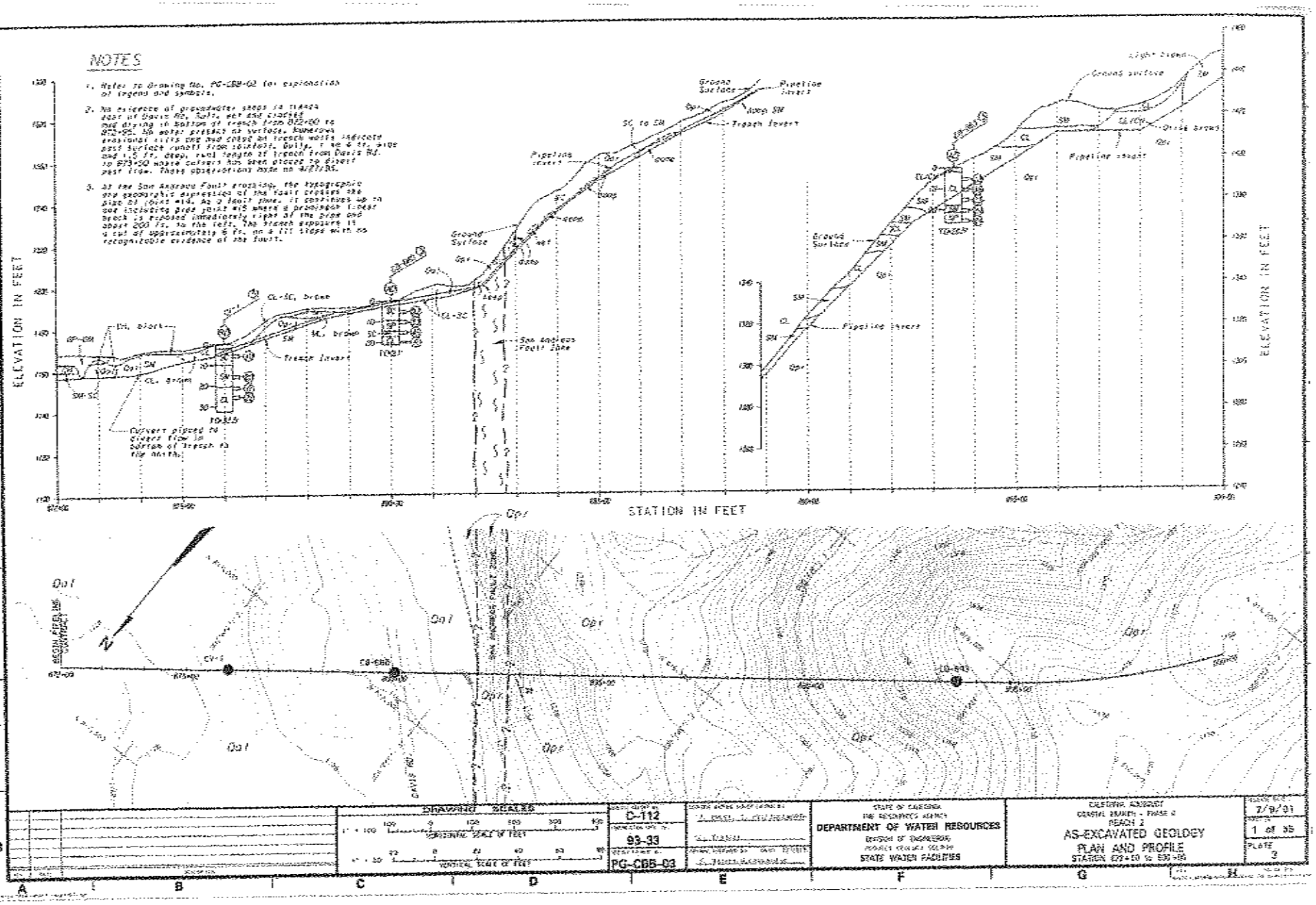
- CB-123 — Drill hole number and location
- LAR-12 — Surface electrical resistivity test number
- S-123 — Seismic Refraction Line location and number
  - Seal point
  - Geophone location and number
- CPT-45 — Cone Penetrometer Test Location
- Qal / Qpr — Inferred geologic contact
- Fault
- Intermittent or minor seep
- Permanent or major spring
- 50 — Strike and dip of bedding
- 40 — Strike and dip of shears
- Alignment, shaded where pipe trench was widened due to the presence of E' soils.
- 950-00 / RC-17 — Test pit location where preconstruction in-situ density was performed to determine the presence of low E' soils.

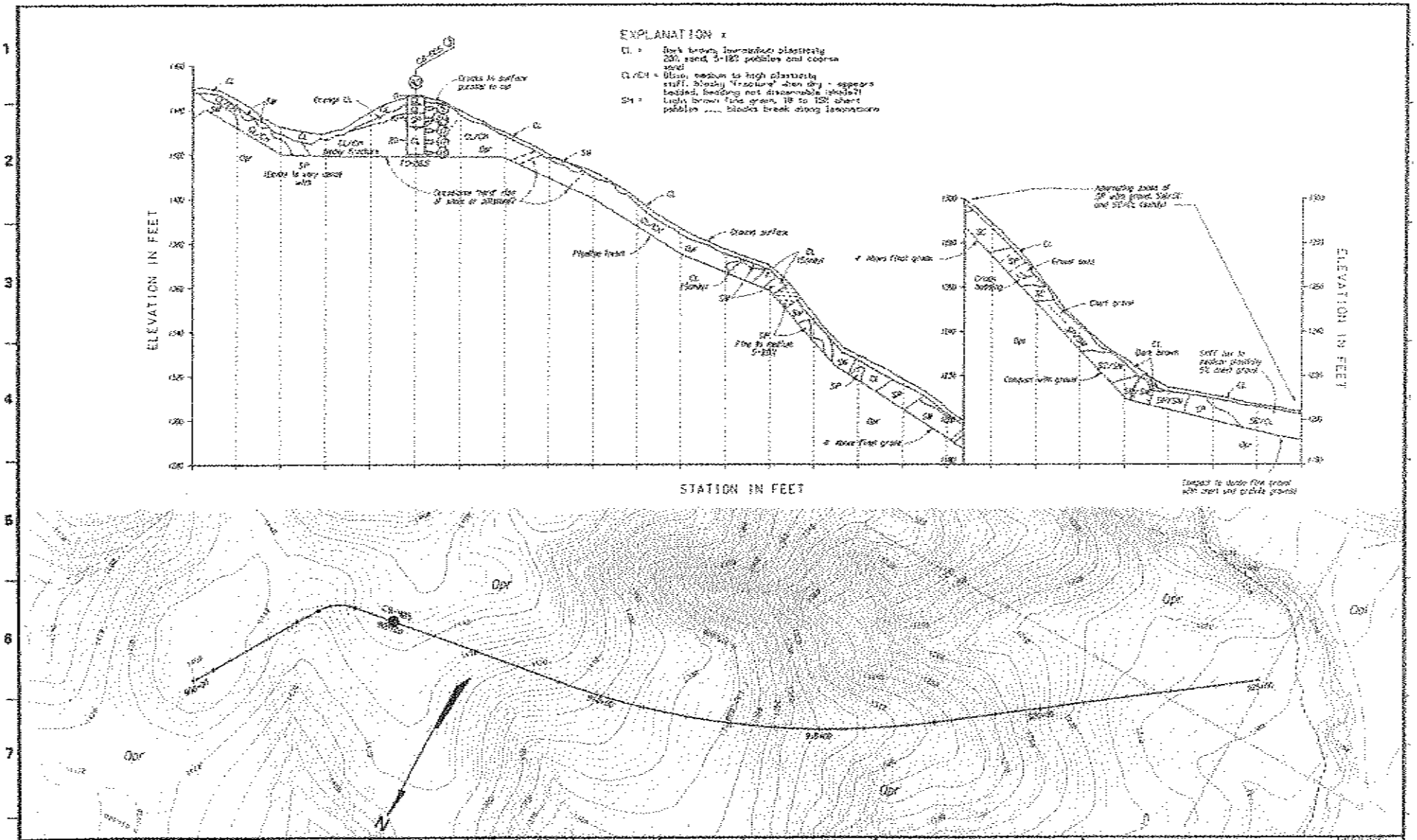
## GEOLOGIC SYMBOLS

- Trace of bedding
- Contact line between geologic units (dashed where approximate)
- Shear or Fault (dashed where approximate, dotted where concealed)

Note: Some of the geologic contacts shown on Plate 3 have been modified by Project Geology after they were transposed from Dibblee, T. W., 1971, Geologic Map Shandon and Orchard Peak Quadrangles, San Luis Obispo and Kern Counties, California, Scale 1:24,000, U. S. Geological Survey Map I-788.

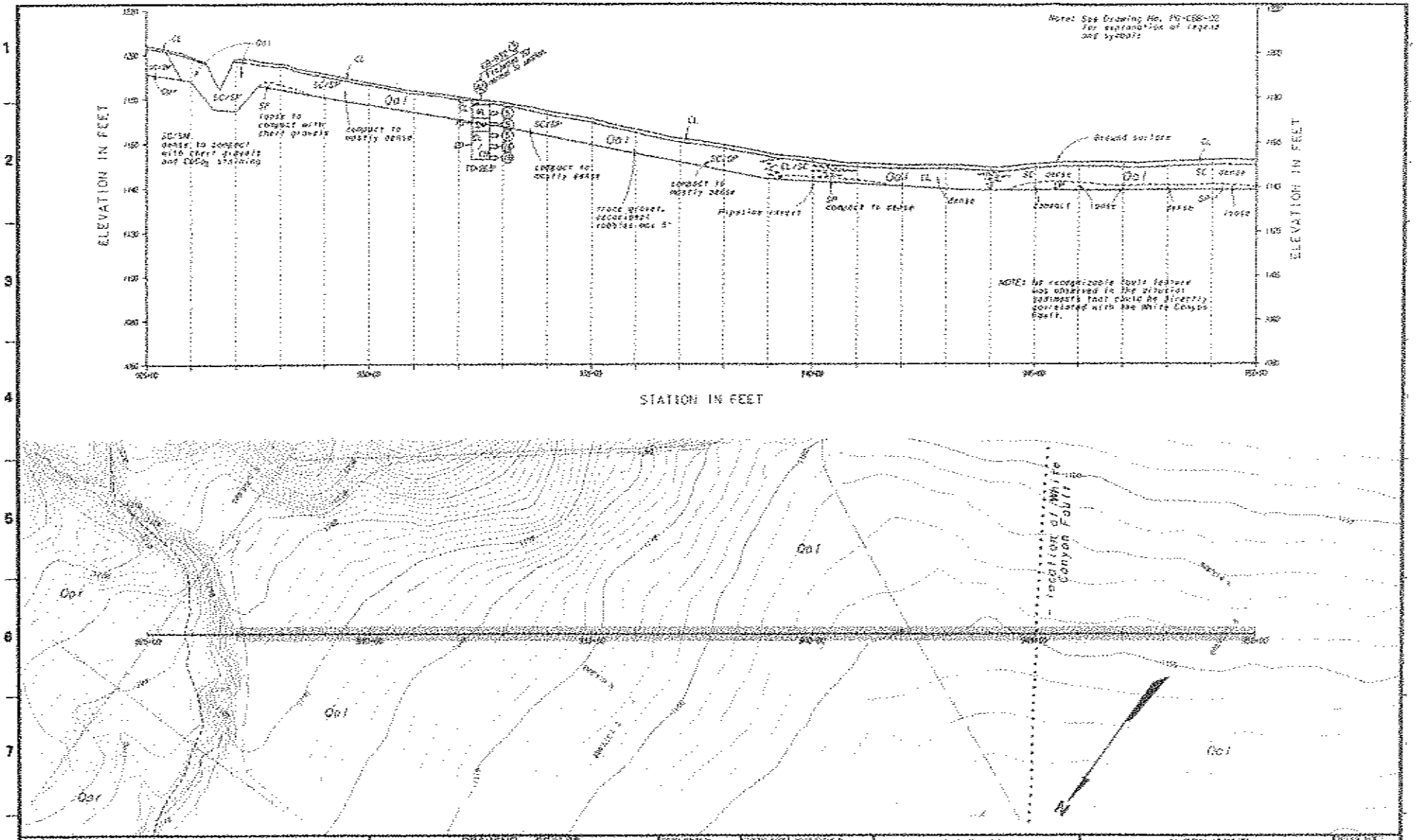
| DRAWING SCALES | | | | | |
|---|---|---|---|---|---|
| | C-112 | | STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF ENGINEERING PROJECT MANAGEMENT BRANCH STATE WATER FACILITIES | CALIFORNIA AQUEDUCT COASTAL BRANCH - PHASE II REACH 2 GEOLOGIC EXPLORATION EXPLANATION SHEET SYMBOLS AND LITHOLOGY | 7/8/81 |
| | 93-33 | | | | 1 OF 1 |
| | PG-C93-02 | | | | PLATE 2 |

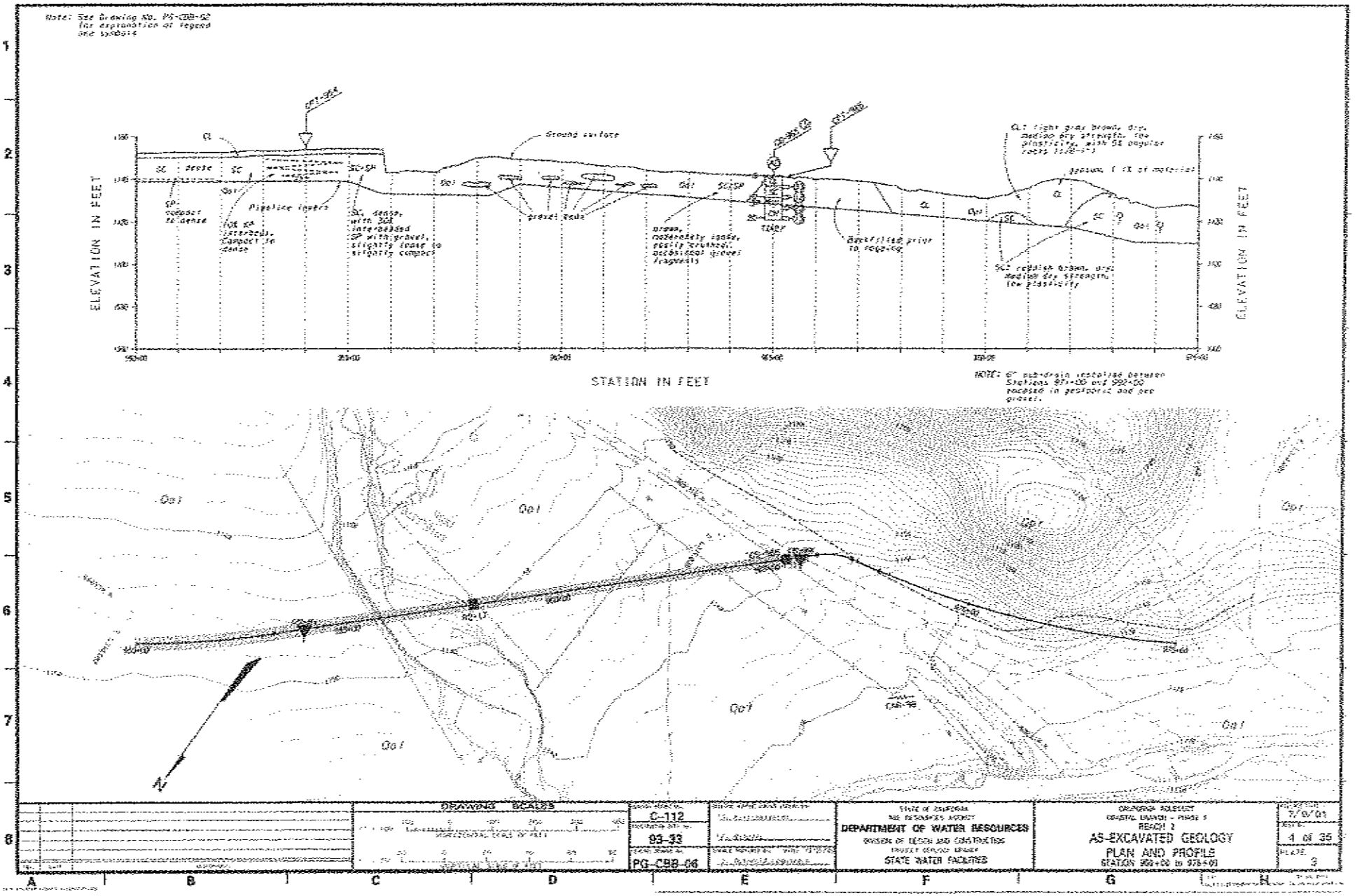

NOTES
1. Refer to Drawing No. PG-CBB-02 for explanation of legend and symbols.
2. No evidence of groundwater seeps in trench east of Davis Rd. Soils wet and caked mud drying in bottom of trench from 872+00 to 872+95. No water present on surface. Numerous erosional rills are mud caked on trench walls indicate past surface runoff from laterals. Only, 1 no 4 ft. pipe and 1.5 ft. deep, rail length of trench from Davis Rd. to 873+50 where culvert has been placed to divert past trip. These observations made on 4/27/35.
3. At the San Andreas Fault crossing, the topographic and geomorphic expression of the fault creates the pipe of joint mid. As a fault zone, it contains up to and including pipe joint #15 where a prominent linear break is exposed immediately right of the pipe and about 200 ft. to the left. The trench appears in a cut of approximately 6 ft. on a 1:1 slope with no recognizable evidence of the fault.
ELEVATION IN FEET
STATION IN FEET
Ground Surface
Pipeline Invert
Trench Invert
Pipeline invert
Light Brown
Culvert placed to divert flow in bottom of trench to the north.
San Andreas Fault Zone
Qal
Qpr
N
DRAWING SCALES
HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET
C-112
93-33
PG-CBB-03
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF ENGINEERING
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE II
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 872+00 to 930+00
7/9/91
1 of 35
PLATE 3

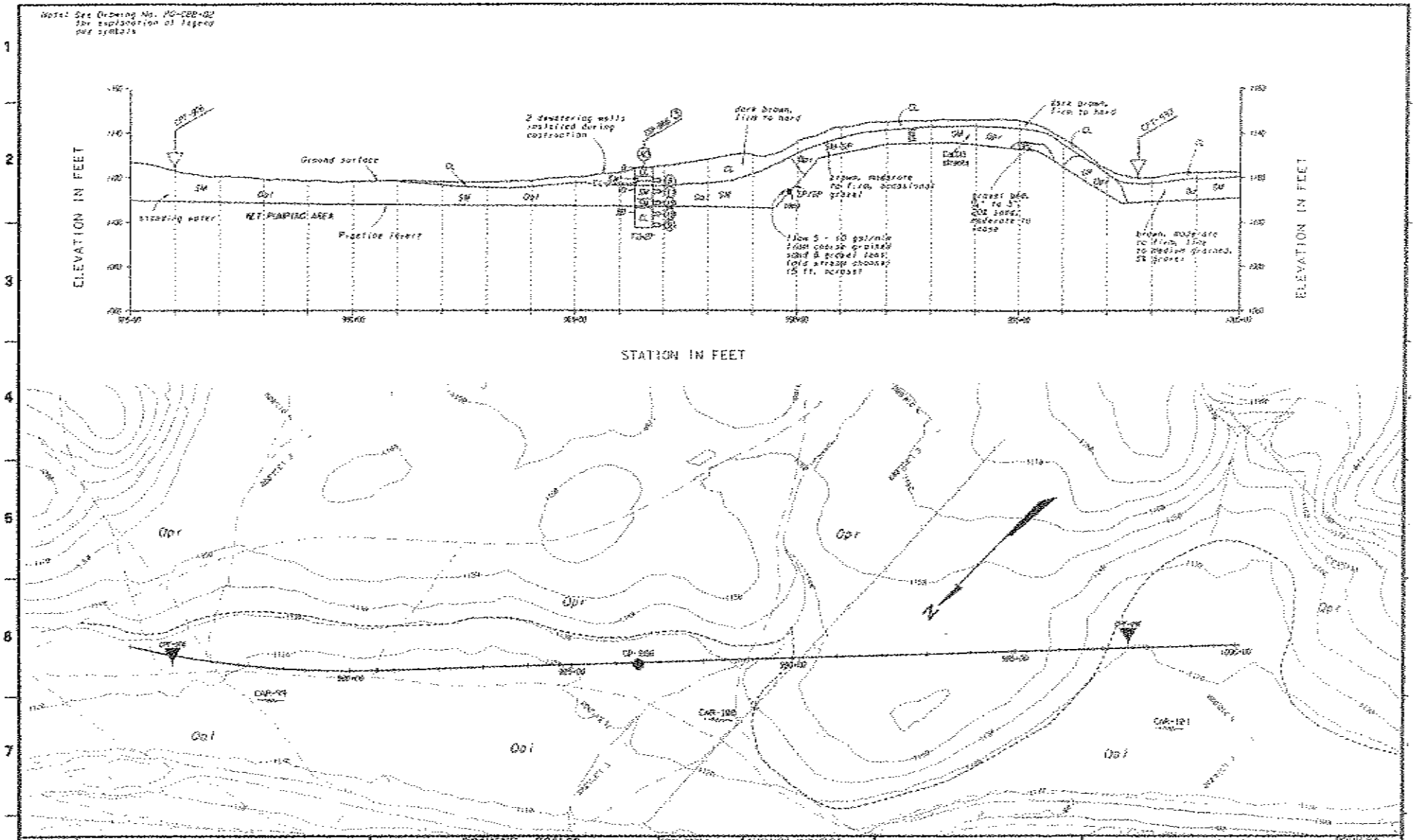


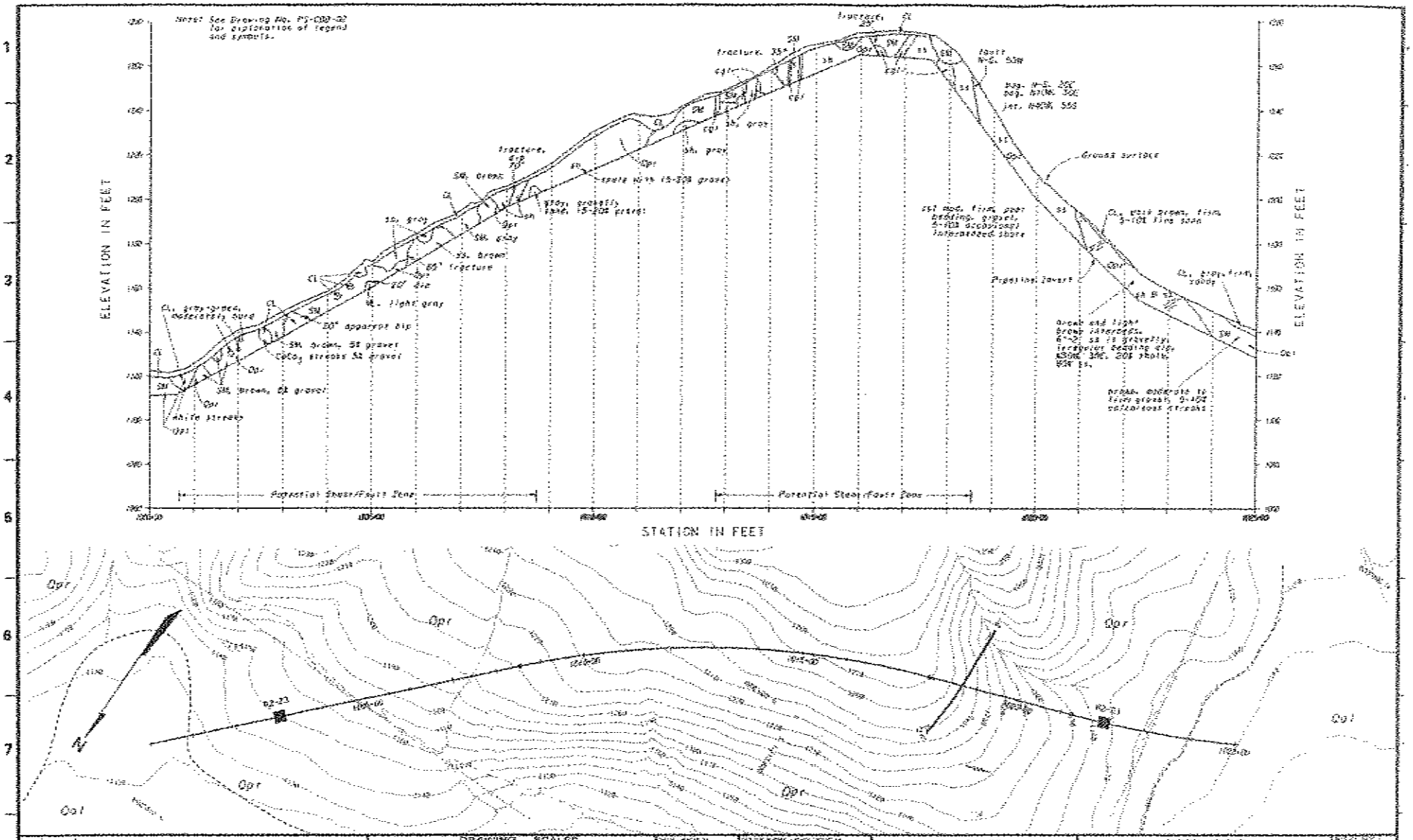

| DRAWING SCALES | | | | |
|---|---|---|---|---|
| | C-112 | | DEPARTMENT OF WATER RESOURCES | AS-EXCAVATED GEOLOGY PLAN AND PROFILE STATION 002+00 to 005+00 | 7/9/01 |
| | 93-33 | | STATE WATER FACILITIES | | 2 of 36 |
| | PG-CHB-04 | | | | 3 |

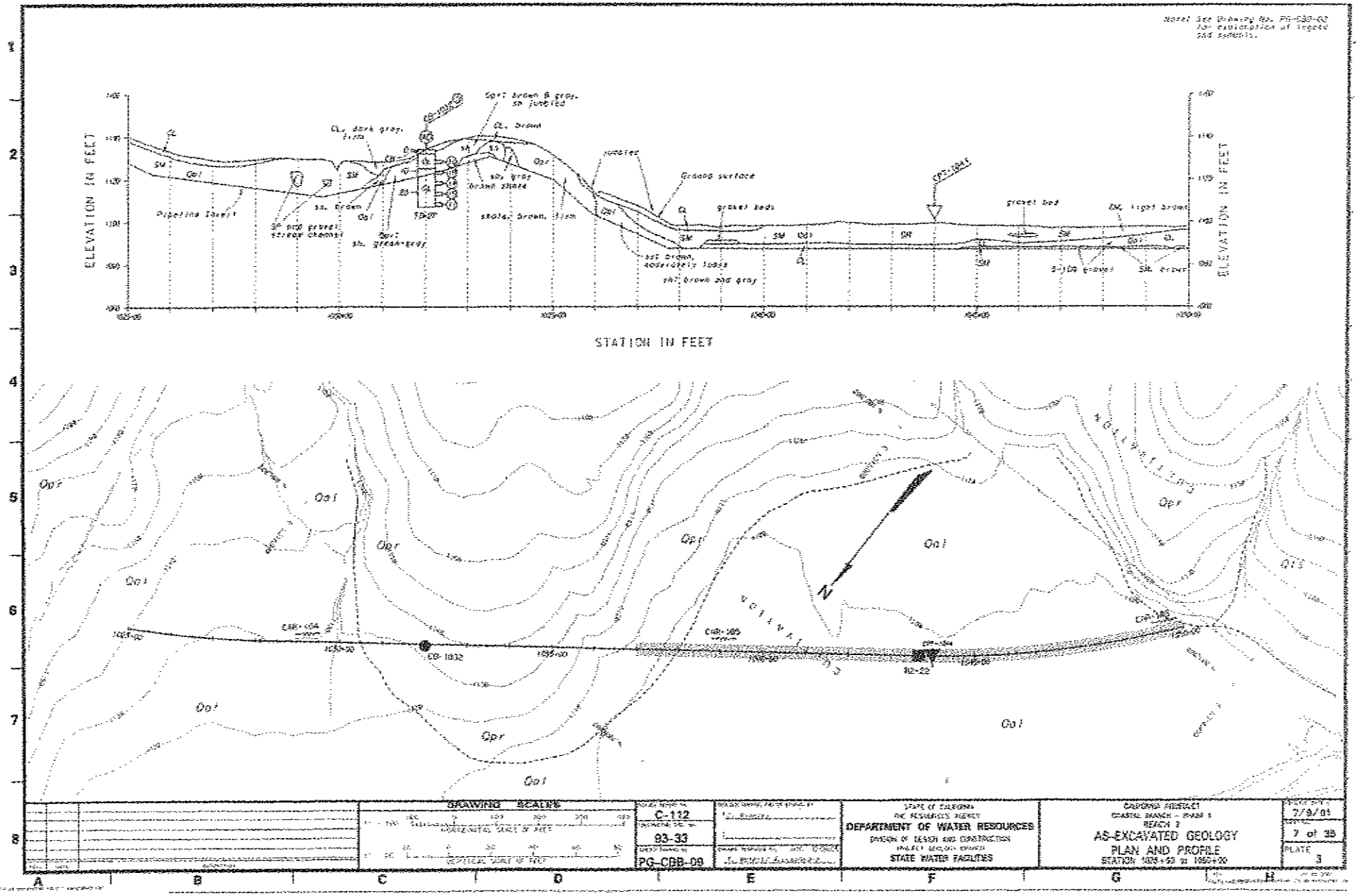
14-61

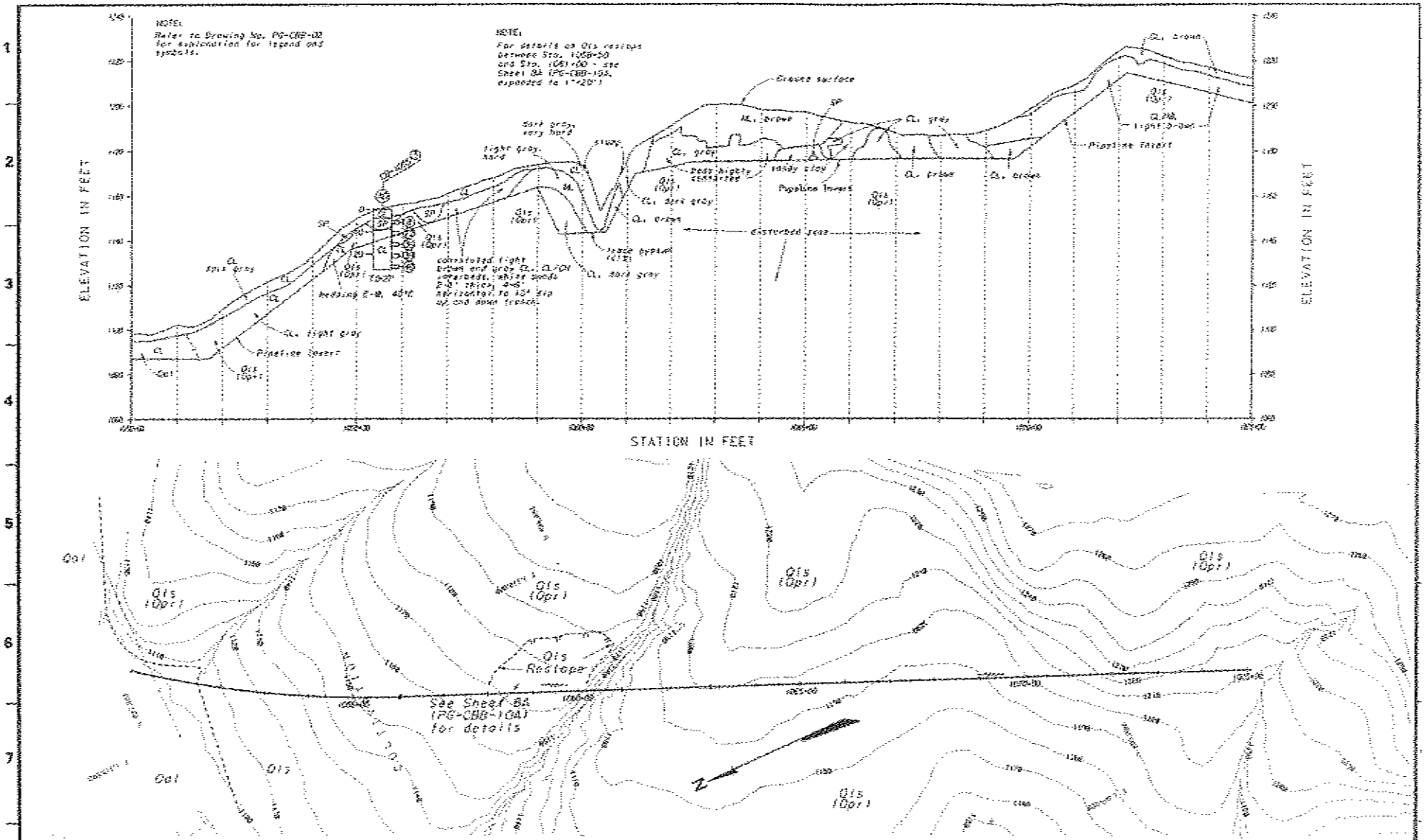

ELEVATION IN FEET
STATION IN FEET
Qal
SC/SM dense to compact with chert gravels and CaCO3 staining
SP loose to compact with chert gravels
compact to mostly dense
TD=65.0'
compact to mostly dense
compact to mostly dense
trace gravel, occasional rootlets max 3"
Piping sand
SP compact to dense
dense
compact
loose
dense
SP loose
ground surface
NOTE: No recognizable basin feature was observed in the alluvial sediments that could be directly correlated with the White Canyon fault.
Location of White Canyon Fault
DRAWING SCALES
HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET
C-112
93-33
PG-CBB-05
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF DESIGN AND CONSTRUCTION
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
SOUTHERN BRANCH - PHASE 2
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 926+00 to 960+00
7/9/01
3 of 39
PLATE
3


Note: See Drawing No. PG-CBB-52 for explanation of legend and symbols
Ground surface
Pipeline layers
gravel seals
Backfilled prior to regrading
ELEVATION IN FEET
STATION IN FEET
Qal
DRAWING SCALES
C-112
93-33
PG-CBB-06
STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/8/01
4 of 35

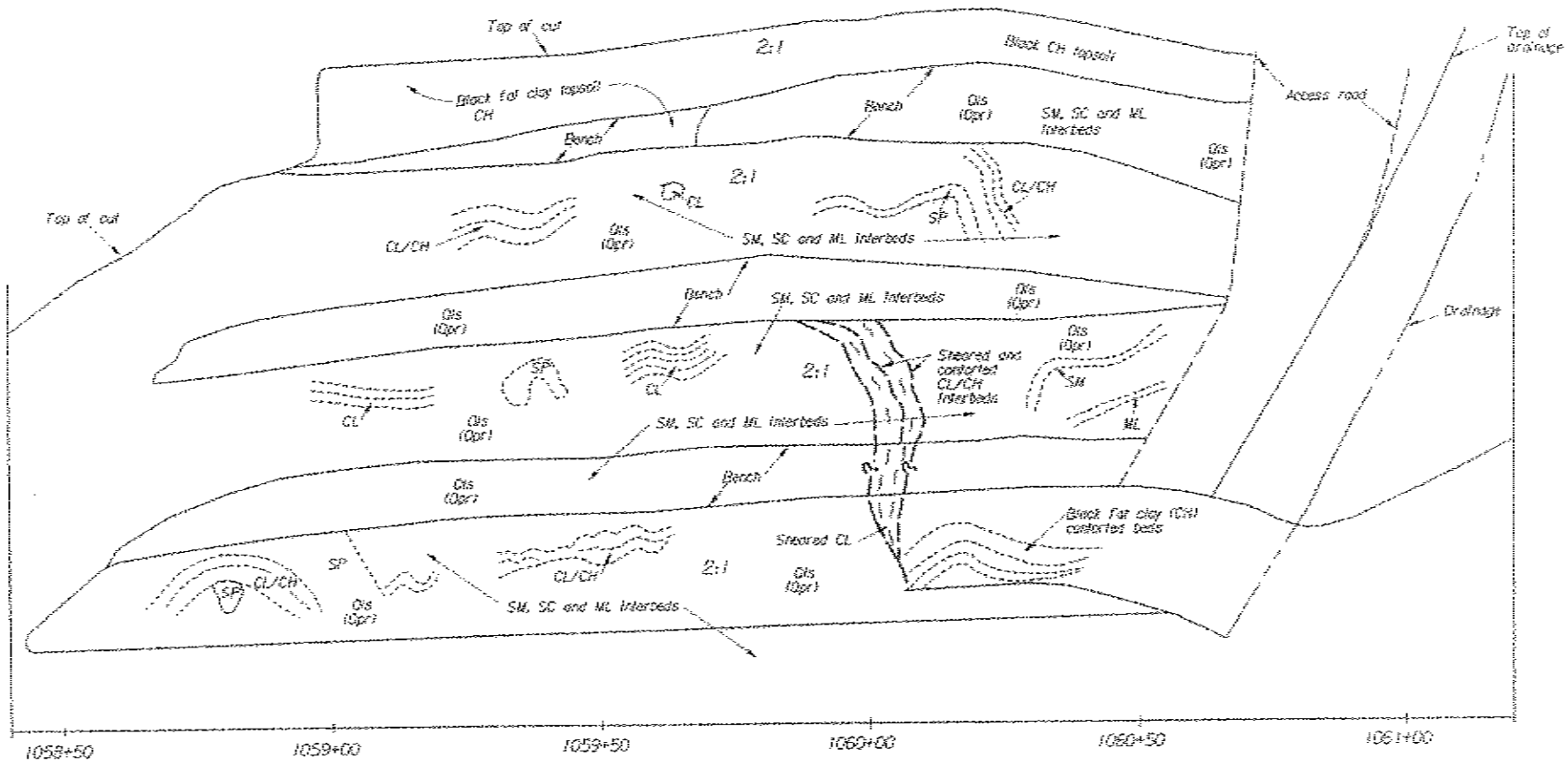

Note: See Drawing No. PG-CBB-02 for explanation of legend and symbols
ELEVATION IN FEET
STATION IN FEET
Ground surface
2 dewatering wells installed during construction
dark brown, firm to hard
Dark brown, firm to hard
Standing water
NET PUMPING AREA
Piezometer
Flow 5 - 10 gal/min from coarse grained sand & gravel layer found across excavation (5 ft. across)
brown, moderate to firm, occasional gravel
Gravel 3/8, 1 to 3, 20% sand, moderate to loose
brown, moderate to firm, fine to medium grained, SP gravel
Qpr
Qoi
CAP-99
CAP-100
CAP-101
CAP-102
CAP-103
CAP-104
CAP-105
CAP-106
CAP-107
CAP-108
CAP-109
CAP-110
CAP-111
CAP-112
CAP-113
CAP-114
CAP-115
CAP-116
CAP-117
CAP-118
CAP-119
CAP-120
CAP-121
DRAWING SCALES
HORIZONTAL SCALE IN FEET
VERTICAL SCALE IN FEET
C-112
93-33
PG-CBB-07
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE 2
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 978+00 to 1001+00
7/9/01
8 of 35
3


ELEVATION IN FEET
STATION IN FEET
Ground surface
Projection Invert
Potential Shear/Fault Zone
Potential Shear/Fault Zone
Opr
Qal
N
DRAWING SCALES
C-112
PG-CBB-08
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF DESIGN AND CONSTRUCTION
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE 2
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1000+00 to 1035+00
7/9/01
8 of 35
PLATE
3


ELEVATION IN FEET
STATION IN FEET
Ground surface
gravel beds
gravel bed
Pipeline Tunnel
Qal
Qpr
N
DRAWING SCALES
C-112
93-33
PG-CBB-09
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/9/01
7 of 35
PLATE
3




| DRAWING SCALES | | | | | |
|---|---|---|---|---|---|
| | C-112 | | DEPARTMENT OF WATER RESOURCES | AS-EXCAVATED GEOLOGY | 7/9/01 |
| | 93-33 | | | PLAN AND PROFILE | 8 of 35 |
| | PG-CBB-10 | | STATE WATER FACILITIES | STATION 1058+00 to 1075+00 | 3 |




DRAWING SCALE

C-112

93-33

PG-CRB-10B

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES

CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE II
REACH 2
LANDSLIDE RESLOPE
PLAN (1/16/98)
STATION 1058+50 to 1061+00

7/8/01

3A of 3B

PLATE 2

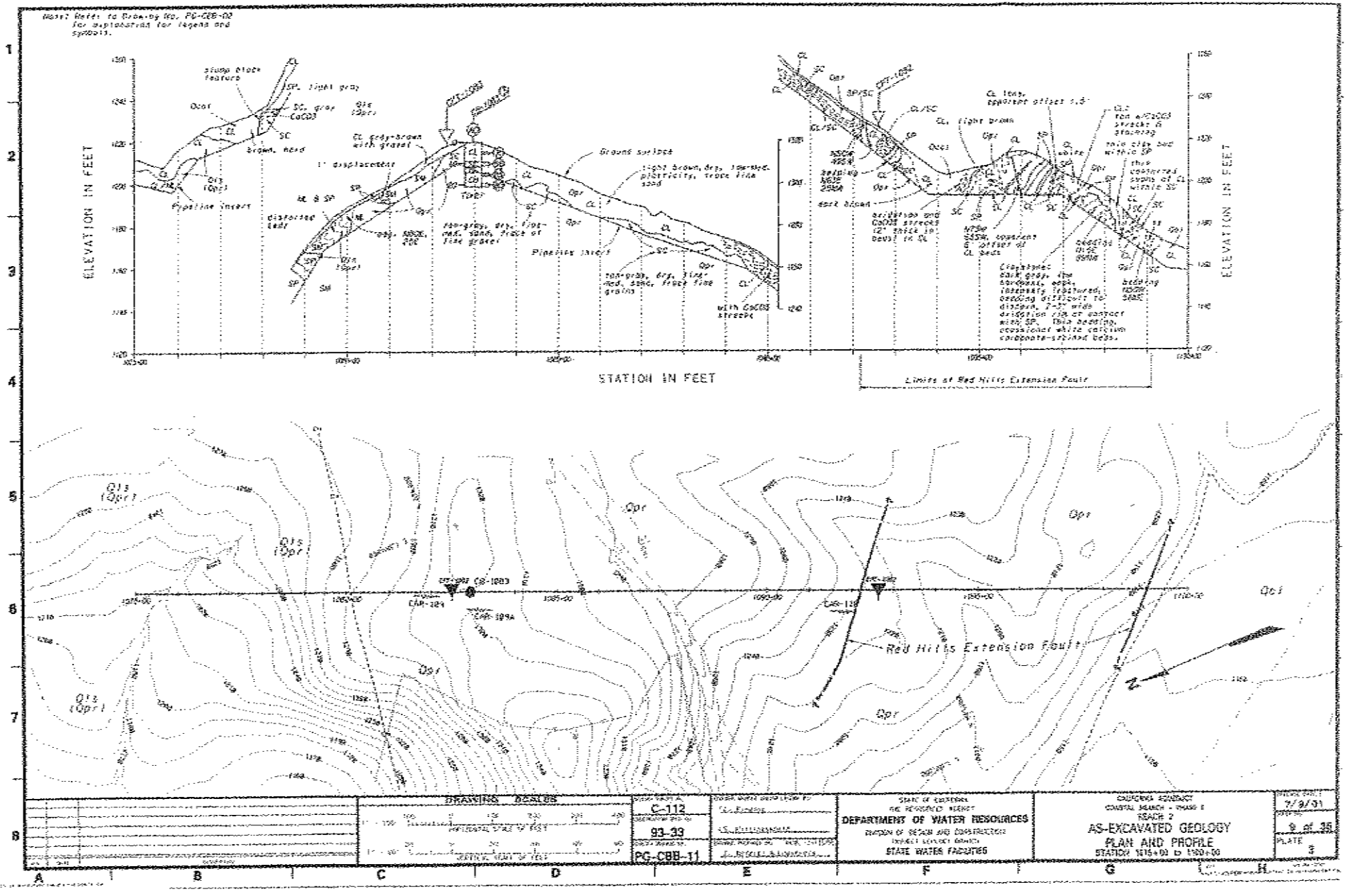

ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipeline insert
Limits of Red Hills Extension Fault
Red Hills Extension Fault
Qcl
Qpl
DRAWING SCALES
C-112
93-33
PG-CBB-11
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/9/91
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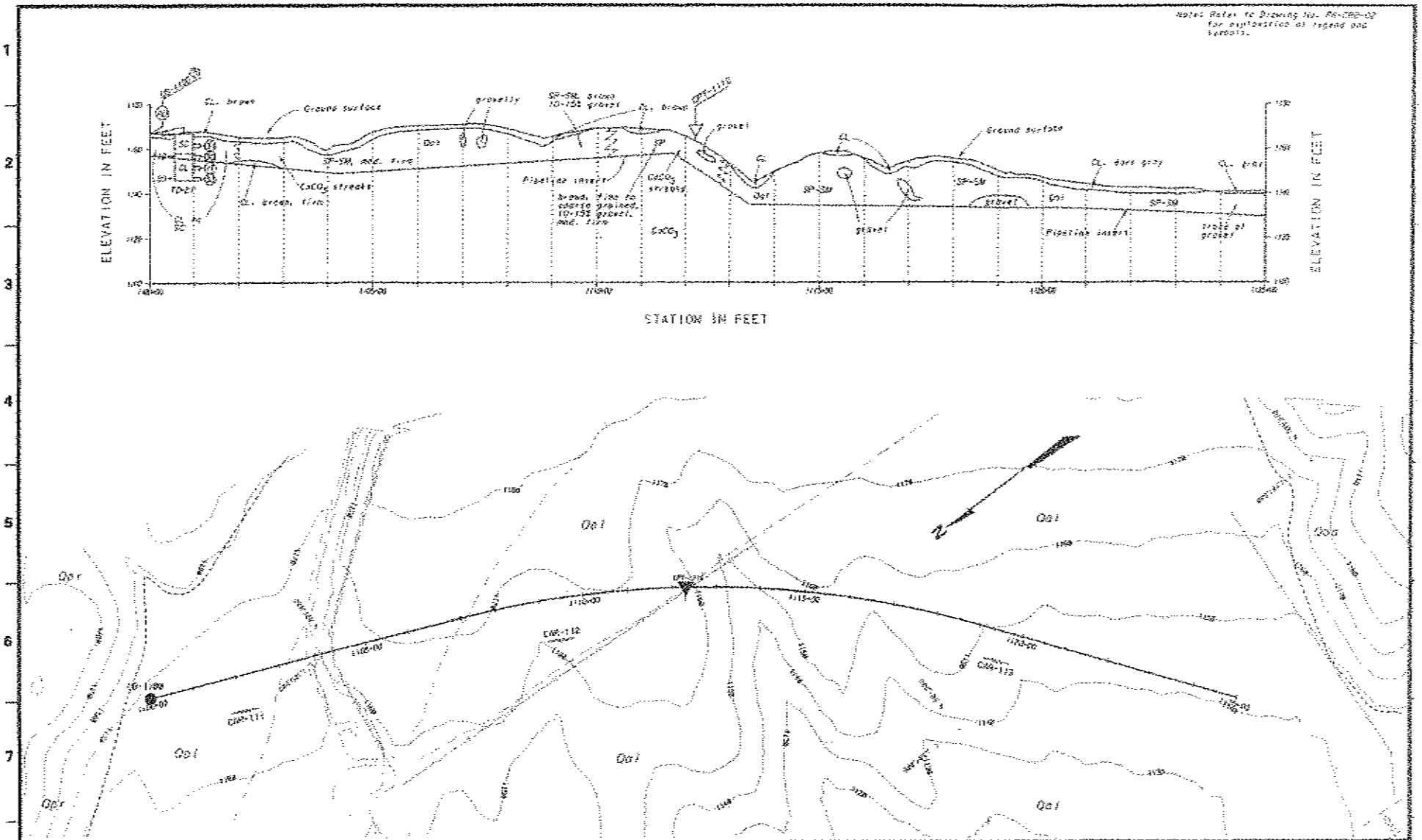
PLATE 3


Ground surface
ELEVATION IN FEET
STATION IN FEET
Qal
Qpr
DRAWING SCALES
C-112
93-33
PG-C8B-12
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/9/01
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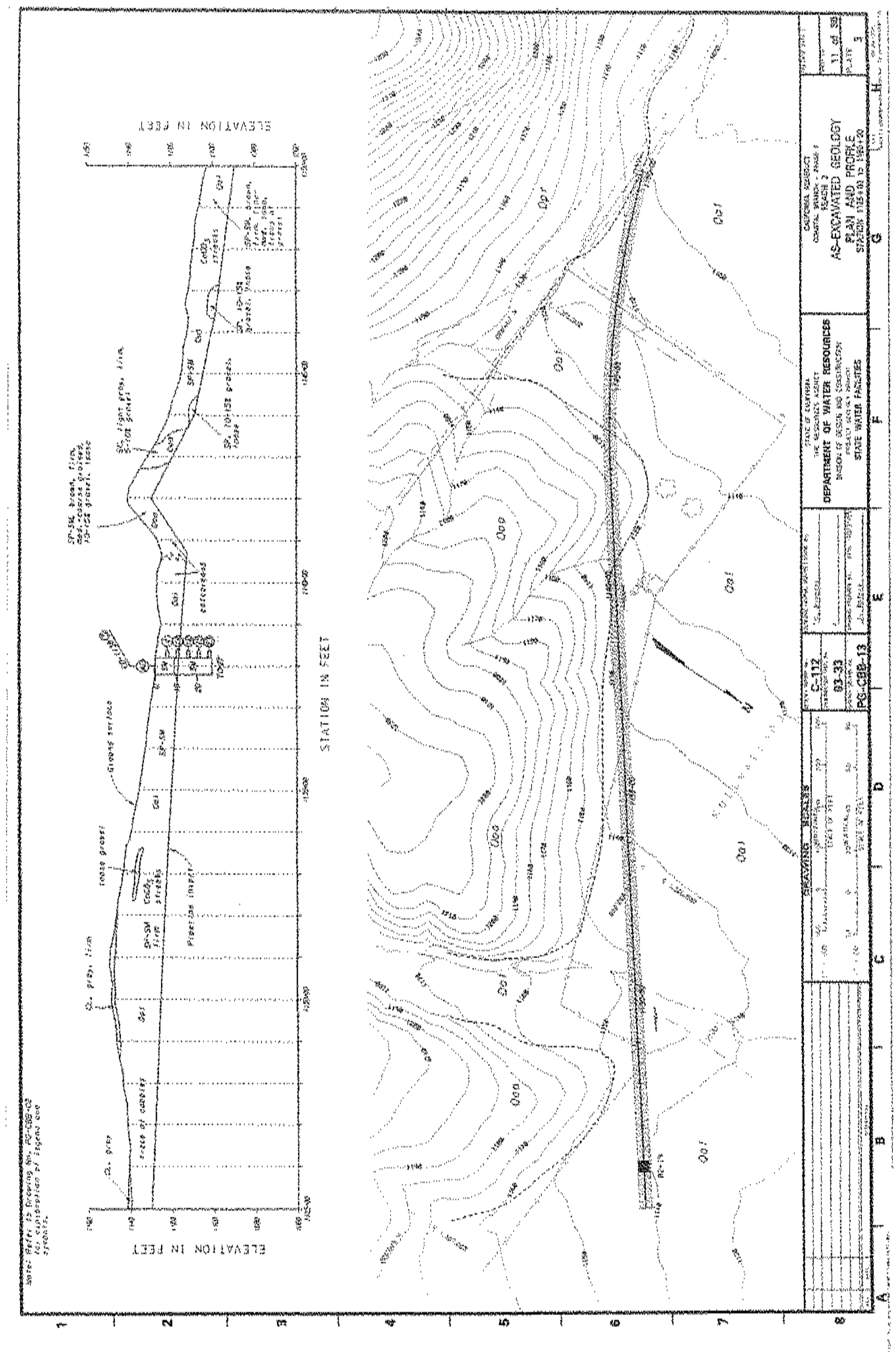
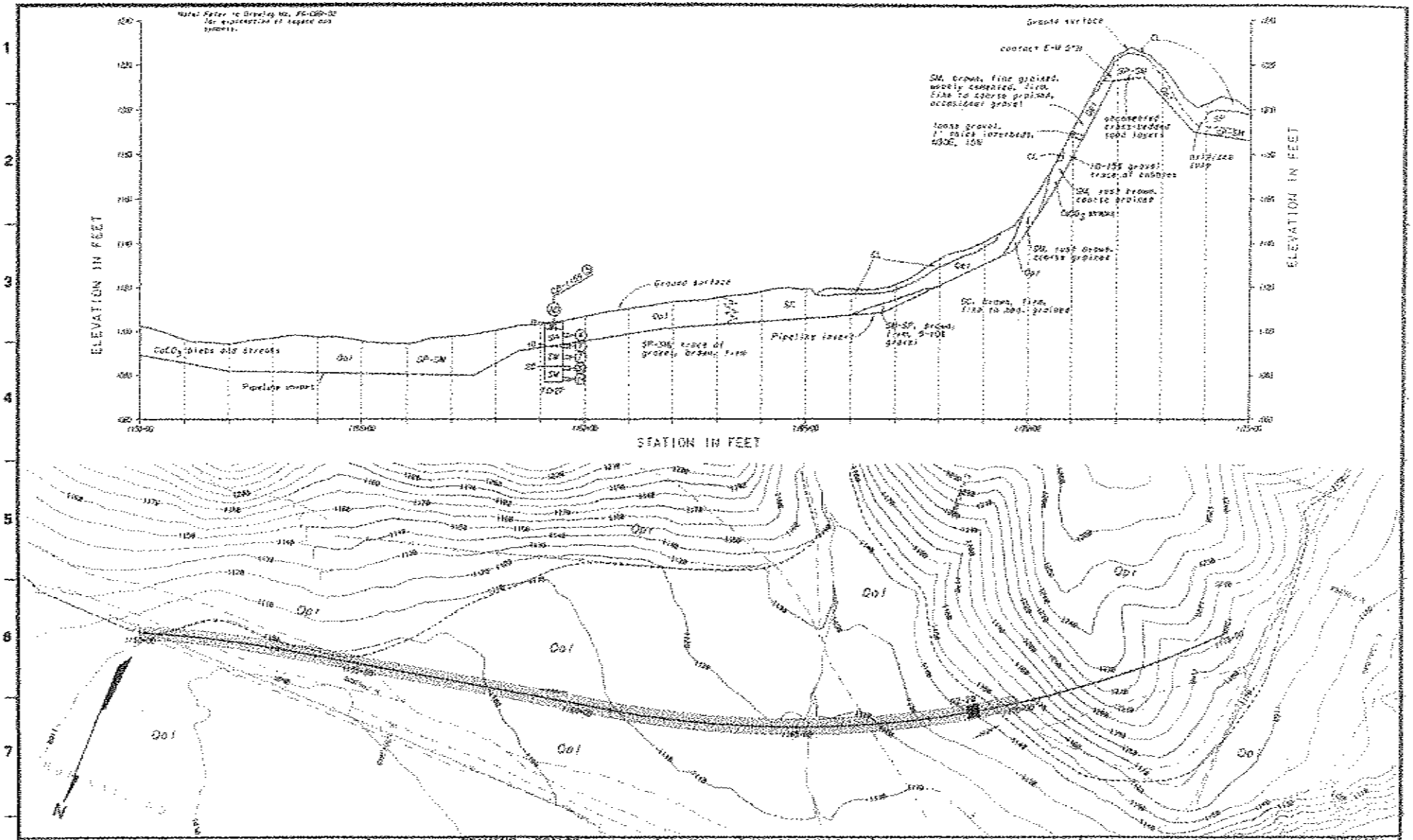
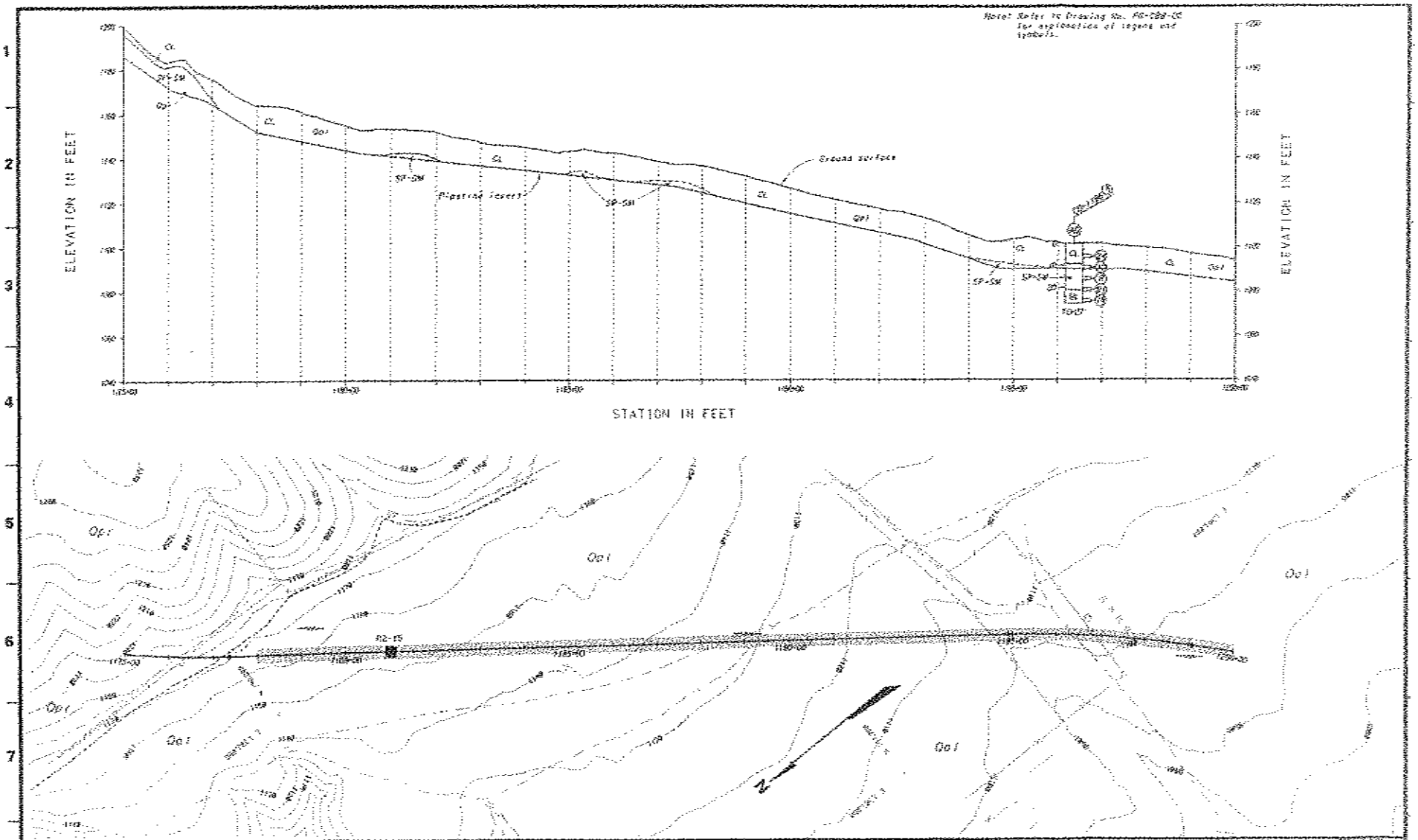
3


ELEVATION IN FEET
STATION IN FEET
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE

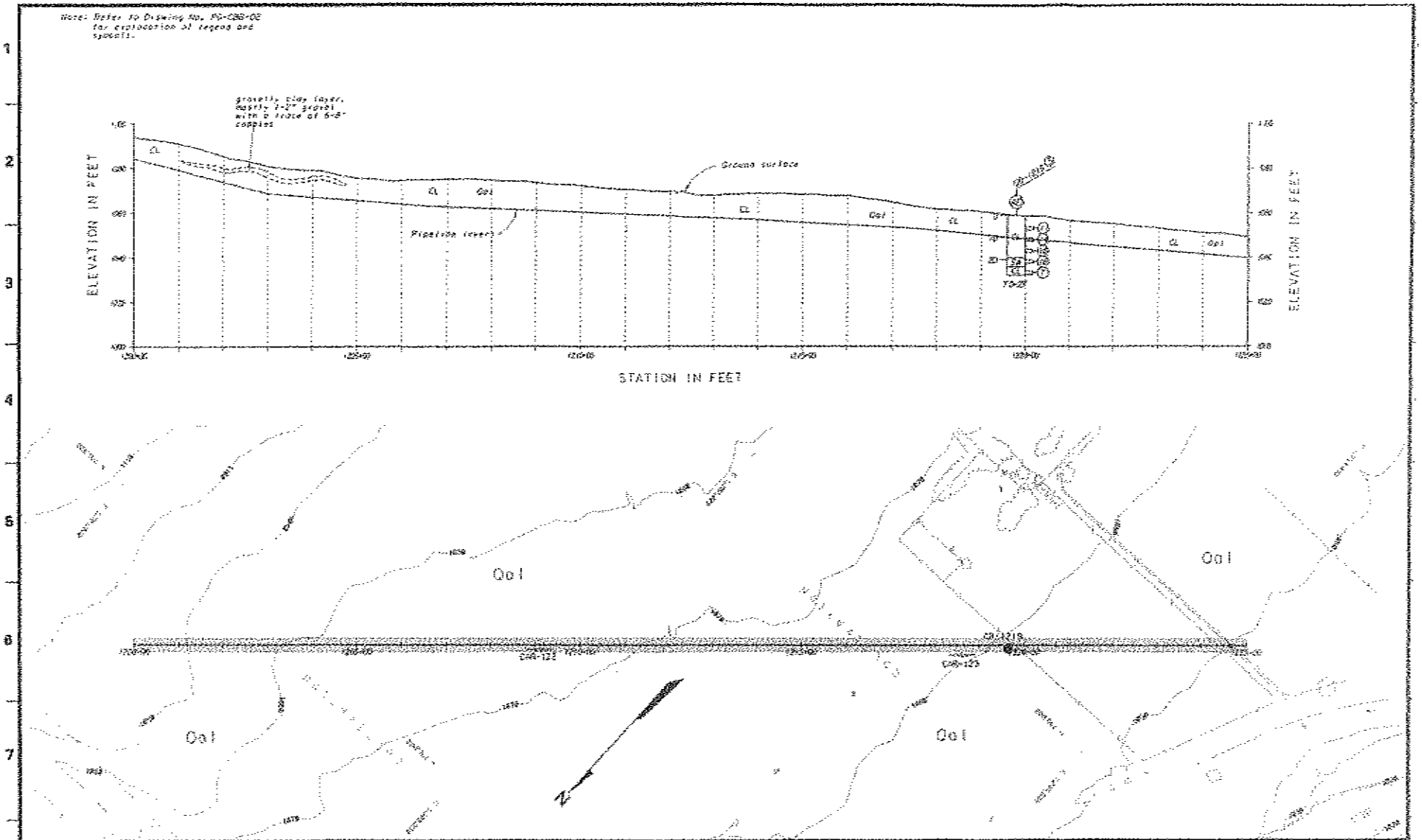



| | | | | | |
|---|---|---|---|---|---|
| DRAWING SCALES<br>HORIZONTAL SCALE IN FEET<br>VERTICAL SCALE IN FEET | C-112<br>93-33<br>PG-CBB-14 | | DEPARTMENT OF WATER RESOURCES<br>STATE WATER FACILITIES | CALIFORNIA AQUEDUCT<br>COASTAL BRANCH - PHASE 2<br>REACH 2<br>AS-EXCAVATED GEOLOGY<br>PLAN AND PROFILE<br>STATION 1181+50 to 1176+50 | 7/8/01<br>12 of 38<br>3 |




| DRAWING SCALES | | | | |
|---|---|---|---|---|
| | C-112 | | STATE OF CALIFORNIA<br>THE RESOURCES AGENCY<br>DEPARTMENT OF WATER RESOURCES<br>DIVISION OF DESIGN AND CONSTRUCTION<br>STATE WATER FACILITIES | CALIFORNIA AQUEDUCT<br>COASTAL BRANCH - PHASE II<br>REACH 2<br>AS-EXCAVATED GEOLOGY<br>PLAN AND PROFILE<br>STATION 1176+00 TO 1208+00 |
| | 83-33 | | | 7/8/01<br>19 of 38<br>PLATE 5 |
| | PG-CBB-16 | | | |

A B C D E F G H




| DRAWING SCALES | | | | |
|---|---|---|---|---|
| HORIZONTAL SCALE IN FEET | C-112 | | STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF DESIGN AND CONSTRUCTION STATE WATER FACILITIES | CALIFORNIA AQUEDUCT COASTAL BRANCH - PHASE II REACH E AS-EXCAVATED GEOLOGY PLAN AND PROFILE STATION 1000+00 to 1025+00 |
| VERTICAL SCALE IN FEET | 93-33 | | | |
| | PG-CBB-10 | | | |

7/9/01

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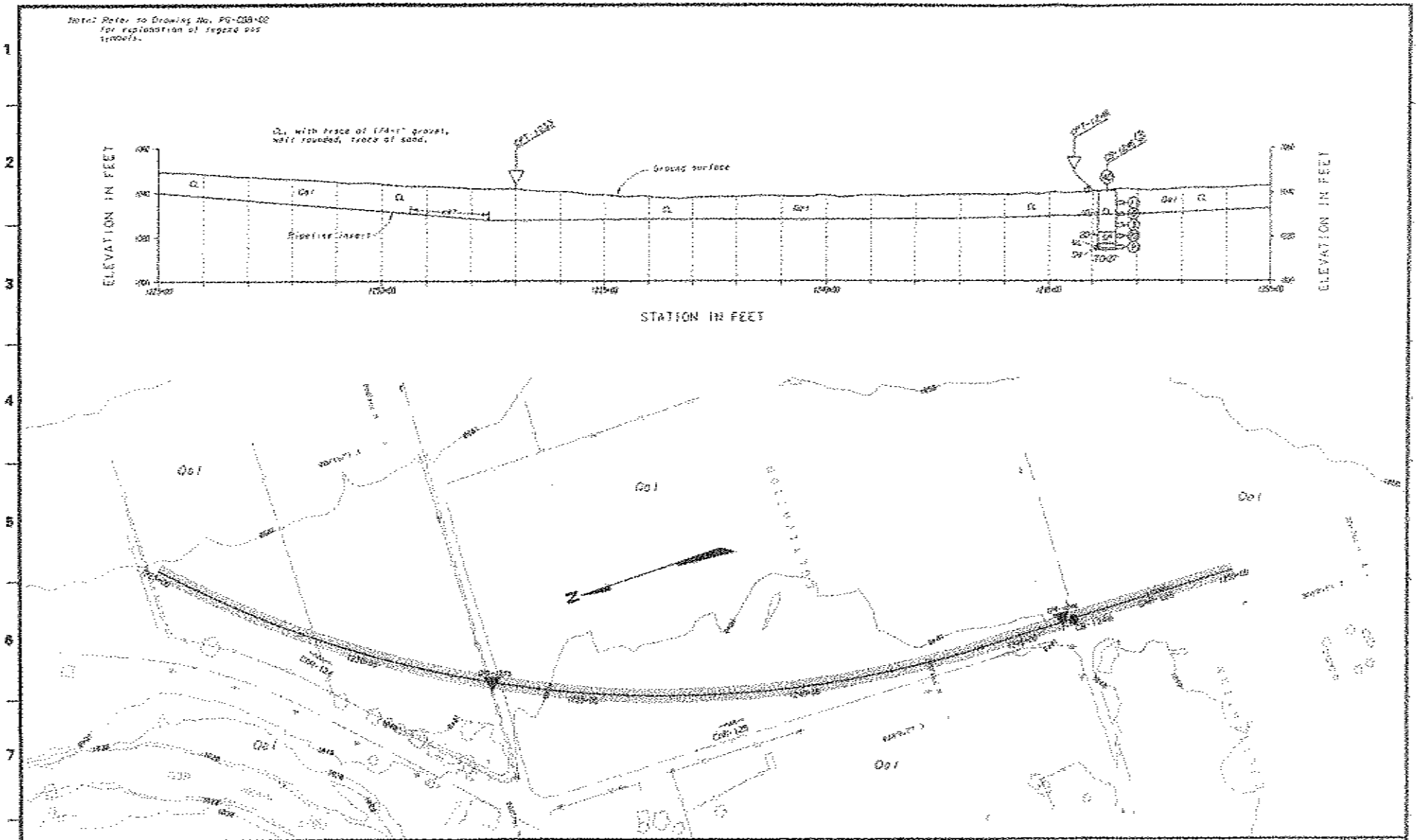
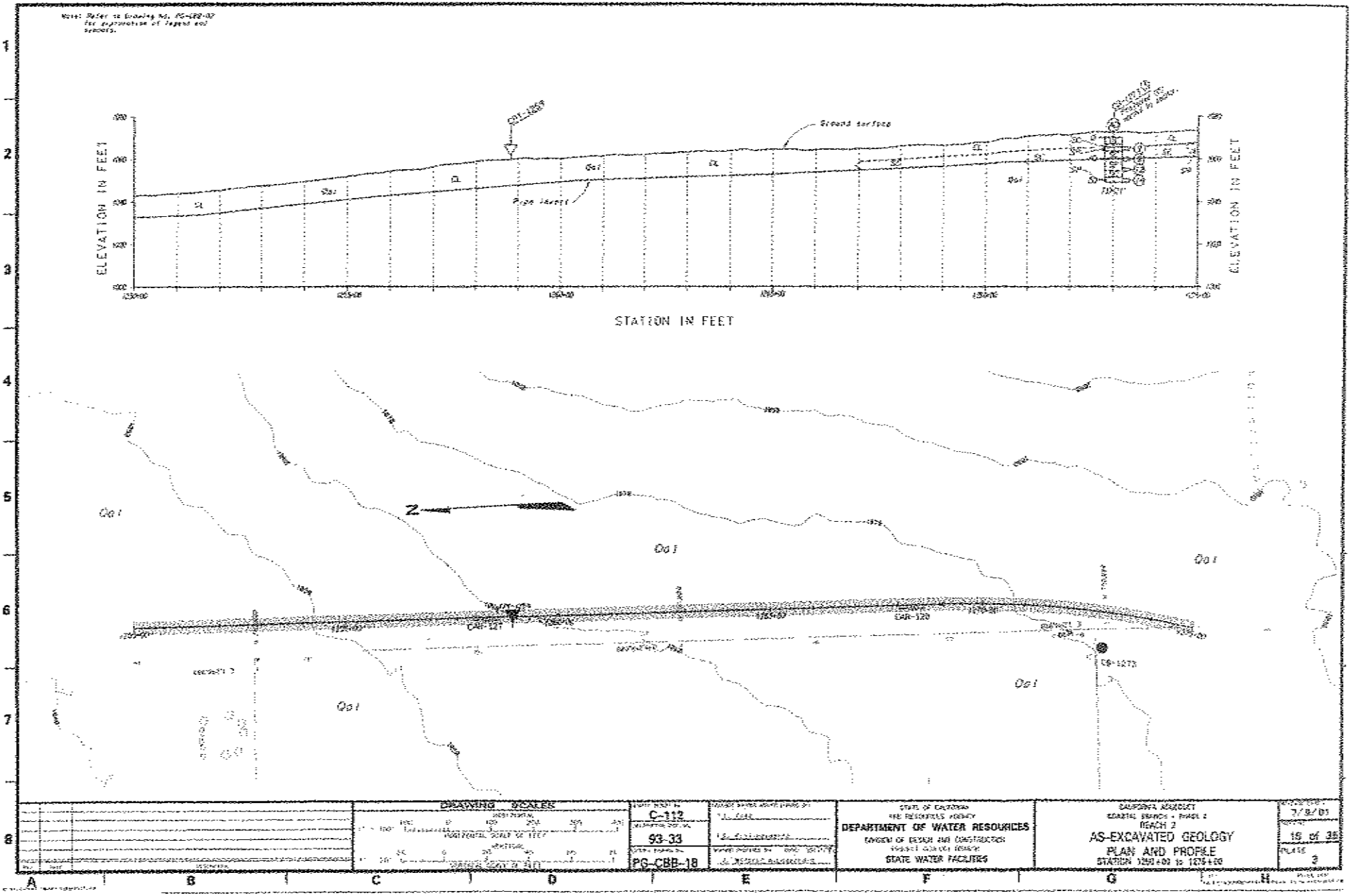
PLATE 3

14-74




| | | | | | | |
|---|---|---|---|---|---|---|
| | DRAWING SCALES | C-112 | | STATE OF CALIFORNIA<br>THE RESOURCES AGENCY<br>DEPARTMENT OF WATER RESOURCES<br>DIVISION OF DESIGN AND CONSTRUCTION<br>HOLLAND TUNNEL PROJECT<br>STATE WATER FACILITIES | CALIFORNIA AQUEDUCT<br>COASTAL BRANCH - PHASE II<br>REACH 2<br>AS-EXCAVATED GEOLOGY<br>PLAN AND PROFILE<br>STATION 1228+00 to 1280+00 | 7/9/91 |
| | | 93-33 | | | | 15 of 35 |
| | | PG-CBB-17 | | | | |


ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipe invert
Qal
Qal
Qal
Qal
Qal
Qal
Qal
Qal
Qal
Qal
Qal
Qal
CAR-120
CAR-121
CB-1273
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
C-112
93-33
PG-CBB-18
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/8/01
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3

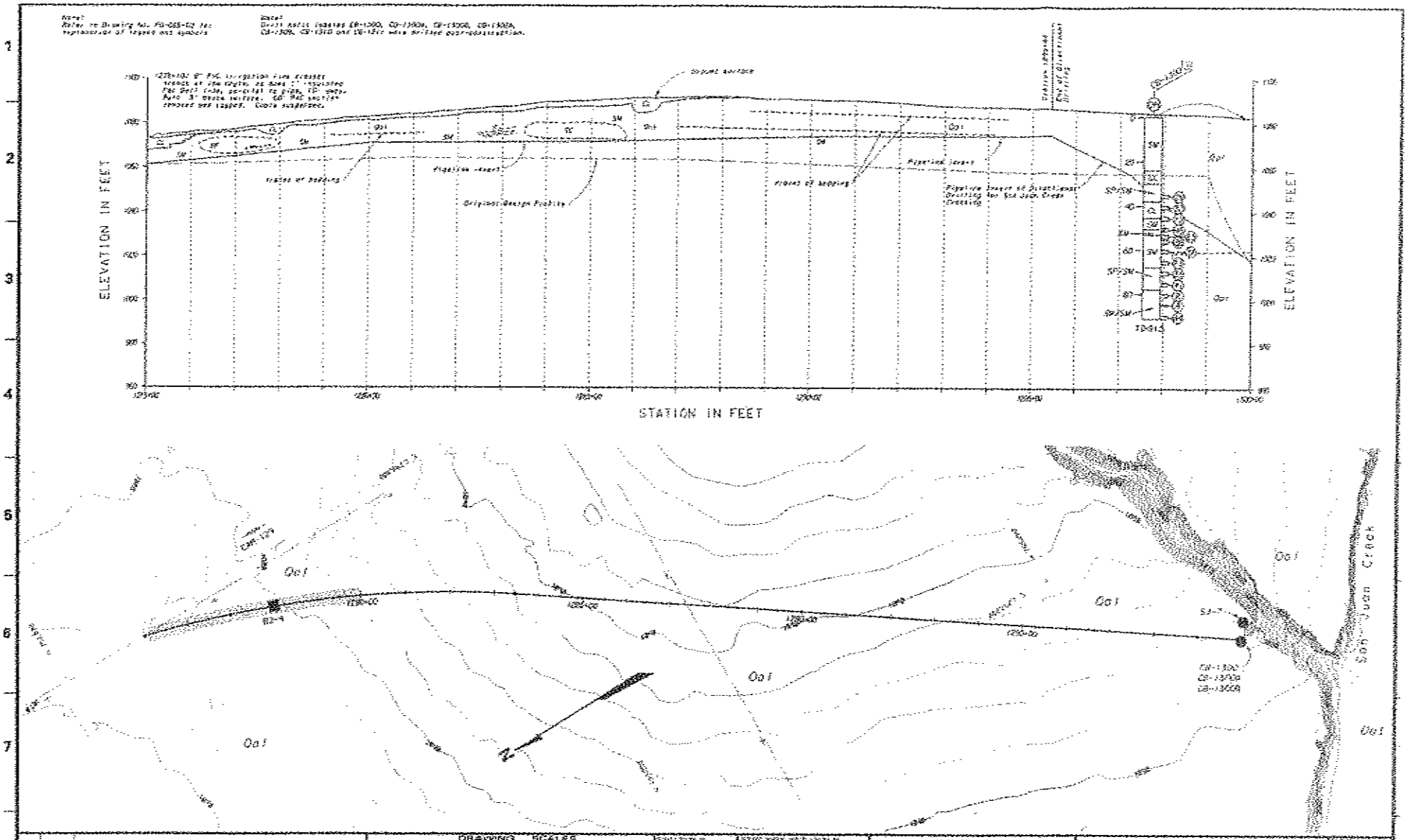
ELEVATION IN FEET
STATION IN FEET
Pipeline Invert
Original Design Profile
Qal
Juan Creek
DRAWING SCALES
C-112
93-33
PG-CSB-19
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/8/01
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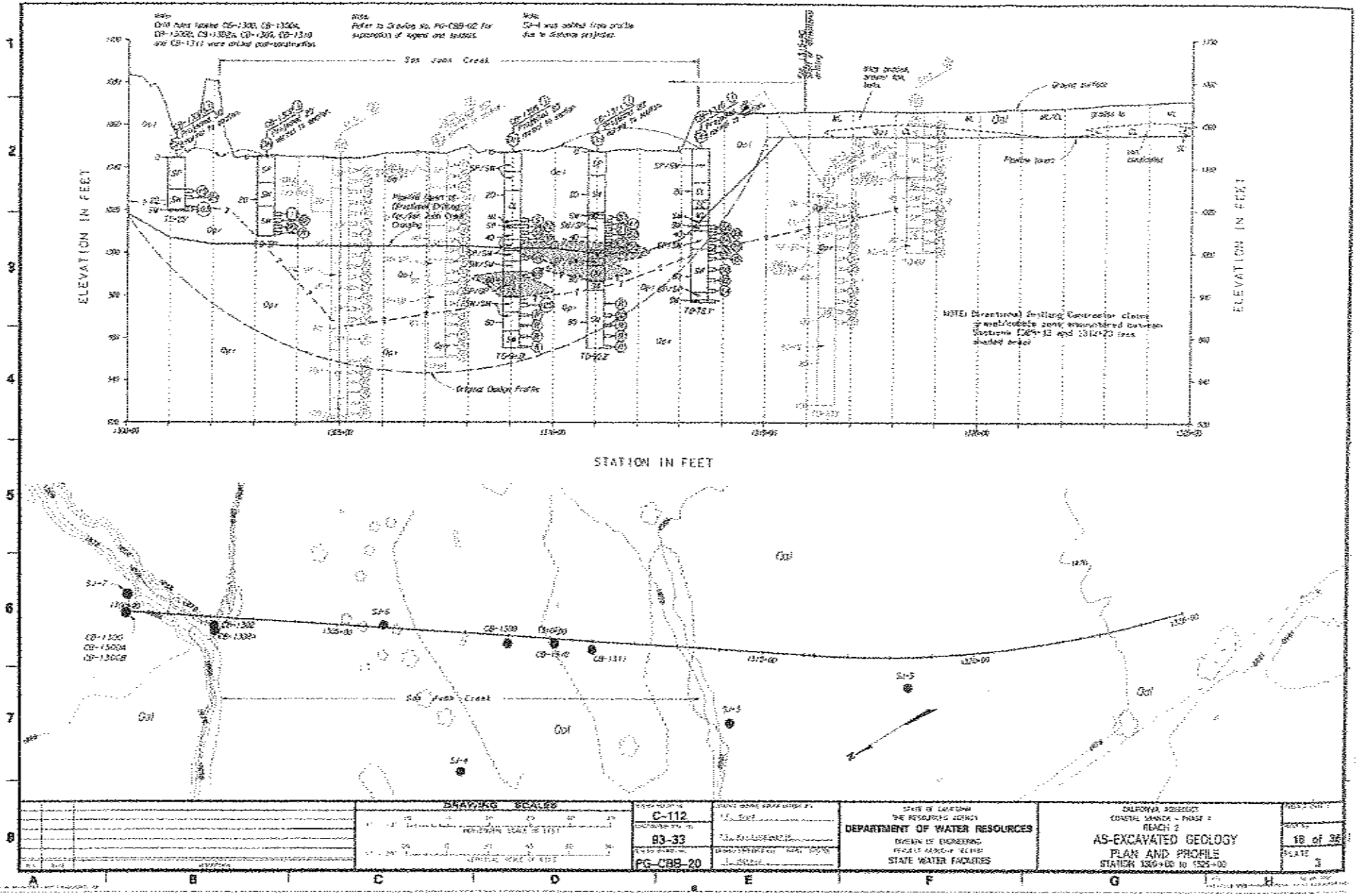
PLATE 3


ELEVATION IN FEET
STATION IN FEET
San Juan Creek
Original Design Profile
Qal
SI-4
SI-5
SI-6
SI-7
CB-1300
CB-1300A
CB-1300B
CB-1302
CB-1302A
CB-1309
CB-1310
CB-1311
DRAWING SCALES
C-112
93-33
PG-CB8-20
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
REACH 2
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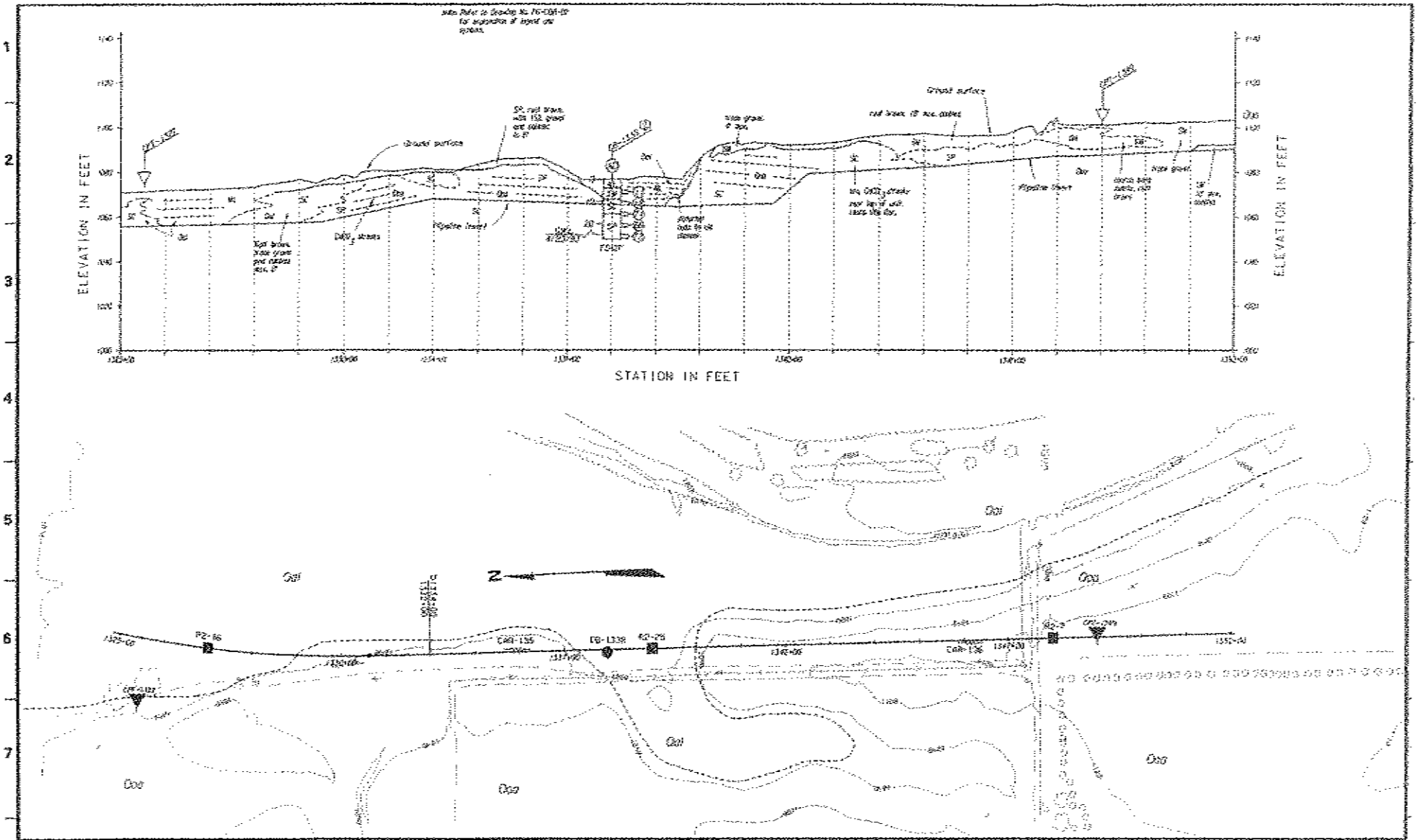
ELEVATION IN FEET
STATION IN FEET
Ground surface
N
Qal
Qoa
PG-86
PG-CBB-135
PG-L339
PG-25
PG-CBB-136
PG-CBB-137
PG-CBB-139
DRAWING SCALES
C-112
93-33
PG-CBB-21
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1325+00 to 1351+00
REACH 2
2/8/01
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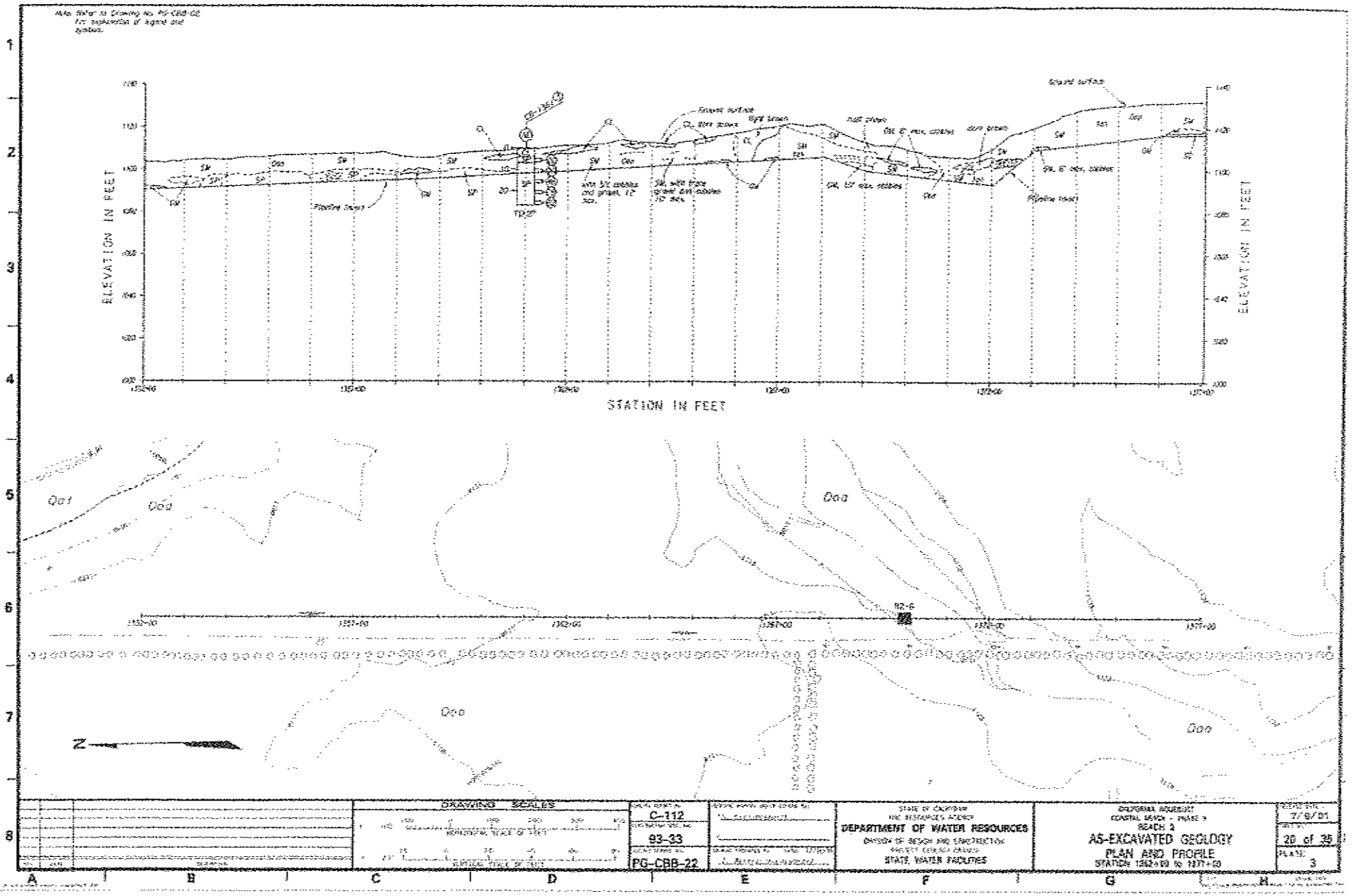
PLATE
3


ELEVATION IN FEET
STATION IN FEET
Qal
Qoa
Qoo
92-6
N
DRAWING SCALES
C-112
93-33
PG-CBB-22
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/8/91
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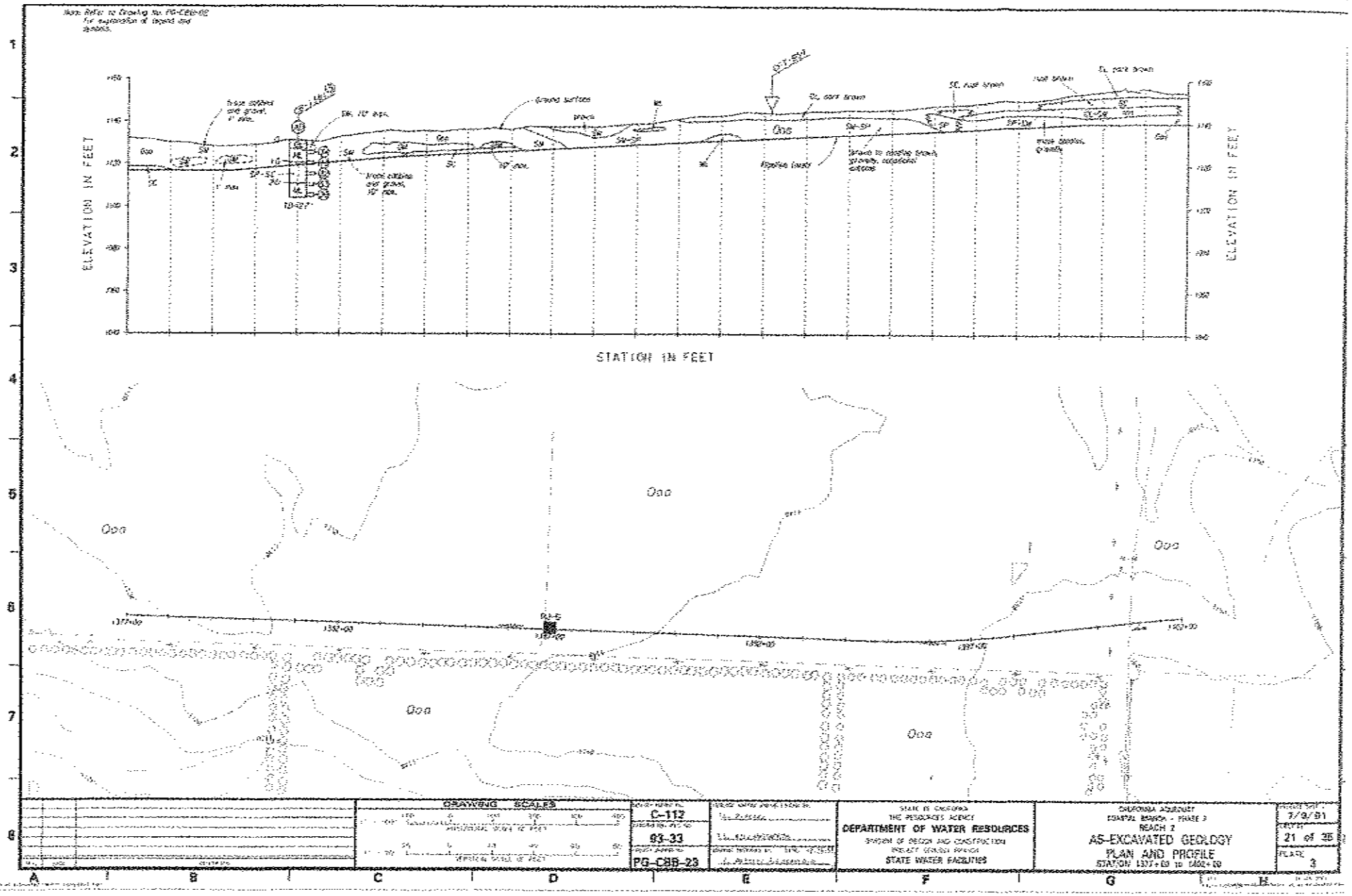
3


ELEVATION IN FEET
STATION IN FEET
Qoa
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
C-112
93-33
PG-C88-23
7/9/91
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3

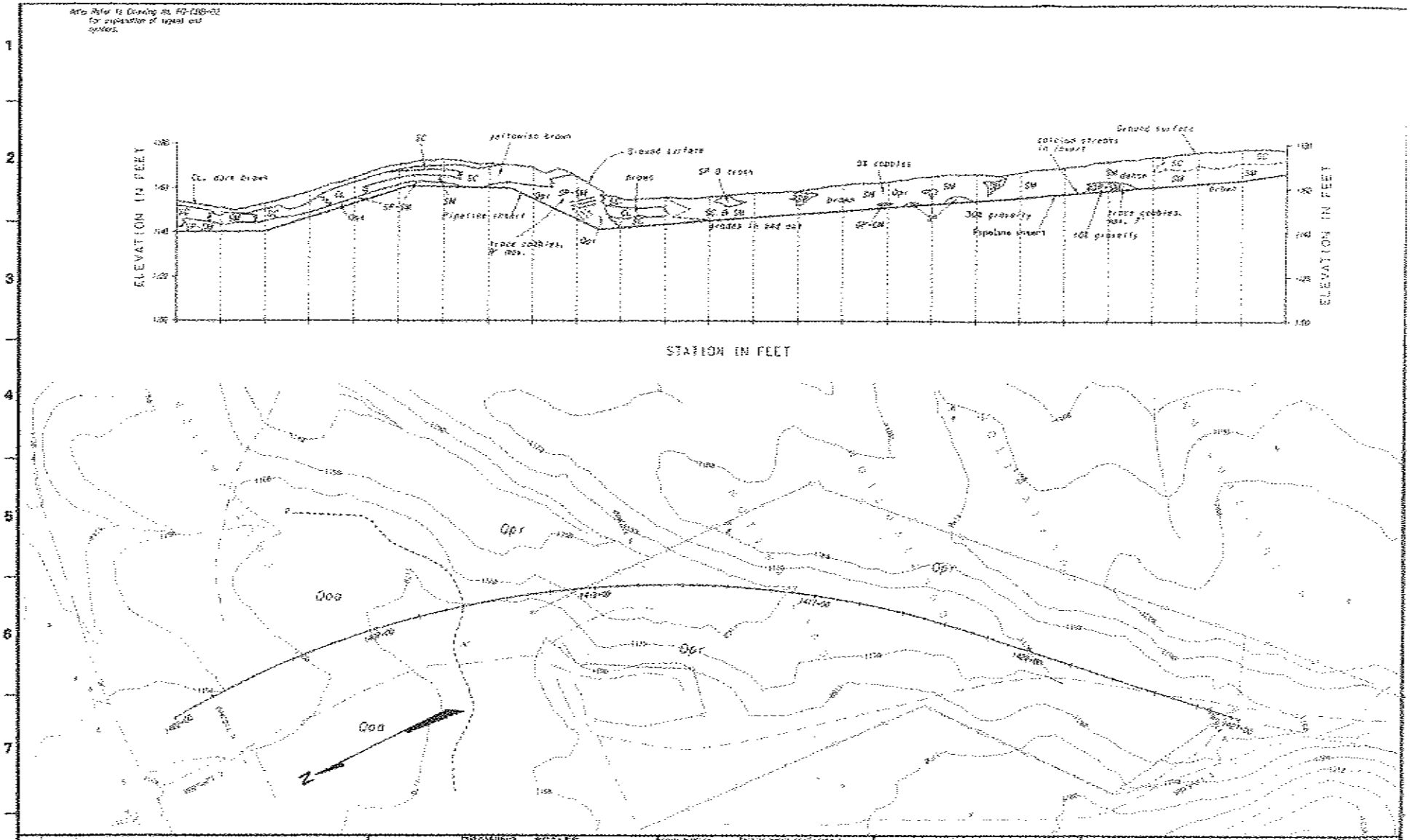
ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipeline invert
Opr
Qoa
N
DRAWING SCALES
C-112
93-33
PG-CBB-24
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF DESIGN AND CONSTRUCTION
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE II
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1426+00 to 1427+00
7/9/01
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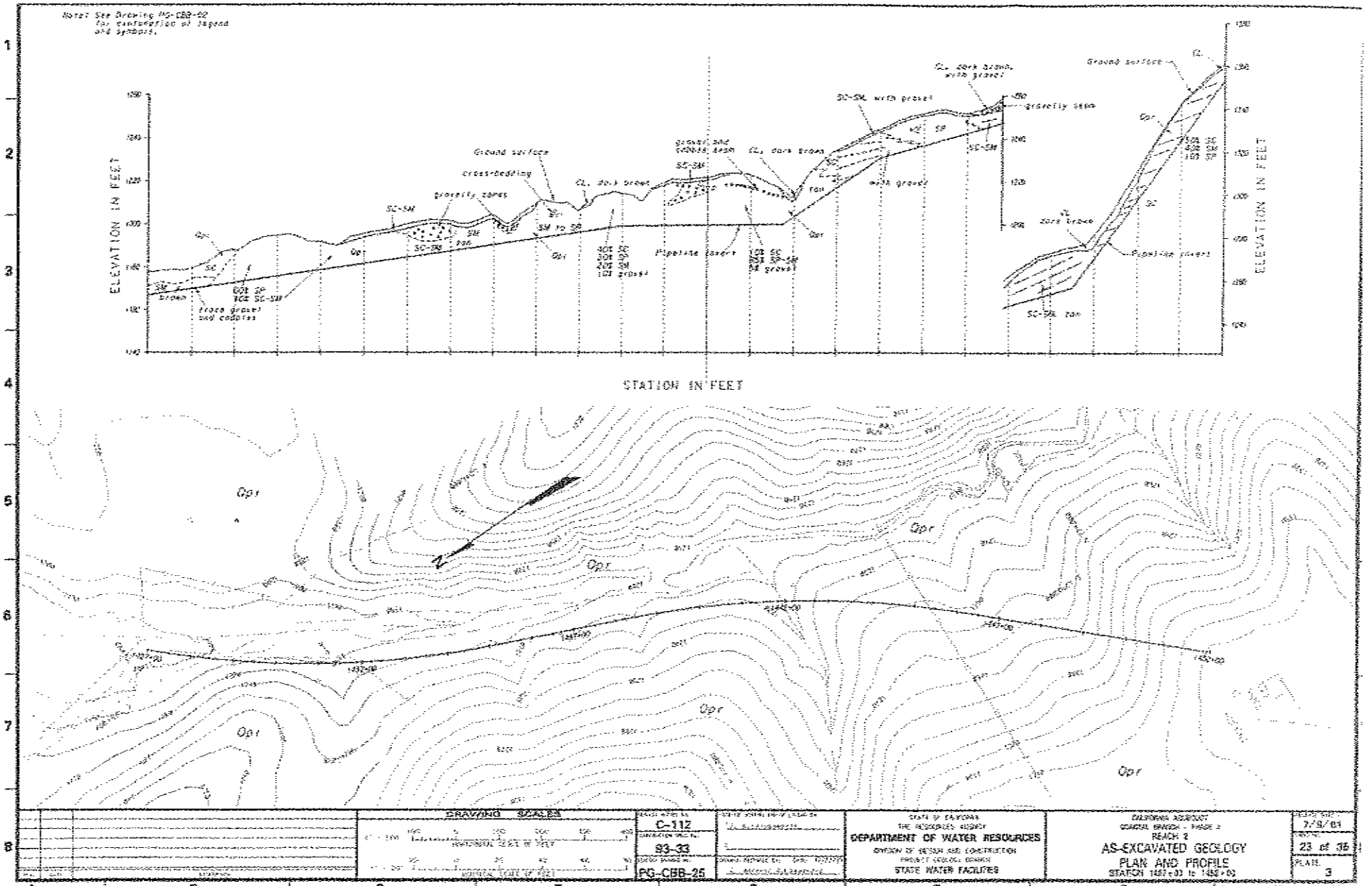
PLATE
3


Note: See Drawing PG-CBB-02 for explanation of legend and symbols.
ELEVATION IN FEET
STATION IN FEET
Ground surface
crossbedding
gravelly seams
CL, dark brown
SC-SM
SM to SP
Pleistocene gravel
SC-SM, with gravel
CL, dark brown, with gravel
Opr
DRAWING SCALES
C-112
93-33
PG-CBB-25
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF DESIGN AND CONSTRUCTION
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/9/81
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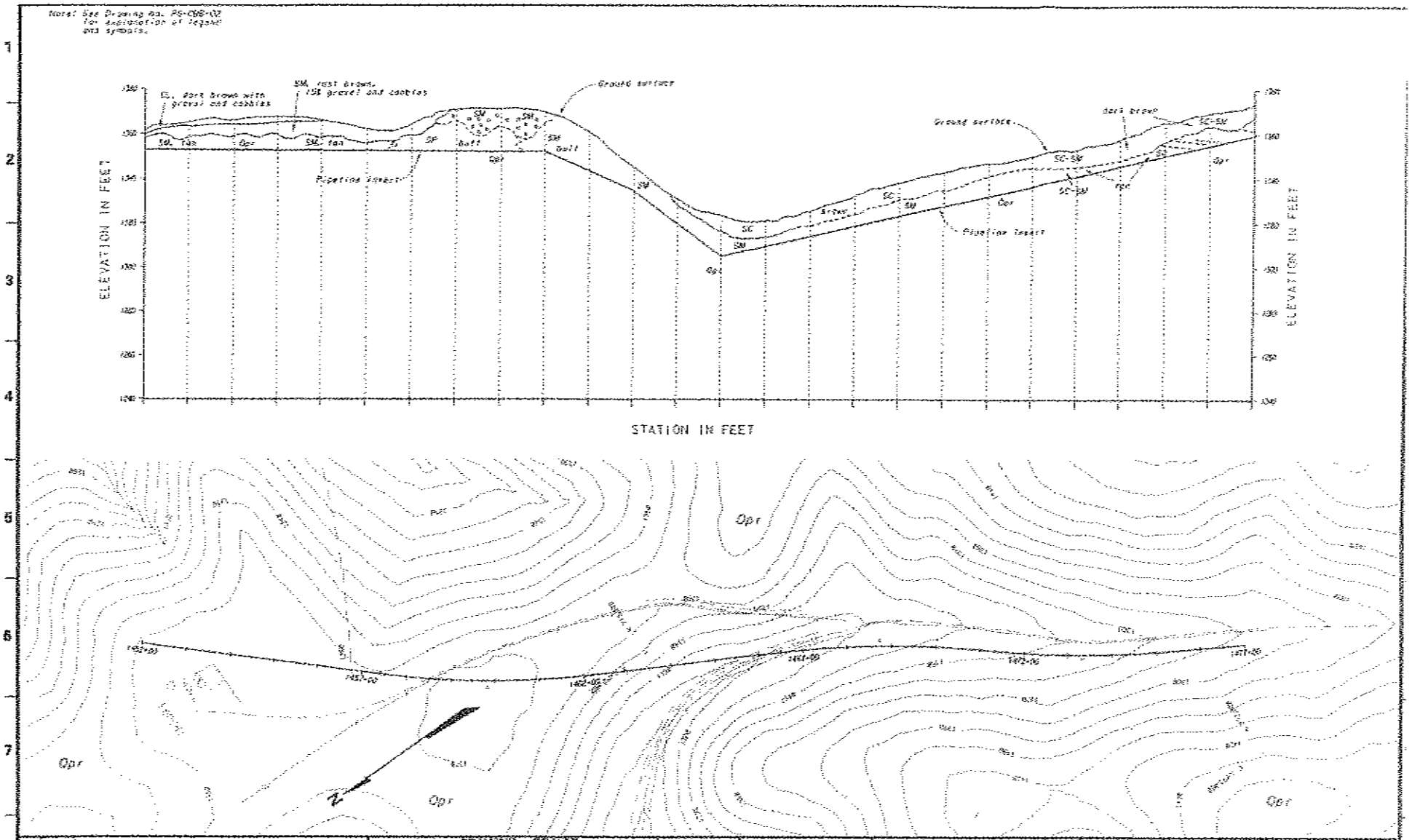
3


Note: See Drawing No. PG-CBB-07 for explanation of legend and symbols.
ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipeline invert
Opr
DRAWING SCALES
C-112
93-33
PG-CBB-26
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/9/01
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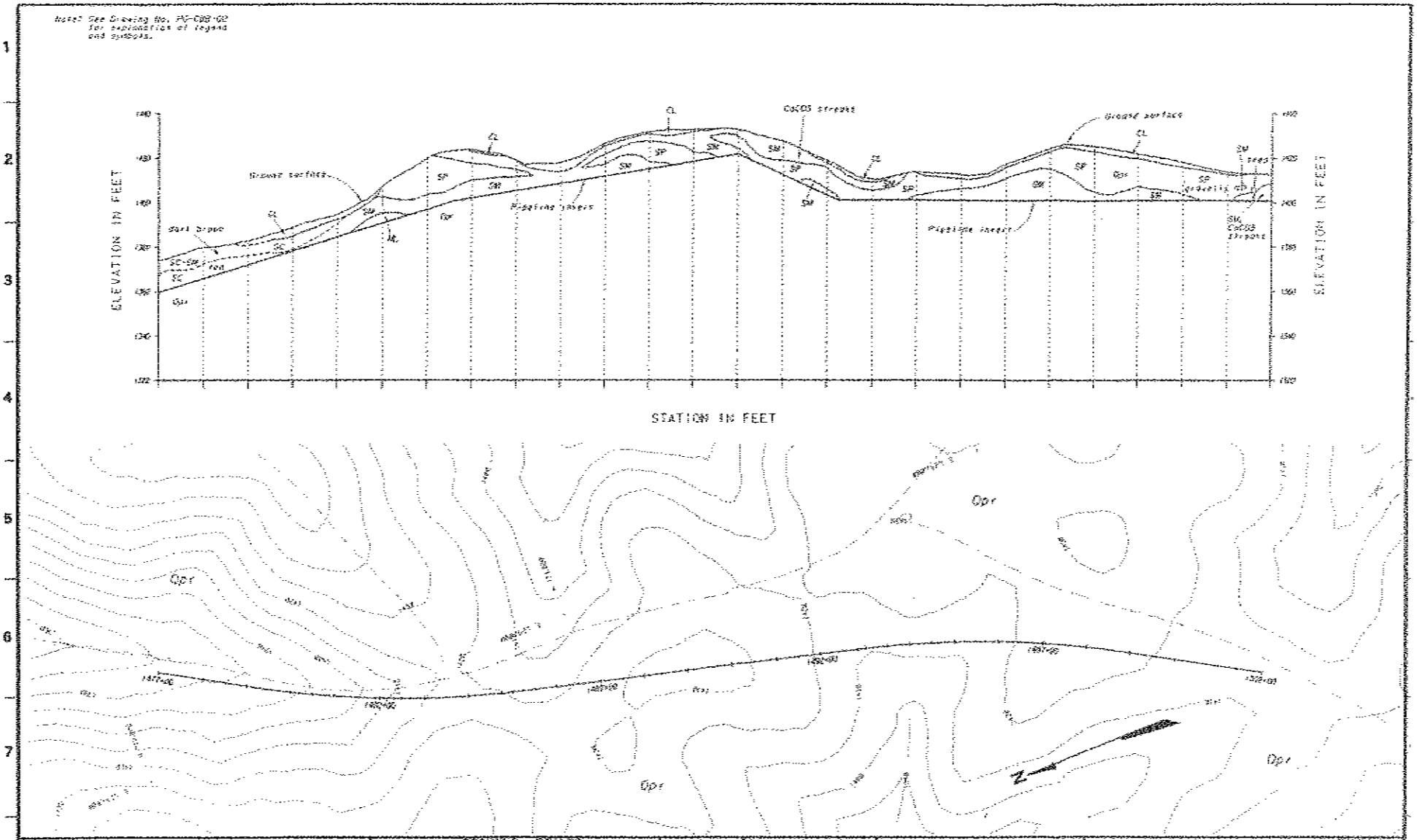
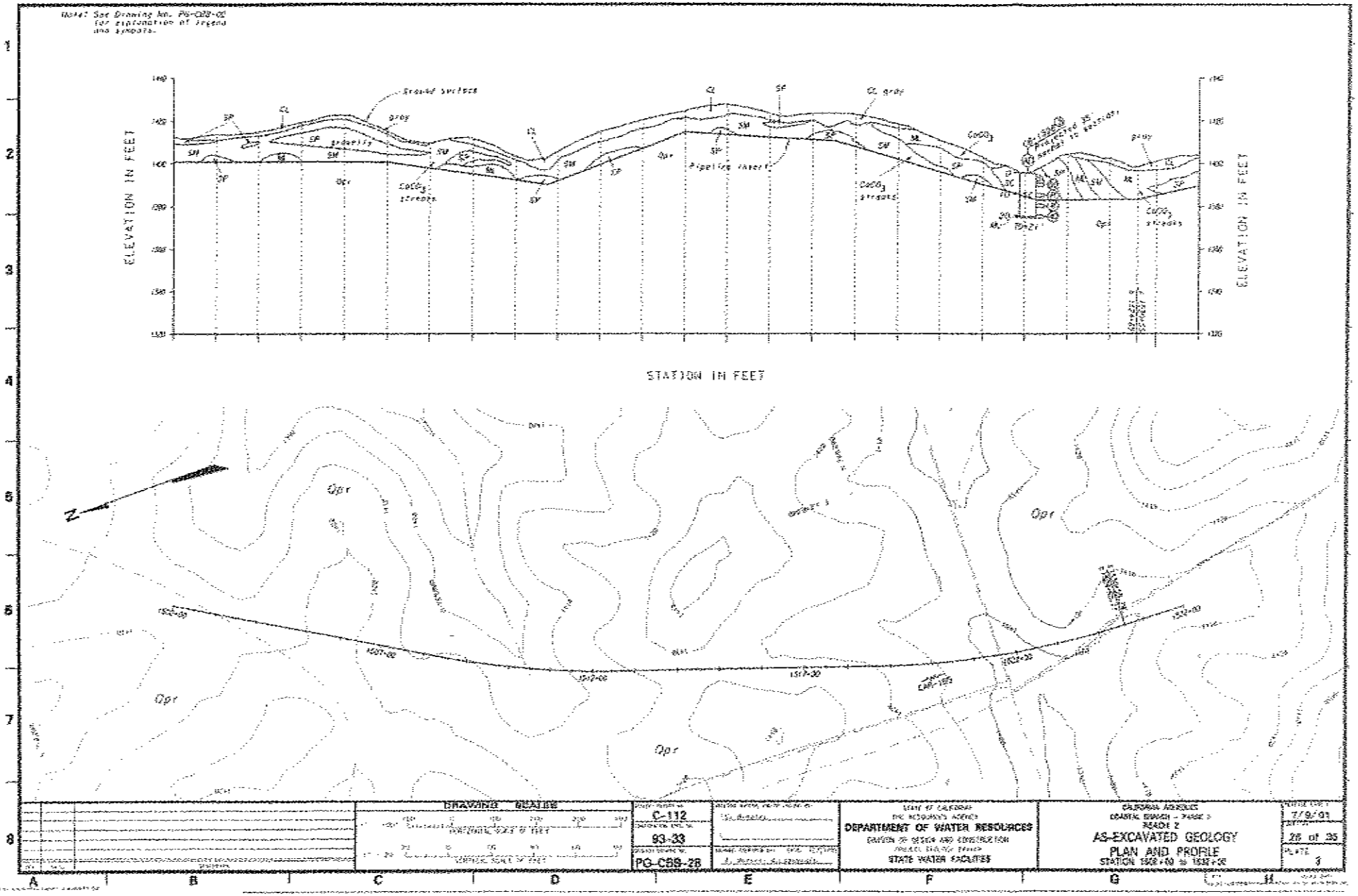
3




| | | | | | |
|---|---|---|---|---|---|
| DRAWING SCALES | C-112 | | STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES DIVISION OF DESIGN AND CONSTRUCTION PROJECT ENGINEER STATE WATER FACILITIES | CALIFORNIA AQUEDUCT COASTAL BRANCH - PHASE II REACH 2 AS-EXCAVATED GEOLOGY PLAN AND PROFILE STATION 1407+00 to 1507+00 | 7/9/01 |
| | 93-33 | | | | 26 of 35 |
| | PG-C6B-27 | | | | PLATE 3 |


Note: See Drawing No. PG-CBB-02 for explanation of legend and symbols.
ELEVATION IN FEET
STATION IN FEET
Ground surface
Opr
N
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
C-112
93-33
PG-CBB-28
7/9/93
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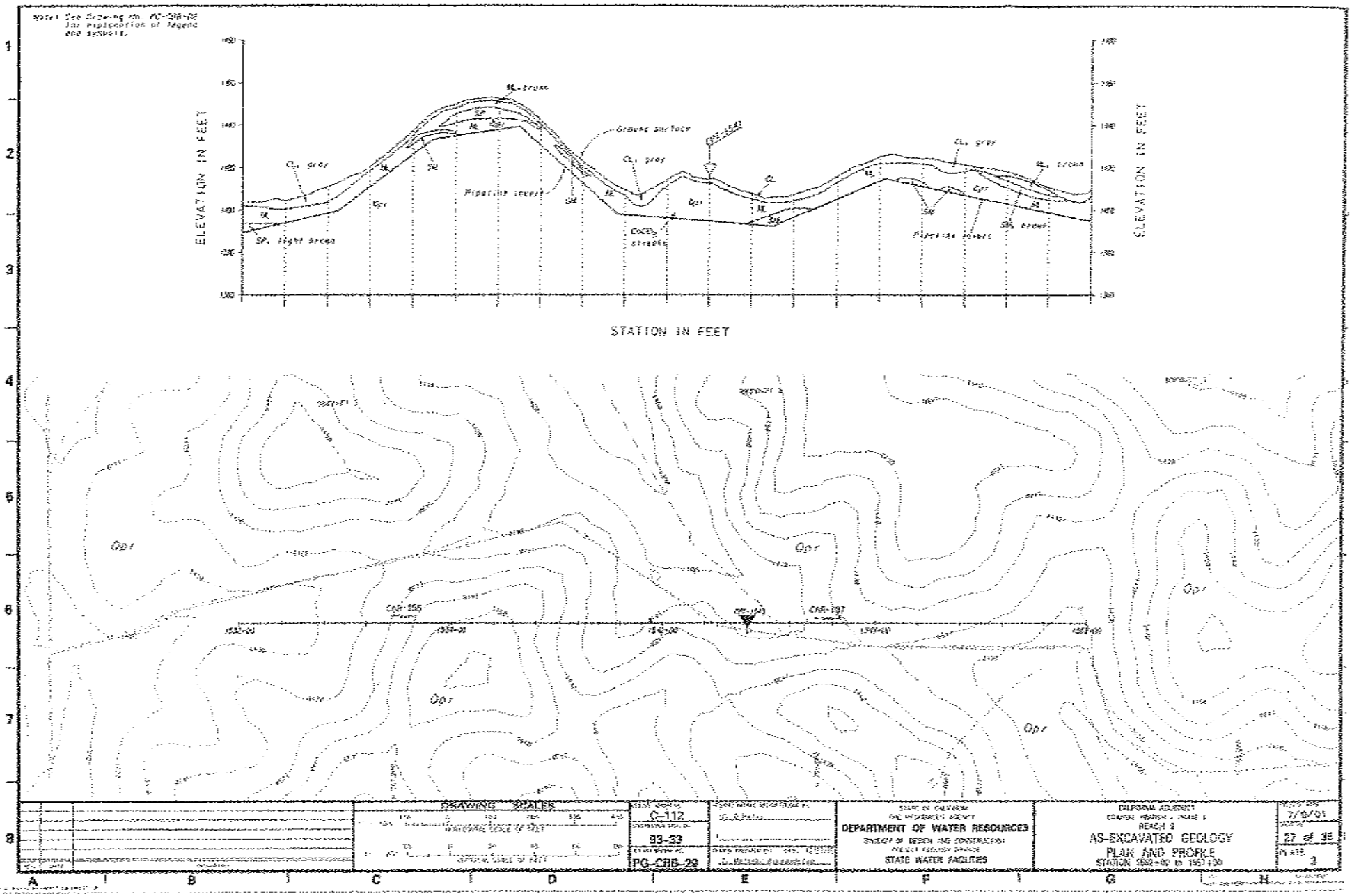
A
B
C
D
E
F
G
H


Note: See Drawing No. PG-CBB-02 for description of legend and symbols.
ML, brown
Ground surface
CL, gray
Pipeline invert
SP, light brown
CaCO3 streaks
CL, gray
Pipeline invert
SM, brown
ELEVATION IN FEET
STATION IN FEET
Qpr
CNR-155
CNR-197
DRAWING SCALES
C-112
93-33
PG-CBB-29
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1552+00 to 1557+00
7/8/91
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3

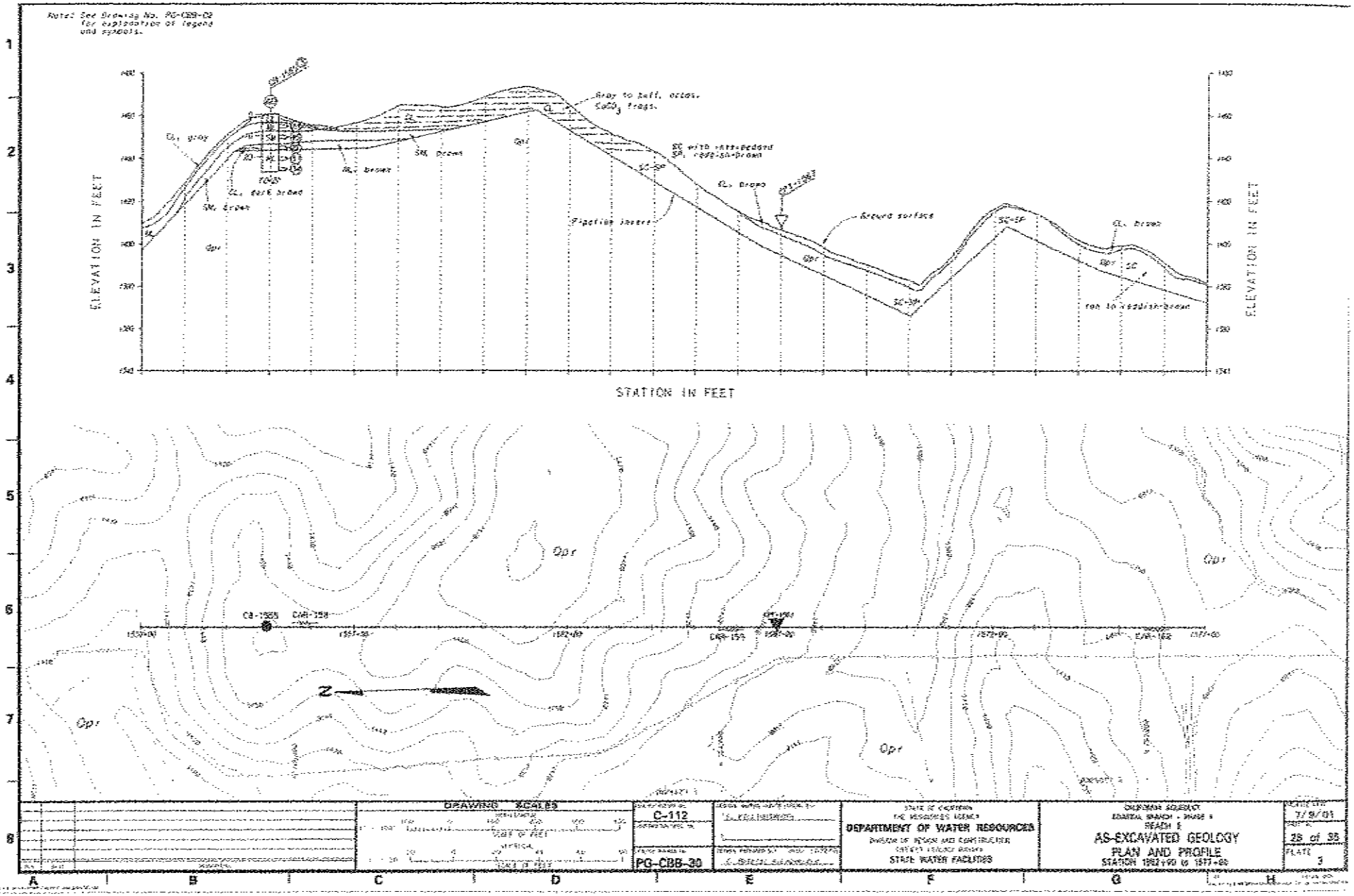
Refer See Drawing No. PG-CBB-02 for explanation of legend and symbols.
ELEVATION IN FEET
STATION IN FEET
Ground surface
Fissure insert
Opr
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
DRAWING SCALES
C-112
PG-CBB-30
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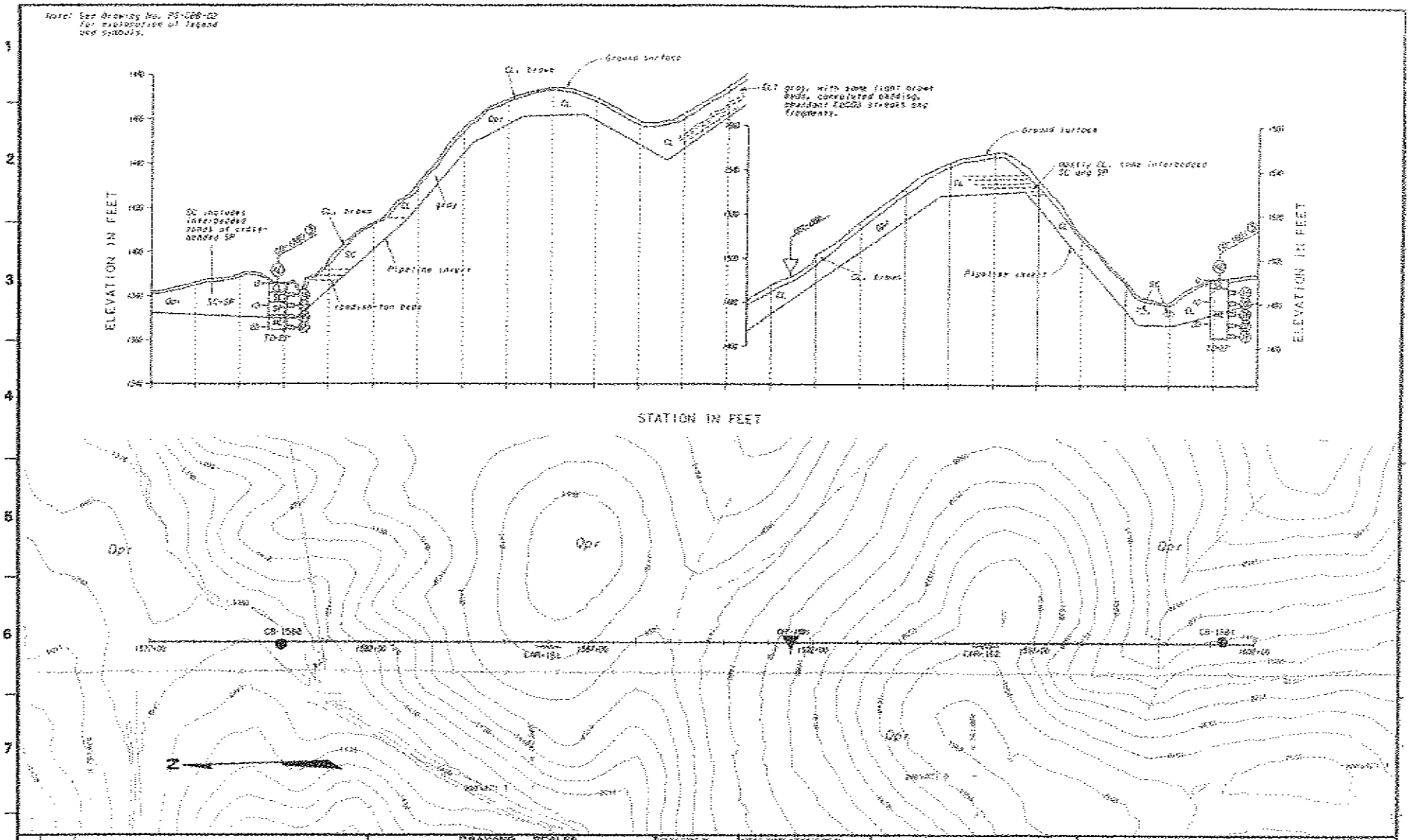
PLATE 3


Note: See Drawing No. PG-CBB-32 for explanation of legend and symbols.
Ground surface
Pipeline invert
ELEVATION IN FEET
STATION IN FEET
Qpr
CB-158R
CB-158L
DRAWING SCALES
C-112
33-33
PG-CBB-31
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF DESIGN AND CONSTRUCTION
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
GENERAL BRANCH - PHASE 2
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1577+00 to 1602+00
7/8/61
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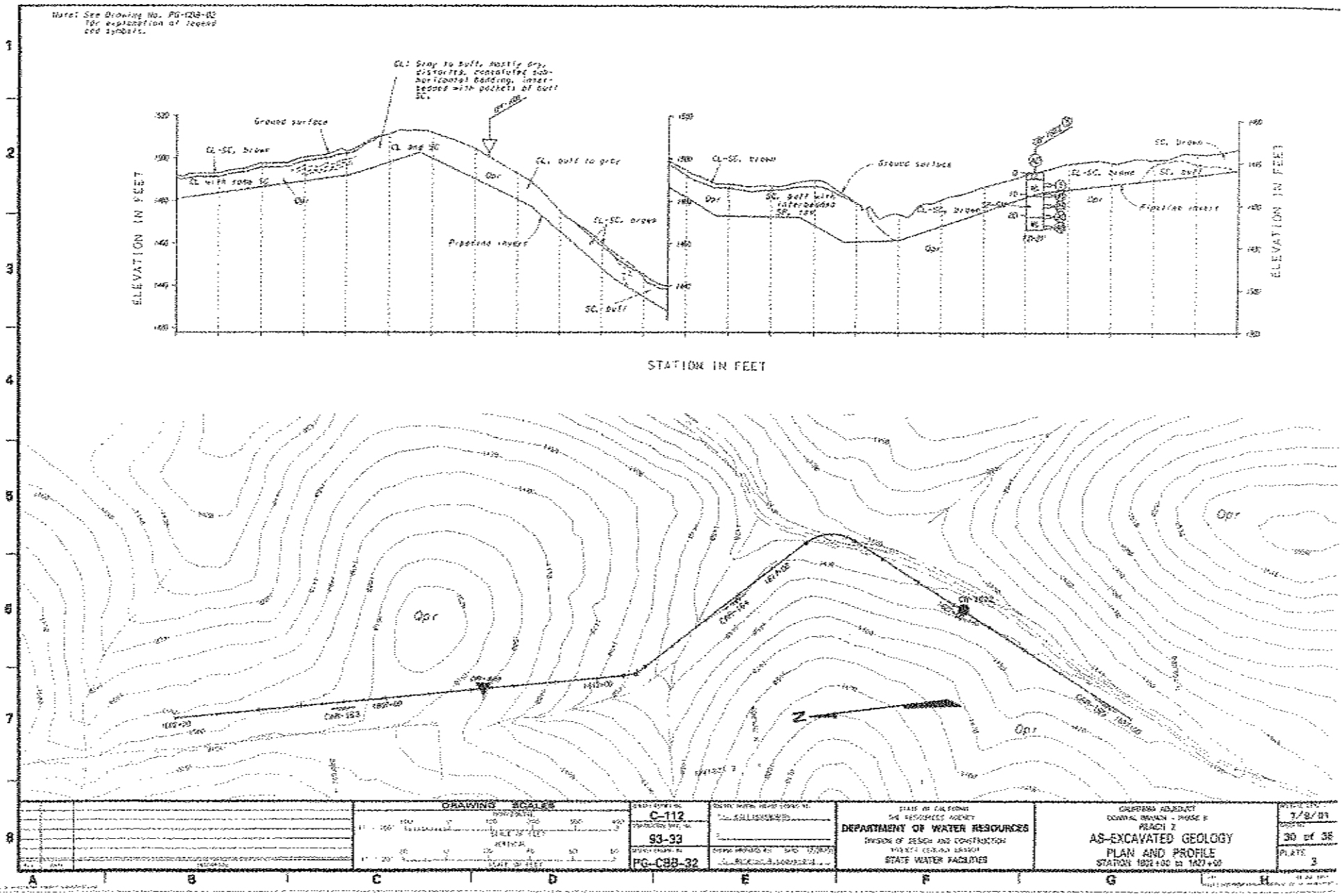
3


Note: See Drawing No. PG-128-B2 for explanation of legend and symbols.
Ground surface
CL-SC, brown
CL with some SC
CL and SC
CL, buff to grey
Qpr
Pipeline invert
CL-SC, brown
SC, buff
SC, buff with interbedded SC, tan
SC, brown
CL-SC, brown
SC, buff
ELEVATION IN FEET
STATION IN FEET
Qpr
N
DRAWING SCALES
C-112
93-33
PG-C88-32
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1802+00 to 1827+50
7/8/01
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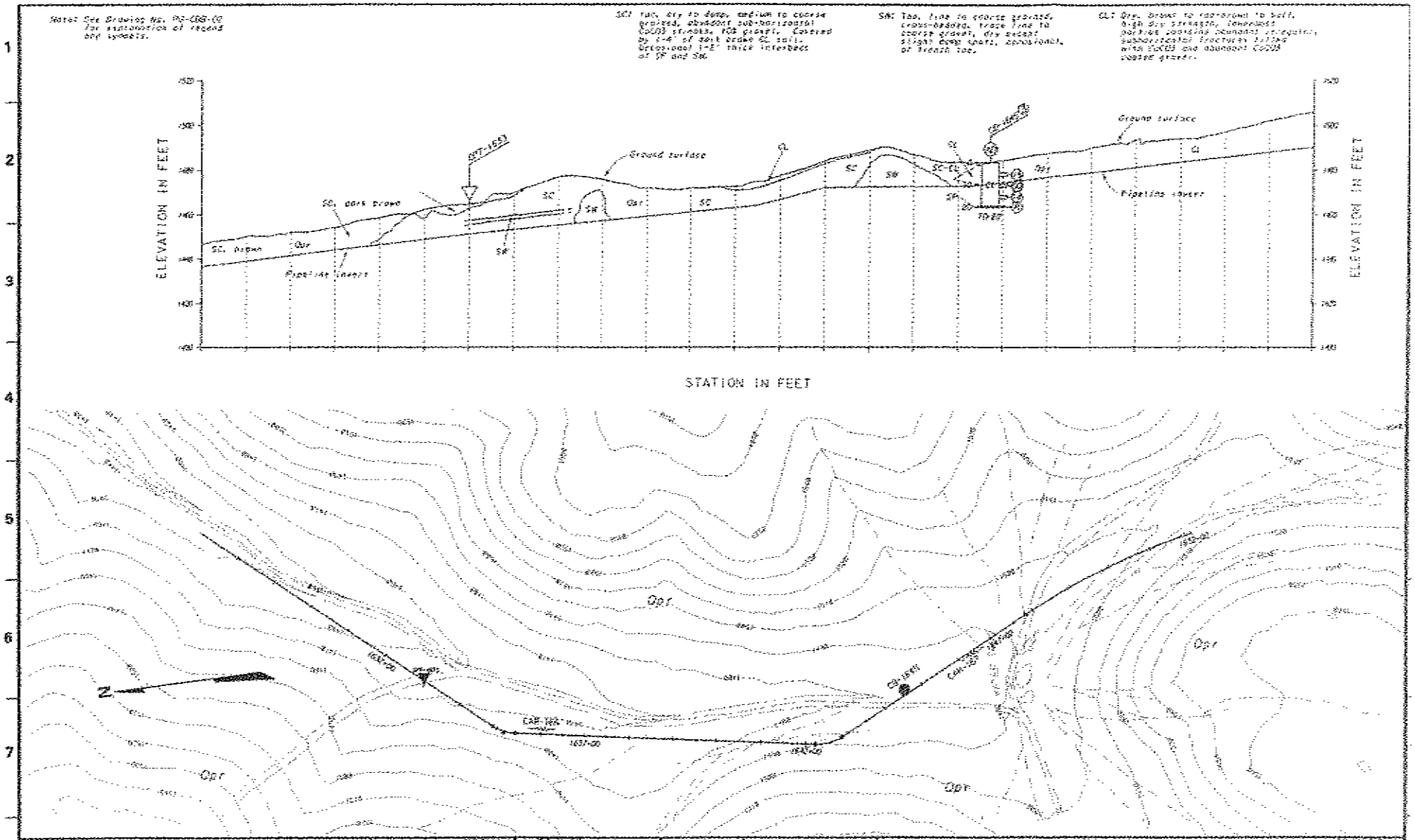
3


Note: See Drawing No. PG-CBB-C0 for explanation of legend and symbols.
ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipeline invert
Qpf
DRAWING SCALES
C-112
93-33
PG-CBB-33
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
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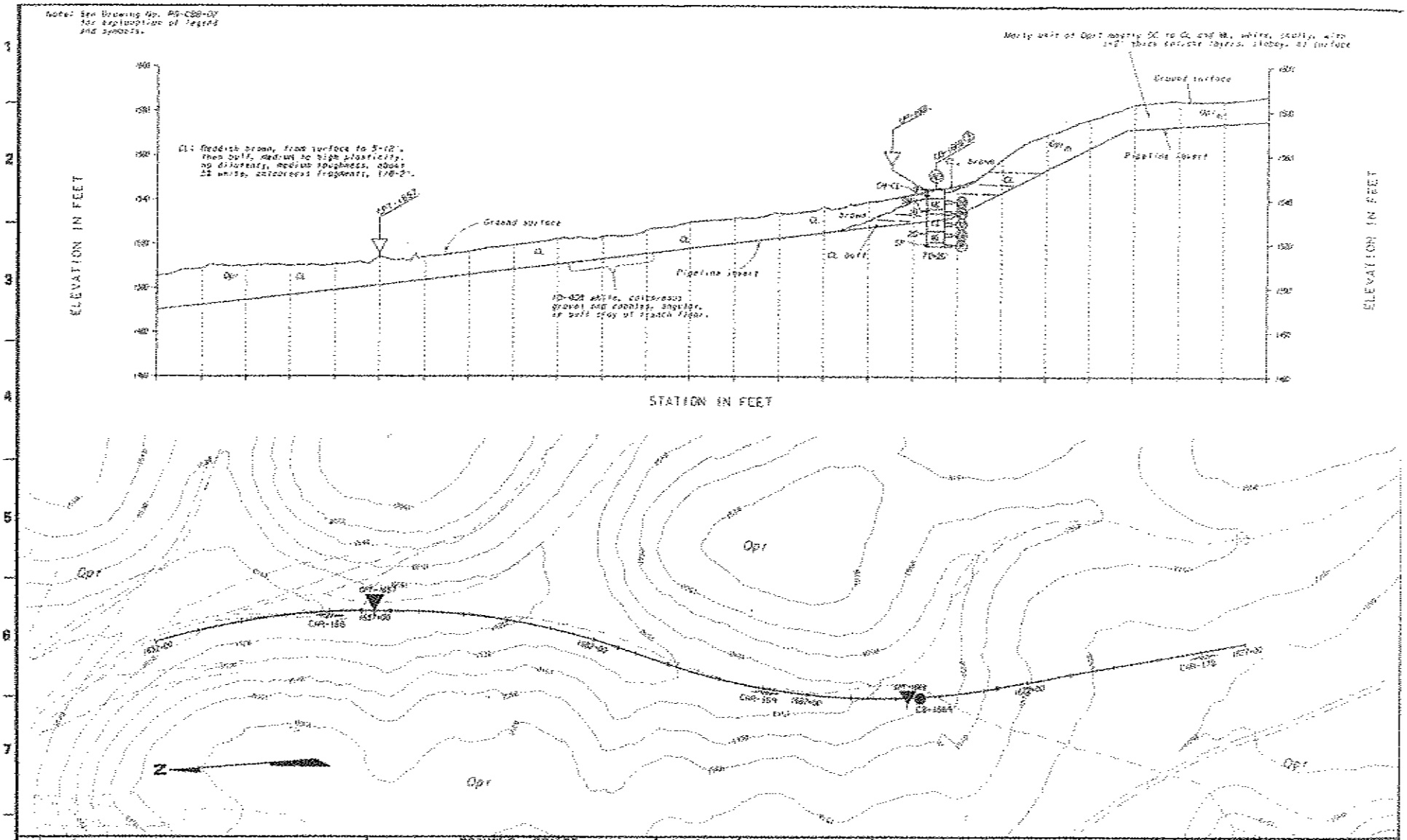
3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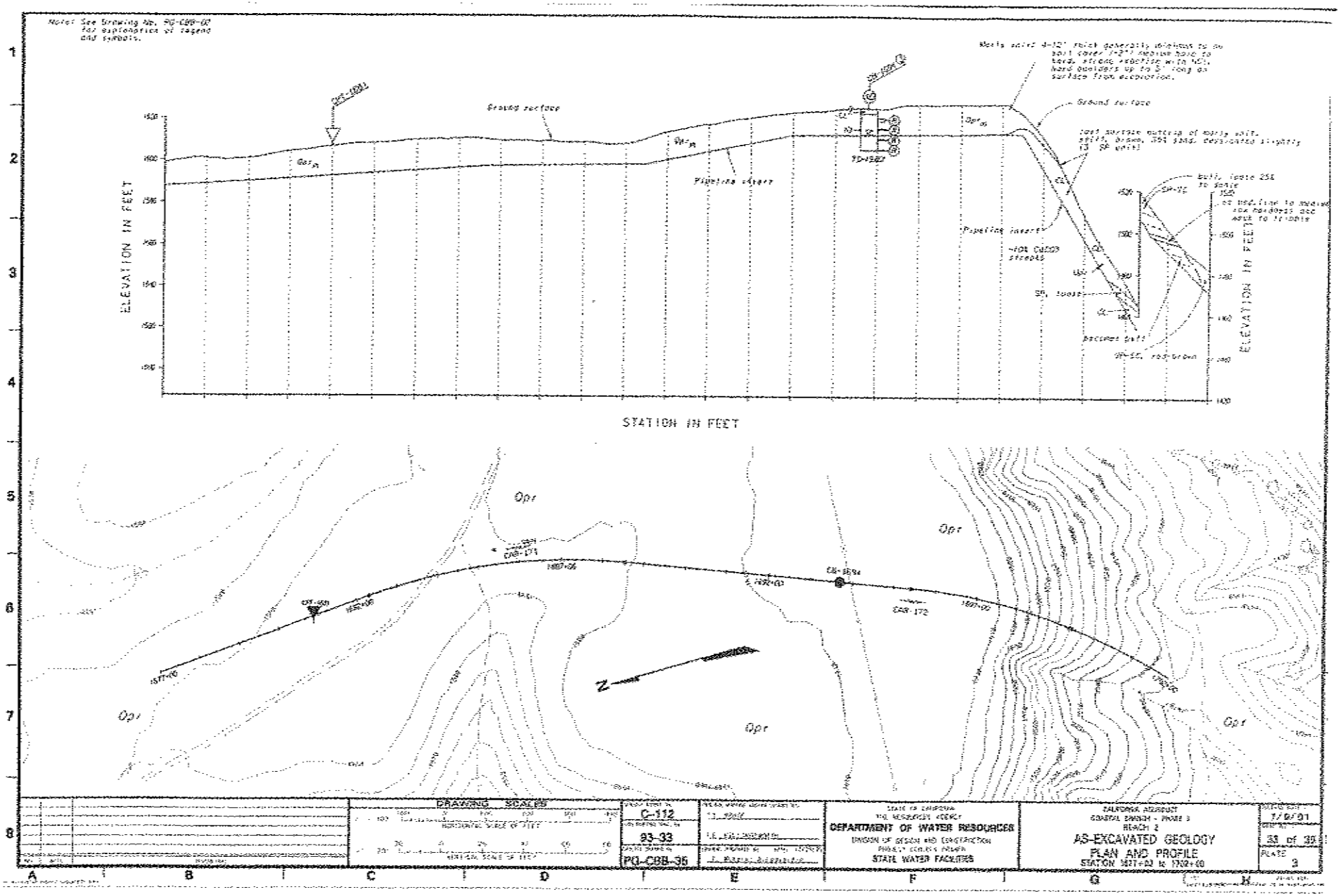
STATION IN FEET
Ground surface
Pipeline invert
Opr
Qa
Qa soil
Grout
CB-159
CB-158
CB-179
N
DRAWING SCALES
C-112
93-33
PG-CBB-34
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS- EXCAVATED GEOLOGY
PLAN AND PROFILE
PLATE 3

14-92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Ground surface
Pipeline insert
ELEVATION IN FEET
STATION IN FEET
Opr
N
DRAWING SCALES
C-112
93-33
PG-CBB-35
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
CALIFORNIA AQUEDUCT
COASTAL BRANCH - PHASE 3
REACH 2
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
STATION 1677+00 to 1702+00
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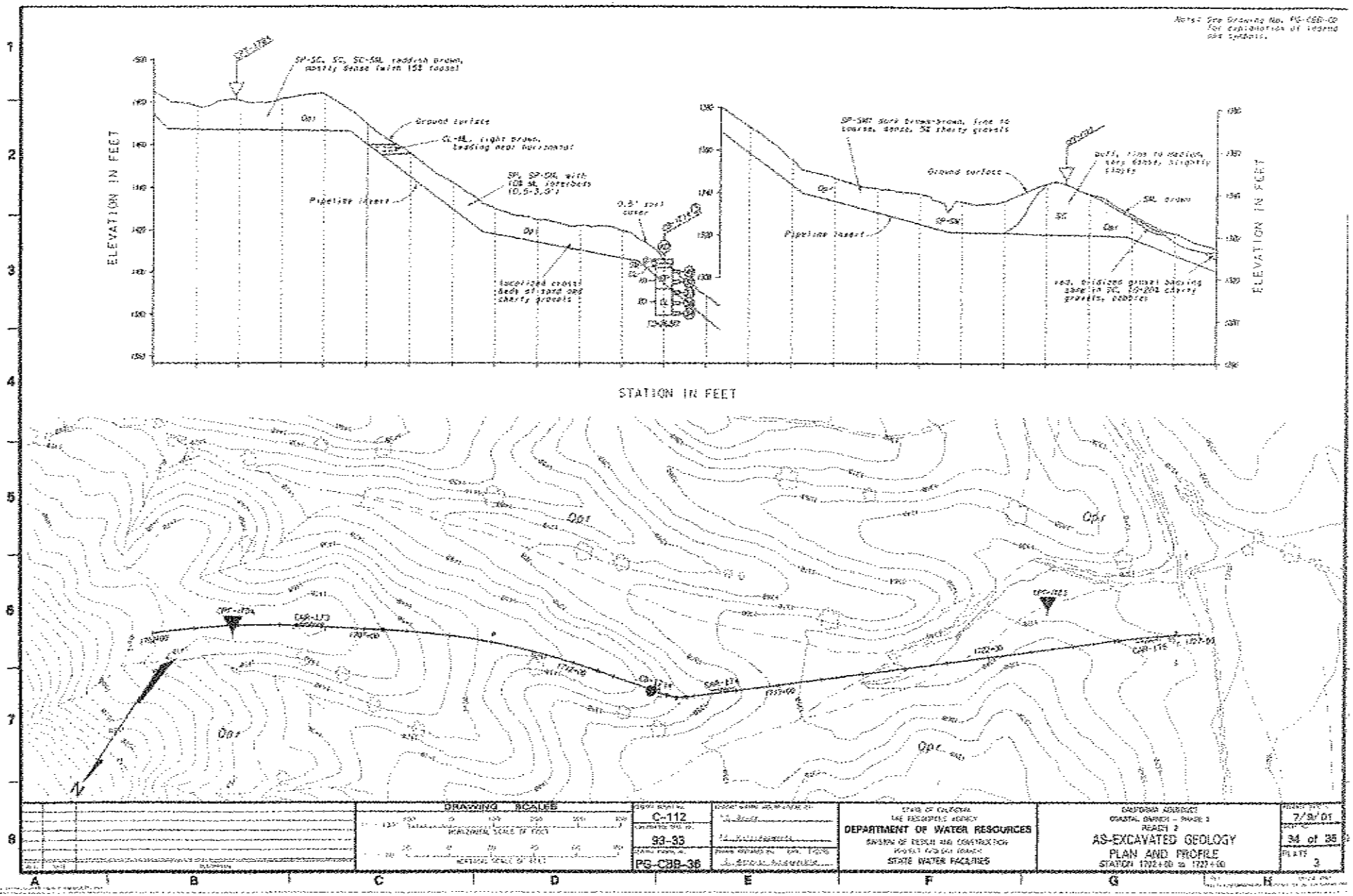
3


ELEVATION IN FEET
STATION IN FEET
Ground surface
Pipeline invert
Qpf
N
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
C-112
93-33
PG-CBB-36
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
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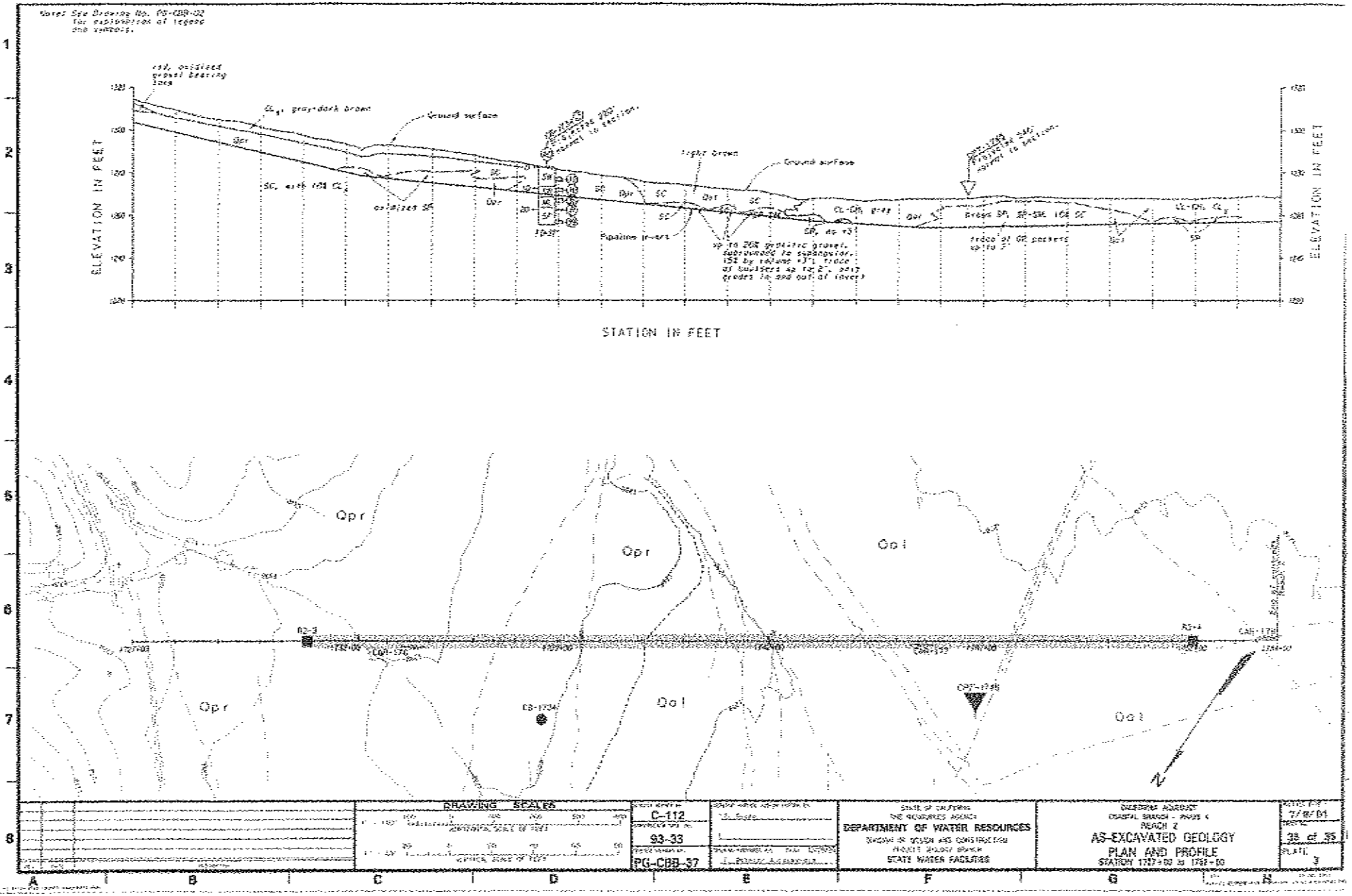
3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STATION IN FEET
Ground surface
Pipeline invert
Qpr
Qal
DRAWING SCALES
C-112
93-33
PG-CBB-37
DEPARTMENT OF WATER RESOURCES
STATE WATER FACILITIES
AS-EXCAVATED GEOLOGY
PLAN AND PROFILE
7/8/81
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PLATE 3

# UNIFIED SOIL CLASSIFICATION
## INCLUDING IDENTIFICATION AND DESCRIPTION

| FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 3 inches and basing fractions on estimated weights) | | | GROUP SYMBOLS | TYPICAL NAMES | INFORMATION REQUIRED FOR DESCRIBING SOILS | LABORATORY CLASSIFICATION CRITERIA |
|---|---|---|---|---|---|---|
| COARSE GRAINED SOILS More than half of material is larger than No. 200 sieve size | GRAVELS More than half of coarse fraction is larger than No. 4 sieve size | Clean gravels (little or no fines) | GW | Wide range in grain size and substantial amounts of all intermediate particle sizes | Give typical name; indicate approximate percentages of sand and gravel, max. size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbol in parentheses. | $C_u = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between one and 3 |
| | | | GP | Predominantly one size or a range of sizes with some intermediate sizes missing | | Not meeting all gradation requirements for GW |
| | | Gravels with fines (appreciable amount of fines) | GM | Non-plastic fines (for identification procedures see ML below) | For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. | Atterberg limits below "A" line, or PI less than 4 — Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols. |
| | | | GC | Plastic fines (for identification procedures see CL below) | | Atterberg limits above "A" line with PI greater than 7 |
| | SANDS 50% or more of coarse fraction is smaller than No. 4 sieve size (For visual classifications, the ¼" sieve may be used as equivalent to the No. 4 sieve size) | Clean sands (little or no fines) | SW | Wide range in grain sizes and substantial amounts of all intermediate particle sizes | EXAMPLE: Silty sand, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (SM) | $C_u = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between one and 3 |
| | | | SP | Predominantly one size or a range of sizes with some intermediate sizes missing | | Not meeting all gradation requirements for SW |
| | | Sands with fines (appreciable amount of fines) | SM | Non-plastic fines (for identification procedures see ML below) | | Atterberg limits below "A" line or PI less than 4 — Above "A" line with PI between 4 and 7 are borderline cases requiring use of dual symbols. |
| | | | SC | Plastic fines (for identification procedures see CL below) | | Atterberg limits above "A" line with PI greater than 7 |
| FINE GRAINED SOILS More than half of material is smaller than No. 200 sieve size. (For visual classifications, the ¼" sieve may be used as equivalent to the No. 200 sieve size) | IDENTIFICATION PROCEDURES ON FRACTION SMALLER THAN No. 40 SIEVE SIZE | | | | | |
| | SILTS AND CLAYS Liquid limit less than 50 | DRY STRENGTH (CRUSHING CHARACTERISTICS): None to slight | DILATANCY (REACTION TO SHAKING): Quick to slow | TOUGHNESS (CONSISTENCY NEAR PLASTIC LIMIT): None | ML | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity |
| | | Medium to high | None to very slow | Medium | CL | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays |
| | | Slight to medium | Slow | Slight | OL | Organic silts and organic silt-clays of low plasticity. |
| | SILTS AND CLAYS Liquid limit greater than 50 | Slight to medium | Slow to none | Slight to medium | MH | Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts |
| | | High to very high | None | High | CH | Inorganic clays of high plasticity, fat clays |
| | | Medium to high | None to very slow | Slight to medium | OH | Organic clays of medium to high plasticity |
| HIGHLY ORGANIC SOILS | | Readily identified by color, odor, spongy feel and frequently by fibrous texture. | | | PT | Peat and other highly organic soils |

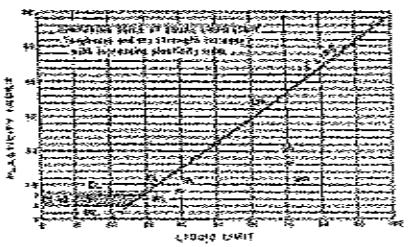
Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; color in wet condition, odor if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses.

For undisturbed soils add information on structure, stratification, consistency in undisturbed and remolded states, moisture and drainage conditions.

EXAMPLE:- Clayey silt, brown, slightly plastic, small percentage of fine sand, numerous vertical root holes, firm and dry in place; loess, (ML)

Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows:- Less than 5% GW, GP, SW, SP. More than 12% GM, GC, SM, SC. BORDERLINE cases requiring use of dual symbol.

Use grain size curve in identifying the fractions as given under field identification.




PLASTICITY CHART
See laboratory classification of fine grained soils

a. Boundary classification: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example GW-GC, well graded gravel-sand mixture with clay binder.

b. All sieve sizes on this chart are U.S. standard

ADAPTED BY CORPS OF ENGINEERS AND BUREAU OF RECLAMATION STANDARD 1952

## FIELD IDENTIFICATION PROCEDURES FOR FINE GRAINED SOILS OR FRACTIONS

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended; simply remove by hand the coarse particles that interfere with the tests.

**DILATANCY (Reaction to shaking)**

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glassy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens, and finally it cracks or crumbles.

The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

**DRY STRENGTH (Crushing characteristics)**

After removing particles larger than No. 40 sieve size, mold a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun, or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when pulverizing the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

**TOUGHNESS (Consistency near plastic limit)**

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is molded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and rerolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as Kaolin-type clays and organic clays which occur below the A-line.

Slightly organic clays have a very weak and spongy feel at the plastic limit.

# SECTION 15

## DWR – PROJECT APPROVAL LETTER
## DATED SEPTEMBER 1, 2015

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STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY

EDMUND G. BROWN JR., Governor

**DEPARTMENT OF WATER RESOURCES**
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

SEP 0 1 2015

Mr. Dave Flynn, Public Works Director
San Luis Obispo County Flood Control
and Water Conservation District
Public Works Department
County Government Center, Room 206
976 Osos Street
San Luis Obispo, California 93408-1002

Dear Mr. Flynn:

The Department of Water Resources (DWR) has reviewed the final plans and specifications submitted by the San Luis Obispo County Flood Control and Water Conservation District (the county) for construction of the proposed Shandon Turnout to be located at Milepost 38.23 of the California Aqueduct's Coastal Branch. Review of the final documents was coordinated among various DWR staff for compliance with applicable State and federal regulations. DWR hereby approves the design plans and specifications. Before the county begins construction, DWR reminds the county of the following:

- A seven-day notice is required prior to starting work within DWR's right of way. The county's notice should include the estimated start date of construction, the names and telephone numbers of contractors responsible for the construction work, and the names and telephone numbers of the county's field representatives who will be available at the site. Notice shall be sent to:

  Mr. Gabino Velazquez, Chief
  Department of Water Resources
  San Joaquin Field Division
  4201 Sabodan Street
  Bakersfield, California 93313
  (661) 858-5666

- During construction, the county shall submit for DWR's approval any shop drawings that change or considerably affect items previously approved in the plans and specifications. Shop drawings may be submitted electronically to Jorge Barajas at Jorge.Barajas@water.ca.gov and Lincoln King at Lincoln.King@water.ca.gov.

- Please provide DWR with a copy of the certificate of insurance evidencing coverage during construction. Refer to the Turnout Agreement for more information on the insurance requirement.

In accordance with an August 27, 2015, conversation between Lincoln King of my staff, the county's and Jeff Lee, three sets of approved stamped plans and specifications will be sent to Mr. John Brady of Central Coast Water Authority for distribution to the county. A DWR field representative will also be inspecting construction of the Shandon Turnout. Please submit a detailed construction schedule to the State Water Project Analysis Office and to the Construction Office located at the following address:

Mr. David Sale
Department of Water Resources
Pearblossom Project Headquarters
34534 116th Street East
Pearblossom, California 93553
(661) 944-8513
David.Sale@water.ca.gov

If there is a change in the start date, please notify both the San Joaquin Field Division at the phone number listed above and Tasmin Eusuff of my staff at (916) 653-6250.

If you have any questions or need additional information, please contact Lincoln King at (916) 653-4389 or Jorge Barajas at (916) 653-7330.

Sincerely,

Robert B. Cooke

Robert B. Cooke, Chief
State Water Project Analysis Office

Enclosures

cc: Mr. Jeff Lee, Project Manager
County of San Luis Obispo
County Government Center, Room 207
San Luis Obispo, California 93408

Mr. John Brady, Operations Manager (3 sets of enclosures)
Central Coast Water Authority
255 Industrial Way
Buellton, California 93427-9565

# PROJECT PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 1 | 15 |

# CONSTRUCTION OF COUNTY SERVICE AREA No. 16

## Shandon State Water Project Turnout

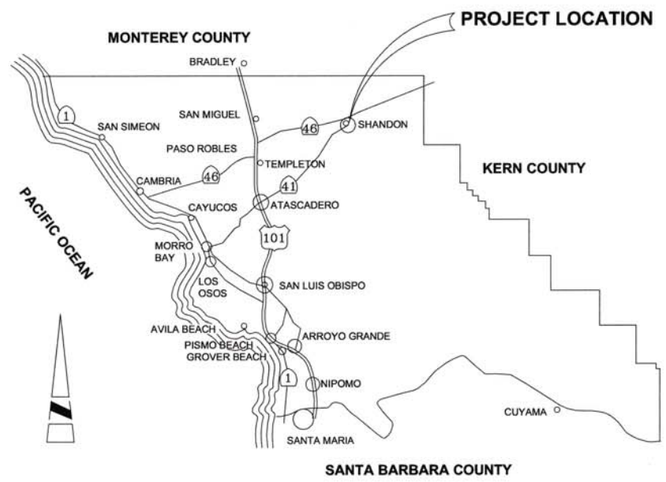
## Contract No. 300463

APPROVED: 06 OCTOBER, 2015

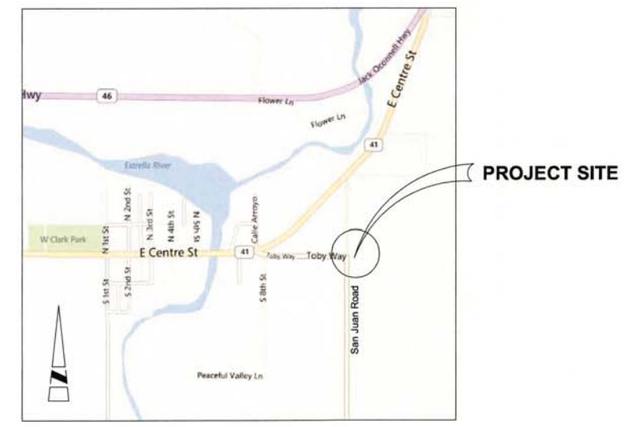
~~DEPUTY~~ DIRECTOR OF PUBLIC WORKS

APPROVED: 10/6/2015

UTILITIES DIVISION MANAGER




LOCATION MAP
SAN LUIS OBISPO COUNTY
NOT TO SCALE




VICINITY MAP
NOT TO SCALE

APPROVED, EXCEPT AS NOTED IN THE LETTER FROM THE DEPARTMENT TO THE San Luis Obispo County Flood Control and Water Conservation District DATED 9/1/2015 FOR CONNECTION TO THE STATE WATER PROJECT.

Robert B Cooke 9/1/15

STATE OF CALIFORNIA, DEPARTMENT OF WATER RESOURCES — DATE

## SHEET INDEX


| Sheet Number | Sheet Title |
|---|---|
| 1 | TITLE SHEET |
| 2 | GENERAL NOTES AND ABBREVIATIONS |
| 3 | SITE PLAN |
| 4 | 2-INCH PIPELINE - PLAN AND PROFILE |
| 5 | METER VAULT AND SECTIONS |
| 6 | CONTROL BUILDING AND SECTIONS |
| 7 | CHAIN LINK FENCE AND GATE DETAILS |
| 8 | DETAILS |
| 9 | DETAILS |
| 10 | ELECTRICAL PLAN AND CONTROL BUILING |
| 11 | MISCELLANEOUS SCHEDULES |
| 12 | ELECTRICAL SITE PLAN |
| 13 | INSTRUMENTATION LEGEND & SYMBOLS |
| 14 | SHANDON METER STATION P&ID |
| 15 | INSTRUMENTATION DETAILS |


## CONTACT LIST

| | | |
|---|---|---|
| CENTRAL COAST WATER AUTHORITY: | JOHN BRADY | (805) 688-2292 EXT. 228 |
| SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT | JEFF LEE | (805) 781-1043 |
| PACIFIC GAS AND ELECTRIC | TOM WAHWEOTTEN | (805) 546-5272 |
| DIG ALERT: | | (800) 642-2444 |
| AECOM: | MARIA ALVAREZ | (213) 593-8046 |
| AT&T | ? | (510) 645 2929 |

## DWR NOTES:

A SEVEN (7) DAY ADVANCE NOTIFICATION IS REQUIRED PRIOR TO STARTING WORK WITHIN STATE WATER PROJECT RIGHT-OF-WAY. CONTACT THE DEPARTMENT OF WATER RESOURCES, DIVISION OF LAND AND RIGHT-OF WAY, ENCROACHMENT PERMIT SECTION, SACRAMENTO, CALIFORNIA, AT (800) 600-4397. SAN JOAQUIN FIELD DIVISION, (661) 858-5517 AND CENTRAL COAST WATER AUTHORITY AT (805) 697-5235, SHALL BE SIMULTANEOUSLY NOTIFIED.

EXCEPT AS OTHERWISE PROVIDED HEREIN, MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT IN PLACE ANY AND ALL SWP FACILITIES AND APPURTENANCES, INCLUDING BUT NOT LIMITED TO, COMMUNICATION CONTROL CABLES AND CORROSION PROTECTION TEST STATIONS AND PIPELINES. THE PERMITEE AND CONTRACTOR WILL BE LIABLE FOR ANY DAMAGE TO DWR FACILITIES AND APPURTENANCES AS A RESULT OF THE CONSTRUCTION, AND FOR ANY OTHER DAMAGES OR LOSSES SUFFERED BY DWR OR ITS WATER CONTRACTORS, INCLUDING POWER, IRRIGATION, MUNICIPAL AND INDUSTRIAL WATER SUPPLY, AND COMMUNICATION LOSSES.

ALL TRENCH EXCAVATION SHALL COMPLY WITH THE MOST CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION STANDARDS. TRENCH BACKFILL SHALL BE PLACED IN NO GREATER THAN 4-INCH LIFTS IF HAND COMPACTED OR NO GREATER THAN 8-INCH LIFTS IF POWER COMPACTED. TRENCH BACKFILL WITHIN DEPARTMENT OF WATER RESOURCES RIGHT-OF WAY SHALL BE COMPACTED TO 95 PERCENT RELATIVE COMPACTION (ASTM D1557).

Know what's below. Call before you dig.

REGISTERED PROFESSIONAL ENGINEER — No. C37465 EXP. 06/30/15 — CIVIL — STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| TITLE SHEET | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 2 | 15 |

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AC | - | ASPHALT CONCRETE | MAX | - | MAXIMUM |
| APPROX | - | APPROXIMATE | MFR | - | MANUFACTURER |
| CF | - | CUBIC FEET | MIN | - | MINIMUM |
| ℄ | - | CENTERLINE | NOM | - | NOMINAL |
| CLR | - | CLEARANCE | NPT | - | NATIONAL PIPE THREAD |
| CONC | - | CONCRETE | NTS | - | NOT TO SCALE |
| CPT | - | CATHODIC PROTECTION TEST STATION | OC | - | ON CENTER |
| | | | OD | - | OUTSIDE DIAMETER |
| DWG | - | DRAWING | POC | - | POINT OF CONNECTION |
| Ø | - | DIAMETER | PSI | - | POUNDS PER SQUARE INCH |
| DWR | - | DEPARTMENT OF WATER RESOURCES | PVC | - | POLYVINYL CHLORIDE |
| | | | RED | - | REDUCER |
| EL | - | ELEVATION | RPP | - | REMOTE PROCESS PANEL |
| EXIST | - | EXISTING | S | - | SLOPE |
| EW | - | EACH WAY | SCH | - | SCHEDULE |
| FF | - | FINISH FLOOR | SHT | - | SHEET |
| FG | - | FINISHED GRADE | SLO | - | SAN LUIS OBISPO |
| FL | - | FLOWLINE | SPEC | - | SPECIFICATION |
| FLG | - | FLANGE | SST | - | STAINLESS STEEL |
| FRP | - | FIBER REINFORCED POLYESTER | STA | - | STATION |
| | | | STD | - | STANDARD |
| FS | - | FINISH SURFACE | SWP | - | STATE WATER PROJECT |
| HSS | - | HIGH STRENGTH STEEL | TYP | - | TYPICAL |
| ICP | - | INSTRUMENT CONTROL PANEL | UNK | - | UNKNOWN |
| | | | UNO | - | UNLESS NOTED OTHERWISE |
| ID | - | INSIDE DIAMETER | W/ | - | WITH |
| L | - | LENGTH | WWM | - | WELDED WIRE MESH |

## LEGEND OF LINE TYPES

| | |
|---|---|
| —\\\—\\\—\\\— | EDGE OF PAVEMENT |
| — — — — — — — — | PROPERTY LINE |
| — OHE — OHE — OHE — OHE — | OVERHEAD ELECTRICAL |
| — WT — WT — WT — WT — WT — | WATER MAIN |
| — ATT — ATT — ATT — | UNDERGROUND TELEPHONE |
| — X — X — X — X — | CHAIN LINK FENCE |
| — FO — FO — FO — FO — FO — | FIBER OPTIC |

## CONSTRUCTION NOTES

1. CONSTRUCTION IN ROADWAYS SHALL COMPLY WITH THE REQUIREMENTS OF SAN LUIS OBISPO COUNTY.
2. OPEN TRENCHES AND POTHOLES SHALL BE PLATED DURING NON-WORKING HOURS WITH NON SKID STEEL PLATES.
3. UNLESS OTHERWISE NOTED, STATIONS ON PLANS REFER TO CENTERLINE OF PIPELINE AND ARE BASED ON HORIZONTAL DISTANCES.
4. UNLESS OTHERWISE NOTED, THE PROFILE GRADE FOR THE PIPE IS THE CENTER OF PIPE.
5. VERIFY DIMENSIONS AND CONDITIONS AT THE SITE BEFORE STARTING WORK. CONFLICTS BETWEEN DETAILS OR DIMENSIONS ON THE DRAWINGS SHALL BE REPORTED PROMPTLY TO THE OWNER, WHO WILL DETERMINE THE INTENT OF THE DESIGN.
6. FIELD VERIFY THE HORIZONTAL AND VERTICAL LOCATION, DIAMETER, AND ORIENTATION AT ALL CONNECTION POINTS AND COORDINATE WITH THE OWNER PRIOR TO CONSTRUCTION.
7. FURNISH AND INSTALL ALL PIPE MATERIALS AND FITTINGS, AS REQUIRED TO MEET EXISTING FIELD CONDITIONS FOR A COMPLETE INSTALLATION.
8. VIDEO RECORD AND DOCUMENT THE EXISTING CONDITION OF PROPERTIES AND SUBMIT THE RECORDING AND DOCUMENT TO THE OWNER PRIOR TO THE START OF CONSTRUCTION.
9. REPAIR DAMAGE TO LANDSCAPING, PAVING, CURBS, GUTTERS, IRRIGATION, STRUCTURES, ETC., CAUSED BY THE WORK, TO PRE-EXISTING CONDITION. FOR CURBS, SIDEWALKS, ETC., THE REPAIRS SHALL EXTEND TO THE NEAREST JOINT.
10. PAVEMENT CUTS SHALL BE PERFORMED BY SAW CUTTING. RECUT PAVEMENT AND REHABILITATE SUBGRADE PRIOR TO REPAVING WHERE UNDERMINING HAS OCCURRED.
11. MAINTAIN A COMPLETE AND ACCURATE RECORD OF ALL CHANGES IN PLANS AND SPECIFICATIONS THAT OCCUR DURING CONSTRUCTION. NO CHANGES SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE OWNER.
12. FURNISH AND MAINTAIN A LOCKABLE CHEMICAL TOILET AT THE WORK LOCATION WITH HAND SANITIZER.
13. PRIOR TO CONSTRUCTION AT THE METER TURNOUT SITE, AMEND THE EXISTING NON STORM WATER MANAGEMENT PLAN AND SWPPP AS NEEDED AND IN ACCORDANCE WITH CALIFORNIA REGULATIONS.
14. ALL SUBSURFACE UTILITY DATA ARE DEPICTED TO LEVEL D AS DEFINED IN ASCE 38-02 UNLESS OTHERWISE INDICATED.
15. SURVEY DATA PRESENTED ON THE DRAWINGS ARE BASED ON AS BUILT RECORDS FOR THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES PROJECT, CALIFORNIA AQUEDUCT COASTAL BRANCH II, SPEC. No. 93-33.
16. GEOTECHNICAL INFORMATION IS AVAILABLE IN "FINAL CONSTRICTION GEOLOGY REPORT COASTAL BRANCH - PHASE II REACH 2 PIPELINE, CHOLAME VALLEY TO SHEDD CANYON". PROJECT GEOLOGY REPORT C-113, JULY 2001.

## STANDARDS DRAWING INDEX

### COUNTY OF SAN LUIS OBISPO

| Drawing No. | Title |
|---|---|
| R-3 | TRENCH REPAIR |
| W-3 | VALVE ANCHOR AND BOX |
| W-10 | WATERLINE CUT-IN TEE AND HOT TAP ASSEMBLY |

APPROVED FOR CONSTRUCTION

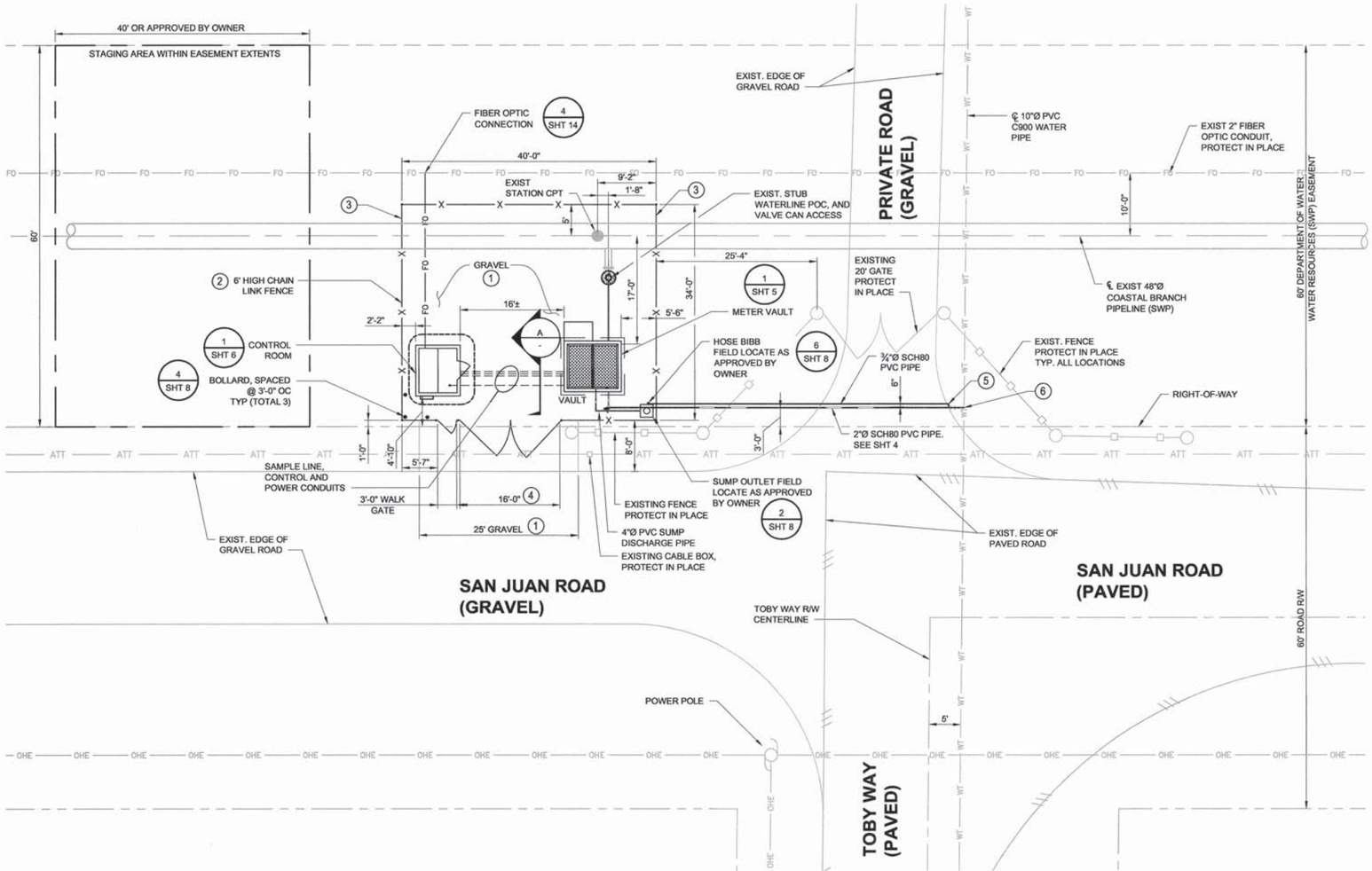
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER — MARISA M. ALVAREZ — No. C67748 — EXP. 06/30/17 — CIVIL — STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| GENERAL NOTES AND ABBREVIATIONS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

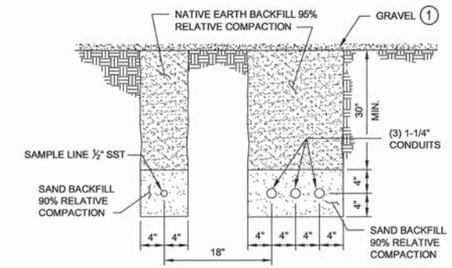
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 3 | 15 |




1 | SITE PLAN

SCALE: 1" = 10'




A | TRENCH SECTION

NOT TO SCALE

## NOTES

1. 6" DEPTH OF ¾" CRUSHED ROCK
2. FURNISH AND INSTALL 6' HIGH CHAINLINK FENCE PER SHT 7.
3. FENCE POST ARE TO CLEAR 48-INCH DWR PIPELINE.
4. DOUBLE LEAF GATE PER DETAIL ON SHT 7.
5. INSTALL 2"x¾" SCH80 PVC TEE IMMEDIATELY NORTH OF 2" TAPPING GATE VALVE. ¾" PIPE TO RUN PARALLEL TO 2" PIPE AT THE SAME ELEVATION.
6. INSTALL TAPPING SLEEVE PER SLO STD DWG W-10.

APPROVED FOR CONSTRUCTION

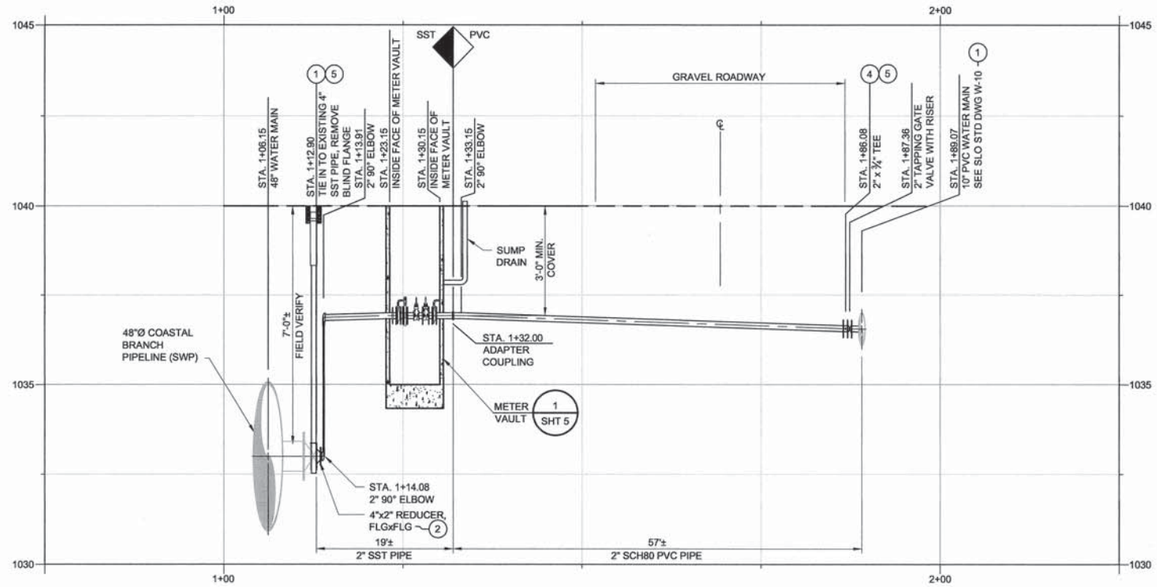
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER BRIAN M. HALE No. 067407 EXP. 06/30/15 CIVIL STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| SITE PLAN | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 4 | 15 |

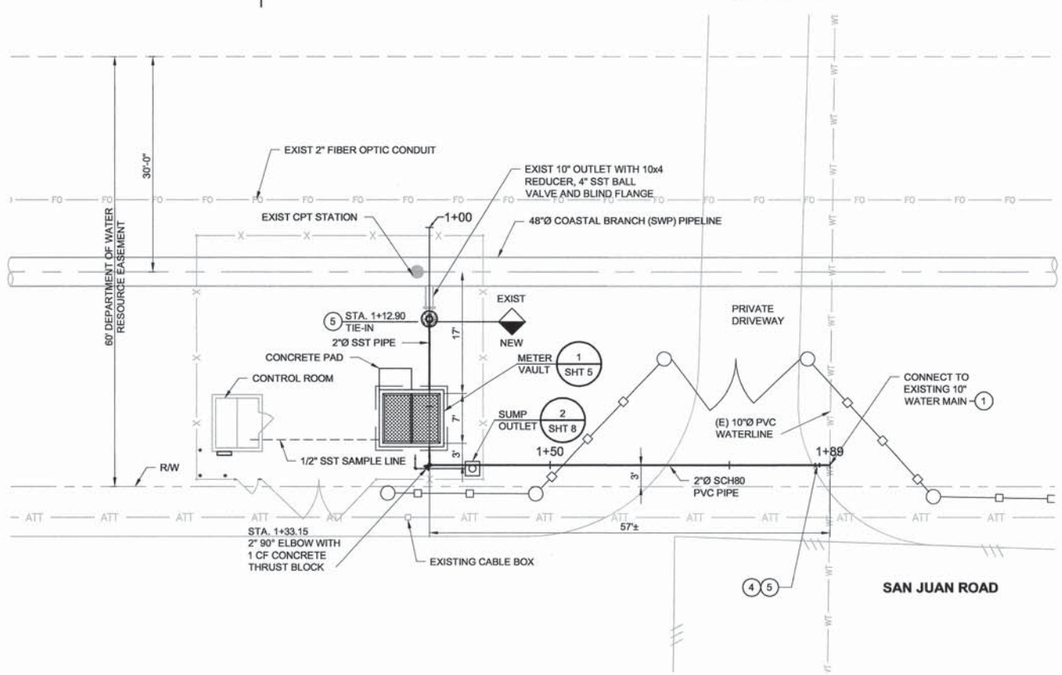



0 10' 20' H: 1" = 10'
0 2' 4' V: 1" = 2'

**A** | **2" PIPE TURNOUT PROFILE**
SHT 4 | Scale: 1" = 10' H, 1" = 2' V

**NOTES:**

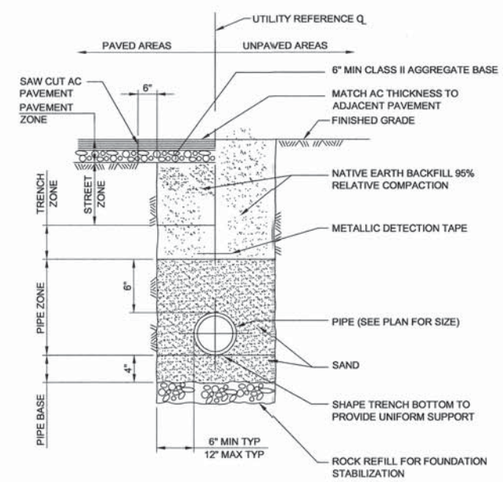
1. POTHOLE CONNECTION POINT AND VERIFY LOCATION, ELEVATION, SIZE AND CONDITION OF EXISTING UTILITY INSTALL TAPPING SLEEVE PER SLO STD DWG W-10.
2. CLOSE BALL VALVE, THEN REMOVE EXISTING BLIND FLANGE AND INSTALL SST REDUCER.
3. REFER TO SHT 3 FOR SITE PLAN.
4. 2" TAPPING GATE VALVE PER SLO COUNTY STD DWG W-10.
5. VALVE ANCHOR AND BOX PER SLO COUNTY STD DWG W-3 AND VALVE CAN ACCESS. INSTALL INSULATING FLANGE KIT.




N

0 10' 20'
1" = 10'

**1** | **PIPE PLAN**
SHT 4 | Scale: 1" = 10'




NOTE:

REFER TO COUNTY OF SAN LUIS OBISPO STANDARD DRAWING R-3 FOR ROADWAY TRENCHING AND REPAIR.

**2** | **TRENCH DETAIL**
- | NOT TO SCALE

APPROVED FOR CONSTRUCTION

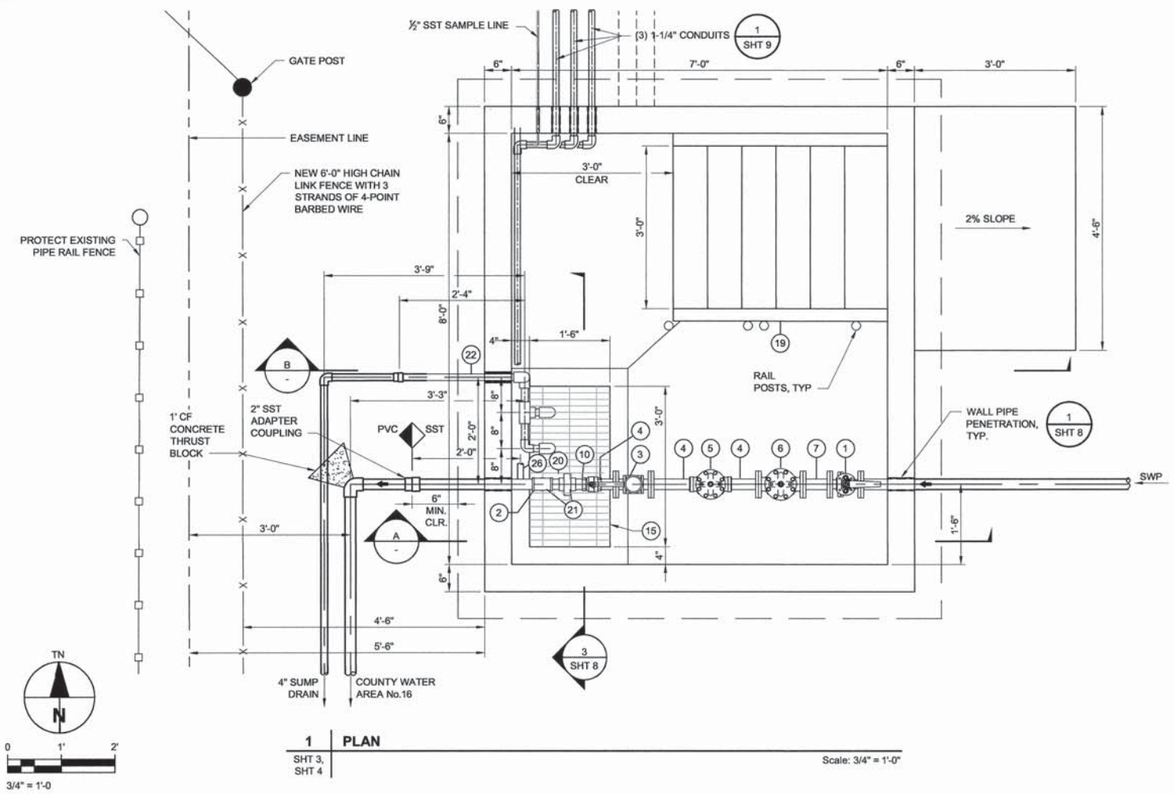
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
No. C67467
EXP. 06/30/15
CIVIL
STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| 2–INCH PIPELINE – PLAN AND PROFILE | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 5 | 15 |




## 1 PLAN

SHT 3, SHT 4

Scale: 3/4" = 1'-0"

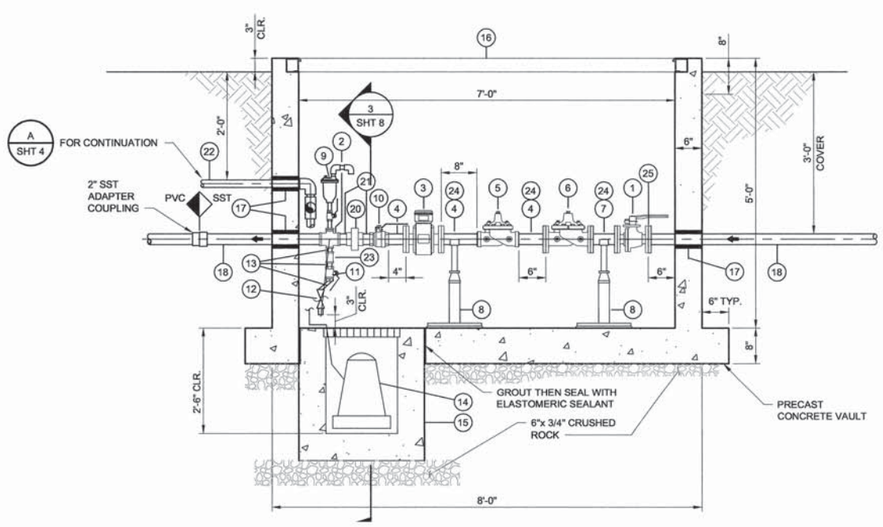
## COMPONENT SCHEDULE

| ITEM | DESCRIPTION MATIERAL |
|---|---|
| 1 | 2" SST BALL VALVE, FLG x FLG, TYPE 101 |
| 2 | 2"x2"x1/2"x3/4" SST CROSS, NPT x NPT x NPT x NPT |
| 3 | 2" MAGNETIC FLOW METER, FLG x FLG |
| 4 | 2"Ø SST PIPE SPOOL, FLG x NPT |
| 5 | 2" SST PRESSURE REDUCING VALVE, NPT x NPT |
| 6 | 2" SST PRESSURE REDUCING VALVE, FLG x FLG |
| 7 | 2"Ø x 6" SST PIPE SPOOL, FLG x FLG |
| 8 | PIPE SUPPORTS, SEE 5 SHT 8 |
| 9 | ½" SST AIR RELEASE VALVE, TYPE 401 WITH ½" SST BALL VALVE, TYPE 102 |
| 10 | 2" SST BALL VALVE, NPT x NPT, TYPE 101 |
| 11 | 3/4" SST BALL VALVE, NPT x NPT, TYPE 102 |
| 12 | 3/4" SST PRESSURE RELIEF VALVE, NPT x NPT, TYPE 301 |
| 13 | 3/4"Ø SST NIPPLE, NPT |
| 14 | 2 - SUMP PUMPS. REFER TO SPECIFICATION 22 14 29. |

## COMPONENT SCHEDULE

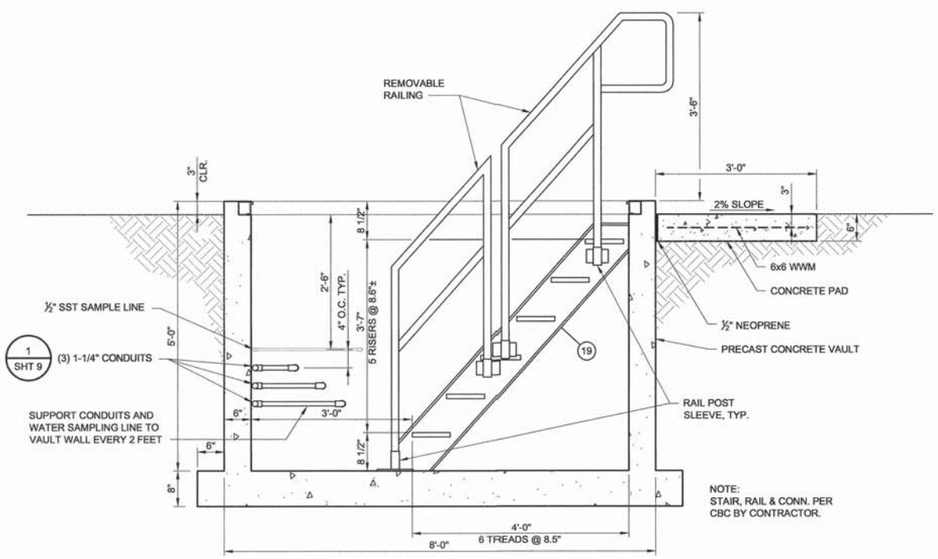
| ITEM | DESCRIPTION MATIERAL |
|---|---|
| 15 | 18" x 36" x 12" MIN. DEPTH PRECAST SUMP WITH F.R.P. GRATE SHALL HAVE 1½" x 1½" x 1/4" ANGLE SUPPORT FRAMING WITH ANCHORS TO CONCRETE SLAB. 3 SHT 8 |
| 16 | 7'-0" x 8'-0" DOUBLE LEAF ALUMINUM ACCESS HATCH (H20S) |
| 17 | WALL PENETRATION, SEE 1 SHT 8 |
| 18 | 2"Ø SST SCH 80 PIPE EPOXY COATING |
| 19 | ALUMINUM STAIRS |
| 20 | 2" SST UNION |
| 21 | 2"Ø SST NIPPLE |
| 22 | 4"Ø PVC SCH 80 SUMP PUMP DISCHARGE PIPE |
| 23 | 3/4"x3/4"x1/2" SST TEE, NPT x NPT x NPT |
| 24 | PRESSURE INDICATOR TRANSMITTER AND TAP FOR SENSING LINE |
| 25 | INSULATED FLANGE KIT. REFER TO SPECIFICATION 33 10 00 |
| 26 | 2"Ø SST TEE, NPT x NPT x NPT SEE DTL 3 ON SHEET 8 |

NOTE: REFER TO SPECIFICATION 33 10 00 FOR VALVE TYPES.




## A SECTION

Scale: 3/4" = 1'-0"




## B SECTION

Scale: 3/4" = 1'-0"

APPROVED FOR CONSTRUCTION

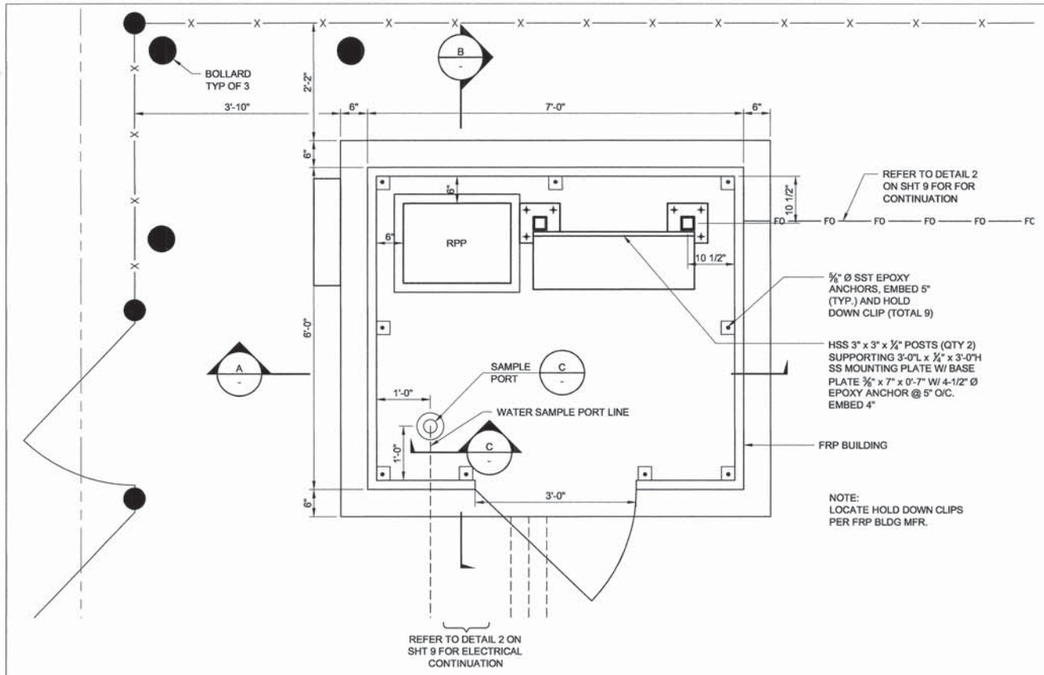
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
MARIO M. ALVAREZ
No. C67485
EXP. 06/30/15
CIVIL
STATE OF CALIFORNIA

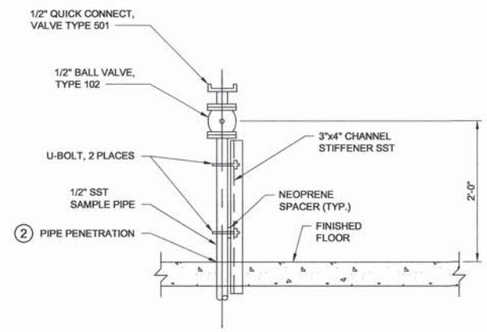
| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| METER VAULT AND SECTIONS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 6 | 15 |




**1 PLAN**
SHT 3
Scale: 3/4" = 1'-0"



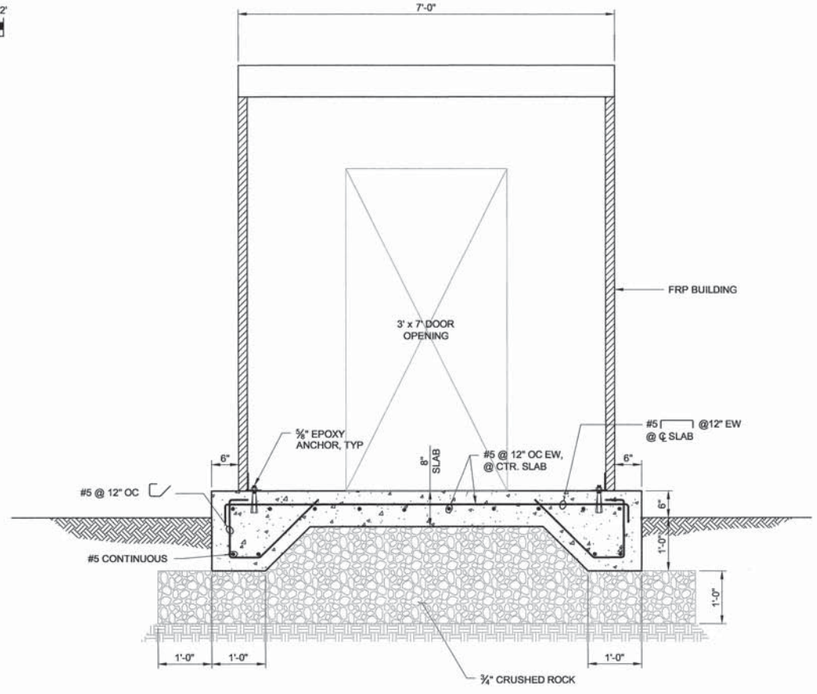

NOTES:

1. REFER TO SPECIFICATION 33 10 00 FOR VALVE TYPES.
2. WRAP PIPE WITH PIPE TAPE & CAST IN CONCRETE.

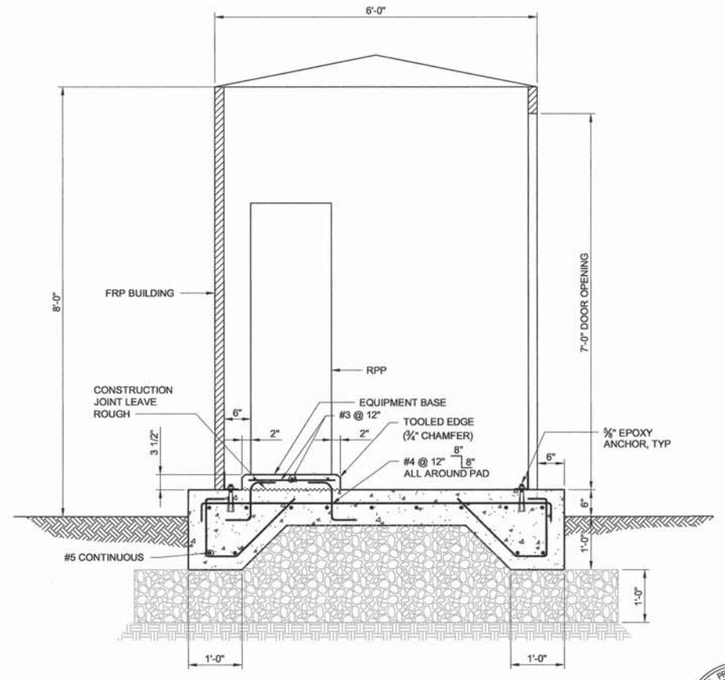
**C SAMPLE PORT 1**
Scale: 3/4" = 1'-0"

N

0 1' 2'
3/4" = 1'-0




**A SECTION**
Scale: 3/4" = 1'-0"




**B SECTION**
Scale: 3/4" = 1'-0"

APPROVED FOR CONSTRUCTION

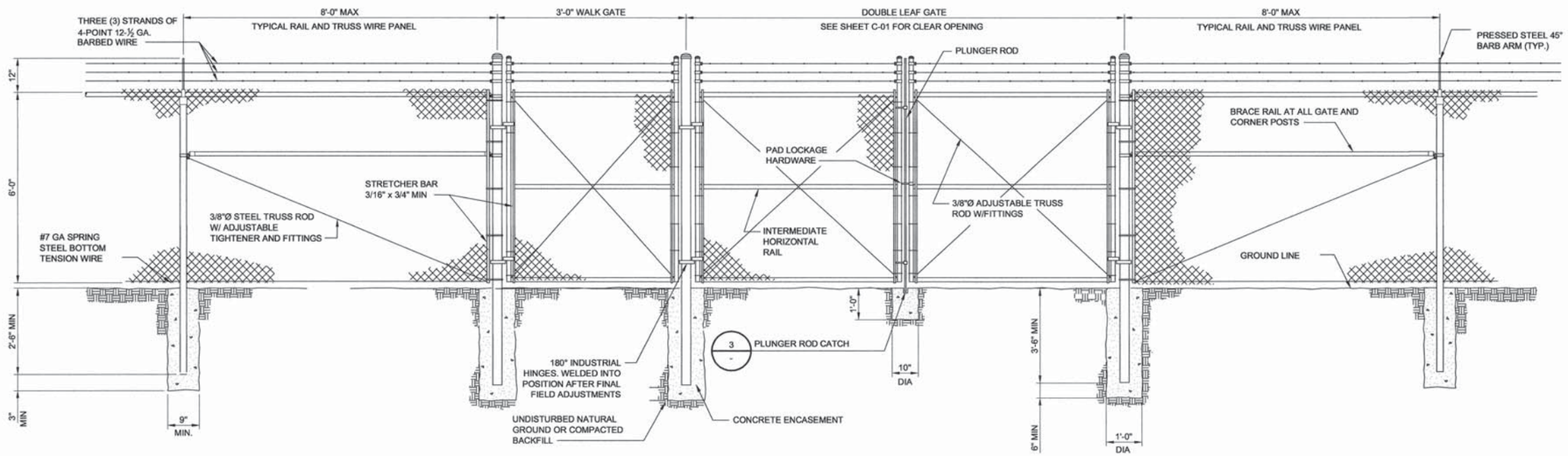
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
DAVID J. SOMERVILLE
No. S1572
EXP. 6-30-15
STRUCTURAL
STATE OF CALIFORNIA

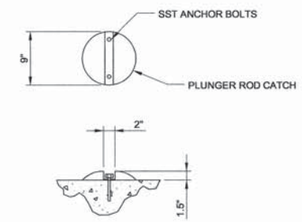
| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| CONTROL BUILDING AND SECTIONS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

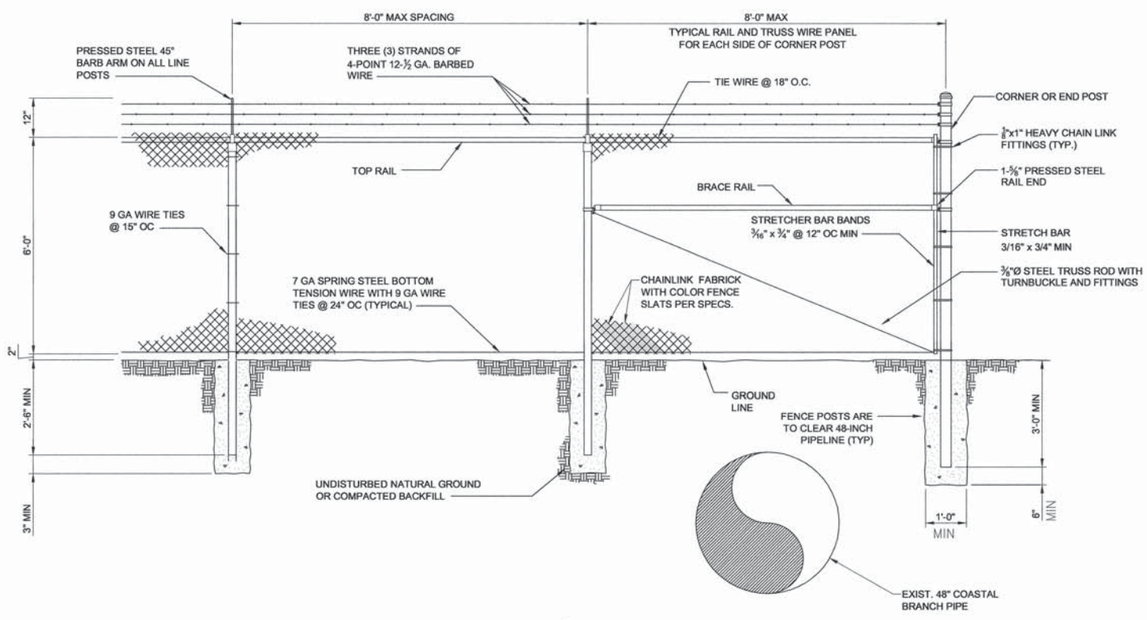
| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 7 | 15 |




**1 DOUBLE LEAF GATE DETAIL**
SHT 3 SCALE: NTS




**3 PLUNGER ROD CATCH**
SCALE: NTS




**2 TYPICAL FENCE ELEVATION**
SHT 3 SCALE: NTS

**POST & MATERIALS TABLE**

| | |
|---|---|
| LINE POSTS | 2-3/8" OD SCH 40 PIPE |
| CORNER & END POSTS | 2-7/8" OD SCH 40 PIPE |
| TOP RAIL | 1-5/8" OD SCH 40 PIPE |
| DRIVE GATE POSTS | 4-1/2" OD SCH 40 PIPE |
| CHAIN LINK FABRIC | 9 GA WIRE 2" DIAMOND WIRE, KNUCKLED TOP & BOTTOM |
| GATE FRAMES | 1-7/8" OD SCH 40 PIPE |
| TENSION WIRE | 7 GA GALV COIL SPRING STEEL |
| TRUSS RODS | 3/8" GALV STEEL |
| BRACE RAIL | 1-5/8" OD SCH 40 PIPE |

NOTE: FENCE TO BE 1' INSIDE PROPERTY LINE UNLESS NOTED OTHERWISE.

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

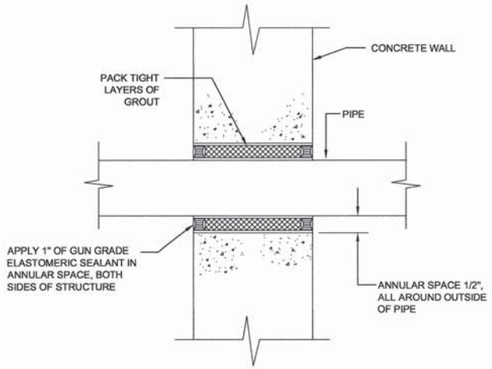
REGISTERED PROFESSIONAL ENGINEER M. A. ALVAREZ No. C67401 EXP. 06/30/15 CIVIL STATE OF CALIFORNIA

COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT
CHAIN LINK FENCE AND GATE DETAILS
SHANDON STATE WATER PROJECT TURNOUT

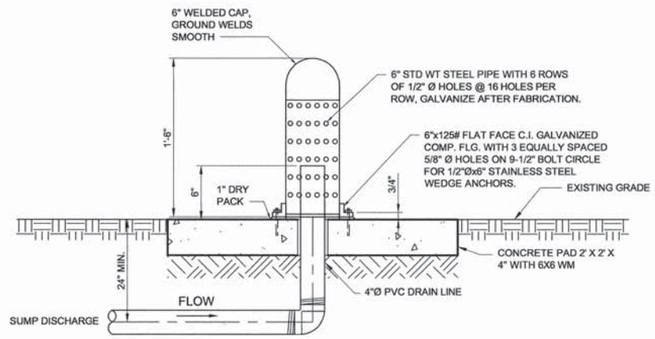
| Designer | Date | Drawn By | Date | Design Engineer | Date |
|---|---|---|---|---|---|
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

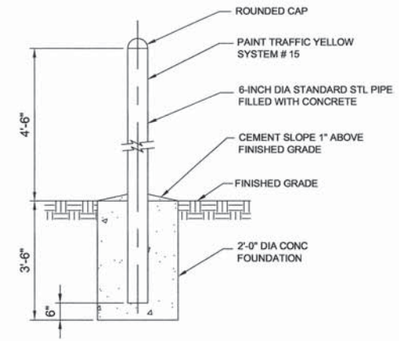
| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 8 | 15 |




**1 WALL PIPE PENETRATION**
SHT 5, SHT 6 — NOT TO SCALE



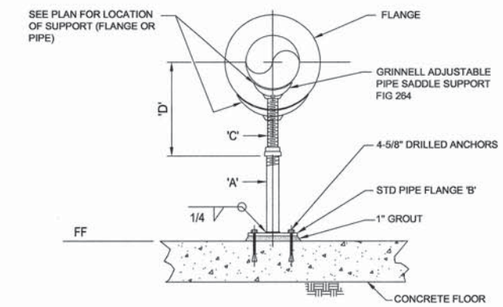

**2 DRAIN DISCHARGE ASSEMBLY DETAIL**
SHT 3 — NOT TO SCALE



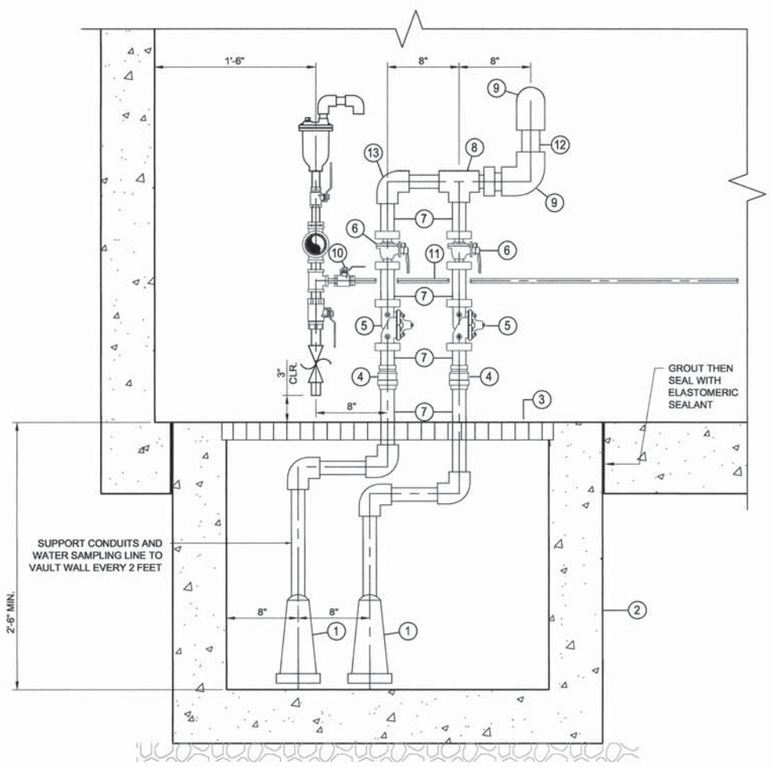

**4 BOLLARD**
SHT 3 — NOT TO SCALE

| PIPE DIA (IN) | 'A' | 'B' | 'C' | 'D' | |
|---|---|---|---|---|---|
| | | | | MIN | MAX |
| 2 | 2 1/2 | 9 | 1 1/2 | 8 | 13 |
| | | | | | |

1. PROVIDE HALF ROUND RIGID INSULATION & INSULATION PROTECTION SHIELD, SIMILAR TO GRINNELL FIG 167 OR B-LINE B-3151.
2. PROVIDE NEOPRENE WAFFLE ISOLATION PAD SIMILAR TO MASON TYPE 'W' OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT
3. SEE TABLE FOR BASE, HEIGHT, & FLANGE DIMENSIONS




**5 PIPE SUPPORT**
SHT 5 — NOT TO SCALE

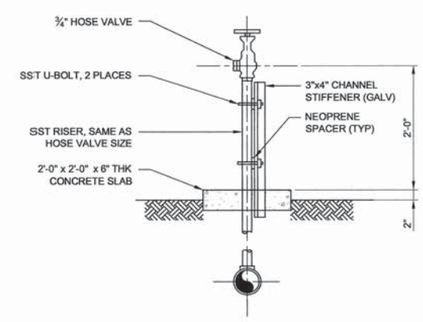



**3 METERING VAULT ENLARGED**
SHT 5 — NOT TO SCALE

## COMPONENT SCHEDULE

| ITEM | DESCRIPTION MATERIAL |
|---|---|
| 1 | 2 - SUMP PUMPS. REFER TO SPECIFICATION 22 14 29. |
| 2 | 18" x 36" x 2'-6" MIN. DEPTH PRECAST SUMP |
| 3 | F.R.P. GRATE SHALL HAVE 1 ½" x 1½" x 1¼" ANGLE SUPPORT FRAMING WITH ANCHORS TO CONCRETE SLAB. |
| 4 | 2" QUICK DISCONNECT, TYPE 501 |
| 5 | 2" CHECK VALVE, PVC, NPT x NPT, TYPE 201 |
| 6 | 2" BALL VALVE, PVC, NPT x NPT, TYPE 103 |
| 7 | 2"Ø PVC SCH80 SUMP PUMP DISCHARGE PIPE |
| 8 | 2" x 2" x 4" SCH80 PVC TEE |
| 9 | 4" 90-DEGREE SCH80 PVC ELBOW |
| 10 | ½" SST BALL VALVE, NPT x NPT, TYPE 102 |
| 11 | ½"Ø SST SAMPLE LINE |
| 12 | 4"Ø PVC SCH 80 SUMP PUMP DISCHARGE PIPE |
| 13 | 2" 90-DEGREE SCH80 PVC ELBOW |

NOTE: REFER TO SPECIFICATION 33 10 00 FOR VALVE TYPES.




**6 HOSE BIBB**
SHT 3 — NOT TO SCALE

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER M. ALVAREZ No. C57401 EXP. 06/30/15 CIVIL STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| DETAILS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 9 | 15 |

Revisions

| Description | Approved | Date | Description | Approved | Date |
|---|---|---|---|---|---|
| REVISE NOTES 2 AND 3 | PH | AUG 14 | | | |

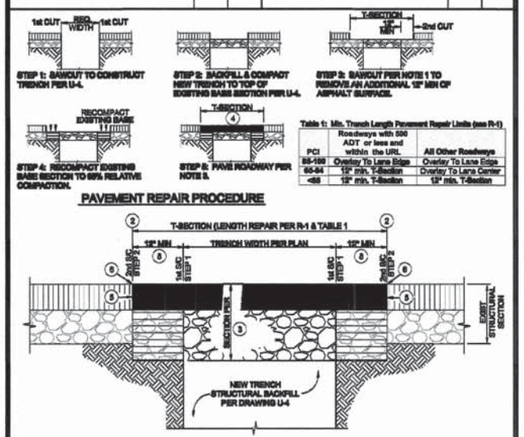



Table 1: Min. Trench Length Pavement Repair Limits (see R-1)

| PCI | Roadways with 500 ADT or less and within the URL | All Other Roadways |
|---|---|---|
| 85-100 | Overlay To Lane Edge | Overlay To Lane Edge |
| 65-84 | 12" min. T-Section | Overlay To Lane Center |
| <65 | 12" min. T-Section | 12" min. T-Section |

PAVEMENT REPAIR PROCEDURE

SECTION VIEW

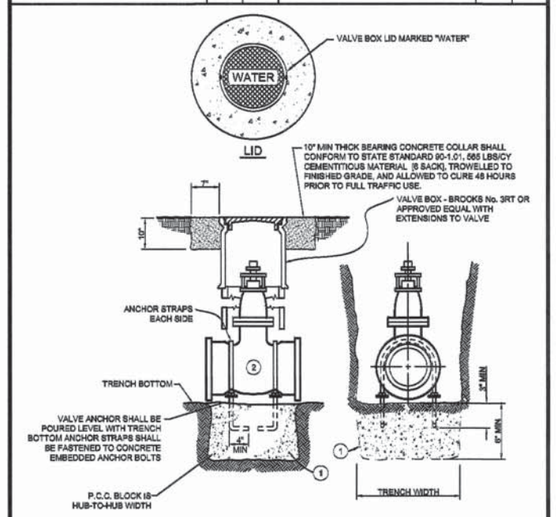
NOTES:
1. TRENCHING IN A ROADWAY IS ONLY ALLOWED WHEN BORING IS SHOWN TO THE DEPARTMENT AS being INFEASIBLE.
2. SAWCUT TO REMOVE DAMAGED OR FAILED PAVEMENT SECTION ADJACENT TO THE SIDES OF TRENCH AS NECESSARY TO PROVIDE A CLEAN JOIN LINE. ALL SAWCUTS SHALL BE PERPENDICULAR OR PARALLEL TO THE TRAVEL LANE. BEARS SHALL NOT BE ALLOWED WITHIN DESIGNATED BICYCLE LANES. ALL CUT EDGES SHALL BE VERTICAL WITH SQUARE CORNERS AND SHALL BE STRAIGHT AND NEAT IN APPEARANCE. ALL SAWCUTS SHALL BE TO MINIMUM SHOWN OR TO COMPETENT PAVEMENT SECTION.
3. THE STRUCTURAL ROAD REPAIR SECTION SHALL MATCH THE EXISTING STRUCTURAL SECTION THICKNESS OR AS REQUIRED BY THE DEPARTMENT. TYPICAL ROAD WIDENING SECTION SHALL BE:
   [illegible]" MINIMUM HOT MIX ASPHALT (HMA) OVER
   [illegible]" MINIMUM CLASS 2 AGGREGATE BASE, OVER
   [illegible] TRENCH SECTION PER DRAWING U-4 (STRUCTURAL BACKFILL TO 95% MIN RELATIVE COMPACTION)
4. NEW PAVEMENT SHALL BE PLACED IN LIFTS NOT EXCEEDING 3-INCHES (COMPACTED).
5. A TACK COAT SHALL BE APPLIED TO ALL HORIZONTAL AND VERTICAL CONCRETE SURFACES PRIOR TO PAVING.
6. AFTER PAVING, APPLY SMH OIL (OR APPROVED EQUAL) TO ALL HMA SURFACE BEARS PER MANUFACTURERS RECOMMENDATIONS.
7. THE DEPARTMENT SHALL PROVIDE ADDITIONAL REQUIREMENTS WHEN TRENCHING IN EXISTING ROADS HAVING CONCRETE STRUCTURAL SECTIONS.
8. T-SECTION WIDTHS SHALL BE INCREASED AS DIRECTED BY THE DEPARTMENT FOR UTILITY PIPES EXCEEDING 36" IN DIAMETER.

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
TRENCH REPAIR
TRANSVERSE TRENCHES AND BORE PITS

| Scale: | Adopted: |
|---|---|
| NTS | 2014 |
| Drawing No: R-3 | |
| Sheet No: 1 OF 1 | |

Revisions

| Description | Approved | Date | Description | Approved | Date |
|---|---|---|---|---|---|
| NOTE 1, CONCRETE COLLAR NOTE | REM | NOV 07 | | | |



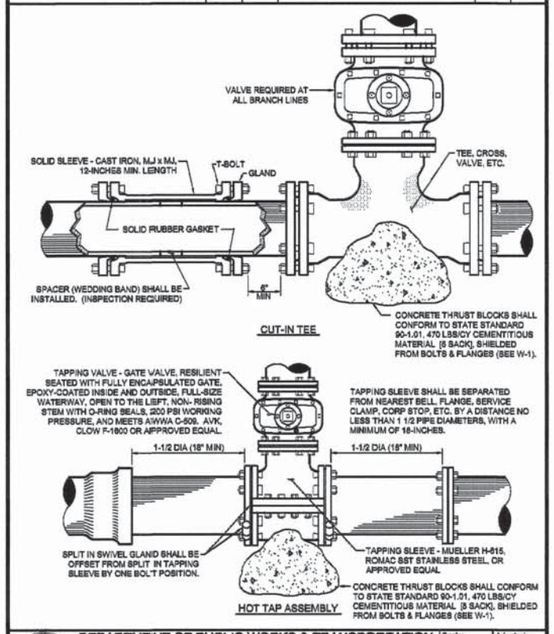

NOTES:
1. CONCRETE THRUST BLOCKS SHALL CONFORM TO STATE STANDARD 90-1.01, 470 LBS/CY CEMENTITIOUS MATERIAL (5 SACK), AND POURED AGAINST UNDISTURBED NATIVE SOIL.
2. VALVES SHALL HAVE NON-RISING STEM, RESILIENT WEDGE, RESILIENT SEAT, AND BE EPOXY COATED.
3. ALL MATERIALS AND INSTALLATION SHALL CONFORM WITH THE APPLICABLE SECTIONS OF THE DESIGN STANDARDS.
4. ALL FITTINGS SHALL BE WRAPPED IN POLYETHYLENE SHEET AND ALL FLANGES AND BOLTS SHALL BE SHIELDED FROM CONCRETE PER THE DESIGN STANDARDS.
5. UNDER NO CIRCUMSTANCES SHALL UTILITY LIDS AND CONCRETE COLLARS BE LOCATED WITHIN CURBS, GUTTERS, SIDEWALKS, DRIVEWAY APRONS, CURB RAMPS, OR CROSS GUTTERS.

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
VALVE ANCHOR & BOX

| Scale: | Adopted: |
|---|---|
| NTS | 2011 |
| Drawing No: W-3 | |
| Sheet No: 1 OF 1 | |

Revisions

| Description | Approved | Date | Description | Approved | Date |
|---|---|---|---|---|---|
| THRUST BLOCK NOTES | REM | NOV 07 | | | |




DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
WATERLINE CUT-IN TEE
& HOT TAP ASSEMBLY

| Scale: | Adopted: |
|---|---|
| NTS | 2011 |
| Drawing No: W-10 | |
| Sheet No: 1 OF 1 | |

APPROVED FOR CONSTRUCTION

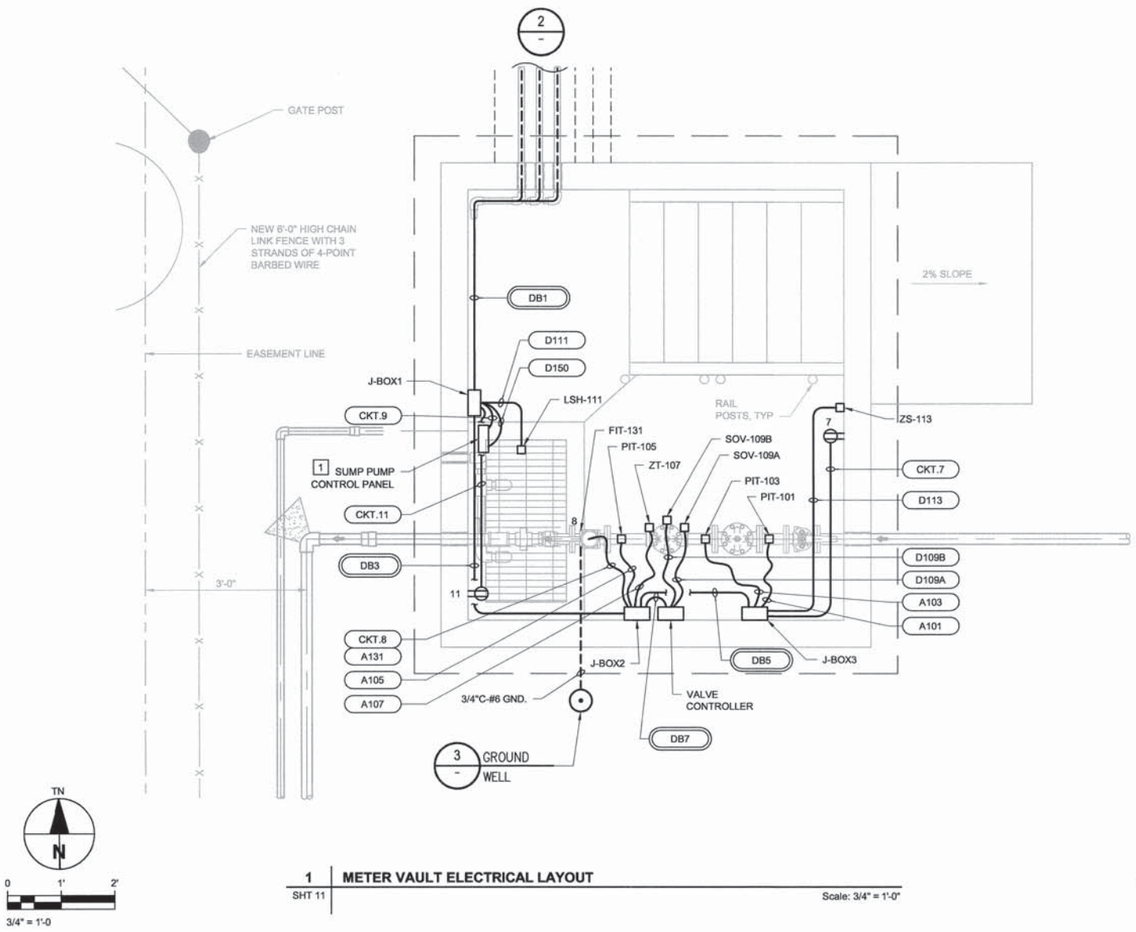
State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
M. ALVAREZ
No. 057487
EXP. 06/30/15
CIVIL
STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| DETAILS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

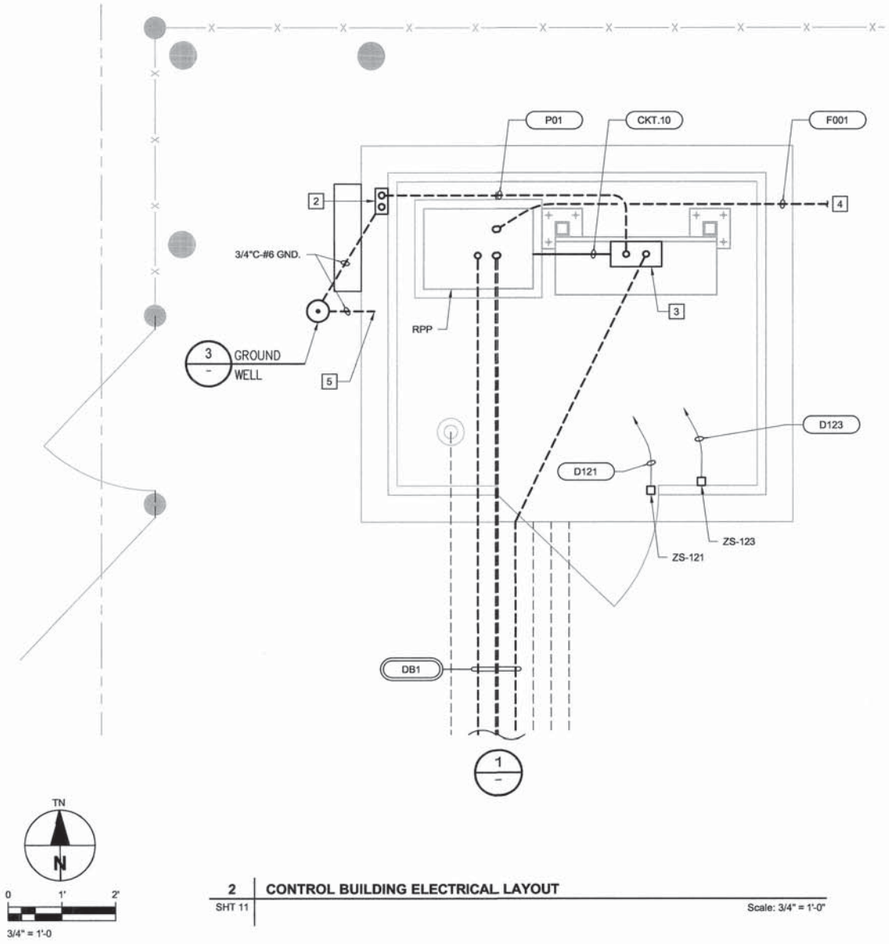
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 10 | 15 |



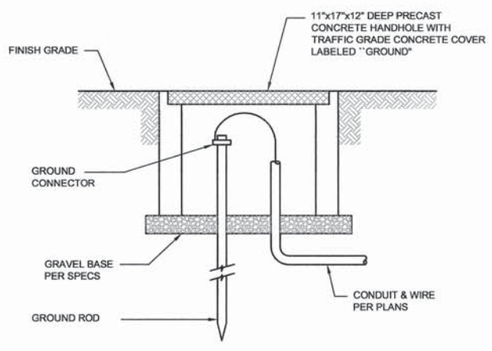

## 1 METER VAULT ELECTRICAL LAYOUT

SHT 11 — Scale: 3/4" = 1'-0"




## 2 CONTROL BUILDING ELECTRICAL LAYOUT

SHT 11 — Scale: 3/4" = 1'-0"




## 3 GROUND WELL DETAIL

NOT TO SCALE

NOTES:

1. CONNECT FLOATS PER DETAIL 5, SHEET 14. PROVIDE CORD GRIPS FOR PUMP CABLE ENTRY INTO BOTTOM OF PANEL.
2. SERVICE METER BOX.
3. PANELBOARD-A.
4. SEE SHEET NO. 11 FOR CONNECTION POINT.
5. BOND TO REBAR

LEGEND:

- GFI RECEPTACLE
- EXPOSED CONDUIT OR DUCKBANK
- EMBEDDED CONDUIT OR DUCTBANK
- FLEXIBLE CONDUIT
- CONDUIT BENDS TOWARD OBSERVER
- HOMERUN
- CONDUIT REFERENCE
- DUCTBANK REFERENCE

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER — MARK ALVAREZ — No. E9206 — Exp. 9/30/15 — ELECTRICAL — STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| ELECTRICAL PLAN AND CONTROL BUILING | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| NAMEPLATE: A | FED FROM: SERVICE METER | MOUNTING: SURFACE | ENCLOSURE: NEMA 1 |
|---|---|---|---|
| BUS: 100A | VOLTAGE: 120/240, 1-Ph, 3-W | AVAILABLE SC (kA): 7.6 / KAIC: 10 | TOP/ BOTTOM FEED: SEE PLANS |
| LOCATION: CONTROL BUILDING | | MAIN BREAKER (AMPS): MLO / 2P | |

| DESCRIPTION | LOAD VA A | LOAD VA B | | NOTES | QTY. | BRKR TRIP | CKT P | CKT REF | CKT REF | BRKR P | BRKR TRIP | QTY. | NOTES | LOAD VA A | LOAD VA B | | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LIGHTING IN CONTROL ROOM | 200 | | | | | 20 | 1 | 1 | 2 | 2 | 40 | | M | | | | MAIN INCOMING |
| REC IN CONTROL ROOM | | 360 | | | | 20 | 1 | 3 | 4 | | | | | | | | |
| FAN IN CONTROL ROOM | 300 | | | | | 20 | 1 | 5 | 6 | 1 | 20 | | | | | | SPARE |
| REC IN VAULT | | 180 | | | | 20 | 1 | 7 | 8 | 1 | 20 | | | | 20 | | FIT-131 |
| SUMP PUMP CP | 200 | | | | | 20 | 1 | 9 | 10 | 1 | 20 | | | 200 | | | RPP |
| REC IN VAULT | | 200 | | | | 20 | 1 | 11 | 12 | 1 | 20 | | | | 200 | | VALVE CONTROLLER |
| SPARE | | | | | | 20 | 1 | 13 | 14 | 1 | 20 | | | | | | SPARE |
| SPARE | | | | | | 20 | 1 | 15 | 16 | 1 | 20 | | | | | | SPARE |
| SPARE | | | | | | 20 | 1 | 17 | 18 | 1 | 20 | | | | | | SPARE |
| SPARE | | | | | | 20 | 1 | 19 | 20 | 1 | 20 | | | | | | SPARE |
| TOTAL VA (Odd Ckts)/ PH | 700 | 740 | | | | | | | | | | | | 200 | 220 | | TOTAL VA (Even Ckts)/ PH |
| TOTAL VA (All Ckts)/ PH | 900 | 960 | | | | | | | | | | | | | | | |

TOTALS = 1860VA AVERAGE AMPS/PH= 8A

AVERAGE: VA / PH= 930VA

NOTES
- VA SUMS AND AVERAGES ARE ROUNDED TO THE NEAREST : 10 VA.
- QUANTITIES IN 'QTY' COLUMN, IF ANY, INDICATE NUMBER OF POWER CONSUMING OUTLETS CONNECTED TO THE RELEVANT CIRCUIT.
- 'M' IN THE 'NOTES.' COLUMN' INDICATES THAT RELEVANT BRANCH BREAKER IS USED AS THE MAIN BREAKER OF THIS PANEL.
- THERE ARE NO CONTINUOUS LOADS OF SIGNIFICANCE FED FROM THIS PANELBOARD.

NUMBERED NOTES
(NOT USED)

**1 PANEL SCHEDULE**

| CONDUIT RUN REF. | CONDUIT SIZE | CONDUCTORS PER CONDUIT QTY | SIZE | GND | FROM | TO | REMARKS |
|---|---|---|---|---|---|---|---|
| P01 | 1" | 3 | #6 | #8 | SERVICE METER | A | |
| | | | | | | | |
| Ckt12 | 3/4" | 2 | #12 | #12 | A | VALVE CONTROLLER | Ckt 12 |
| Ckt10 | 3/4" | 2 | #12 | #12 | A | RPP | Ckt 10 |
| A101 | 3/4" | 1 | #18 TSP | | RPP | PIT-101 | |
| A103 | 3/4" | 1 | #18 TSP | | RPP | PIT-103 | |
| A105 | 3/4" | 1 | #18 TSP | | RPP | PIT-105 | |
| D100 | 3/4" | 4 | #14 | #14 | RPP | VALVE CONTROLLER | |
| A100 | 3/4" | 2 | #18 TSP | | RPP | VALVE CONTROLLER | |
| | | | | | | | |
| A131 | 3/4" | 1 | #18 TSP | | RPP | FIT-131 | |
| | | 4 | #14 | | | | PULSE & FAIL SIGNALS |
| Ckt8 | 3/4" | 2 | #12 | #12 | A | FIT-131 | Ckt 8 |
| A107 | 3/4" | 1 | #18 TSP | | RPP | ZT-107 | |
| | | | | | | | |
| D109A | 3/4" | 2 | #14 | #14 | VALVE CONTROLLER | SOV-109A | |
| D109B | 3/4" | 2 | #14 | #14 | VALVE CONTROLLER | SOV-109B | |
| D111 | 3/4" | 2 | #14 | #14 | RPP | LSH-111 | |
| D113 | 3/4" | 2 | #14 | #14 | RPP | ZS-113 | |
| | | | | | | | |
| D121 | 3/4" | 2 | #14 | #14 | RPP | ZS-121 | |
| D123 | 3/4" | 2 | #14 | #14 | RPP | ZS-123 | |
| | | | | | | | |
| CKT7 | 3/4" | 2 | #12 | #12 | A | REC 7 | |
| CKT9-11 | 3/4" | 2 | #12 | #12 | A | REC9-11 | |
| | | | | | | | |
| F001 | 2" | 1 | FIBEROPTIC | | RPP | EXISTING NETWORK | |
| | | | | | | | |
| D150 | 3/4" | 4 | #14 | #14 | RPP | SUMP PUMP CP | |
| | | | | | | | |
| | | | | | | | |

**2 CONDUIT SCHEDULE**

| DB1 | | |
|---|---|---|
| DUCT | CONDUIT | REF |
| 1-1/4" | 3/4" | CKT7 |
| | 3/4" | Ckt8 |
| | 3/4" | CKT9-11 |
| | 3/4" | Ckt12 |
| | | |
| 1-1/4" | 3/4" | A101 |
| | 3/4" | A103 |
| | 3/4" | A105 |
| | 3/4" | A107 |
| | 3/4" | A100 |
| | 3/4" | A131 |
| | | |
| 1-1/4" | 3/4" | D111 |
| | 3/4" | D113 |
| | 3/4" | D100 |
| | 3/4" | D150 |
| | | |

| DB3 | | |
|---|---|---|
| DUCT | CONDUIT | REF |
| 1-1/4" | 3/4" | Ckt12 |
| | 3/4" | CKT7 |
| | 3/4" | Ckt8 |
| | | |
| 1-1/4" | 3/4" | A100 |
| | 3/4" | A101 |
| | 3/4" | A103 |
| | 3/4" | A105 |
| | 3/4" | A107 |
| | 3/4" | A131 |
| | | |
| 1-1/4" | 3/4" | D100 |
| | 3/4" | D113 |

| DB5 | | |
|---|---|---|
| DUCT | CONDUIT | REF |
| 3/4" | 3/4" | CKT7 |
| | | |
| 3/4" | 3/4" | D113 |
| | | |
| 1" | 3/4" | A101 |
| | 3/4" | A103 |

| DB7 | | |
|---|---|---|
| DUCT | CONDUIT | REF |
| 3/4" | 3/4" | Ckt12 |
| | | |
| 3/4" | 3/4" | D100 |
| | | |
| 1" | 3/4" | A100 |

DUCTBANK SCHEDULE NOTES

1. "DUCT" - SIZE OF CONDUIT THAT SHALL BE USED AS A MINIMUM TO REPLACE CONDUITS LISTED UNDER "CONDUIT", WHEN RUNNING AS PART OF REFERENCED DUCTBANK.
2. "CONDUIT" - SIZES AS USED IN CONDUIT SCHEDULE, OR AS REQUIRED BASE ON QUANTITY AND CONDUCTOR SIZES IF NOT SHOWN IN SCHEDULE. INCLUDED HERE FOR EASY REFERENCE.
3. "REF" - CONDUIT REFERENCE AS LISTED IN CONDUIT SCHEDULE WHOSE CONDUCTORS SHALL RUN IN THE DUCT. WHERE '(SPARE)' IS INDICATED, EMPTY CONDUITS OF SIZE AND QUANTITY INDICATED SHALL BE PROVIDED AS PART OF THAT DUCTBANK.

**3 DUCTBANK SCHEDULE**

APPROVED FOR CONSTRUCTION

State of California
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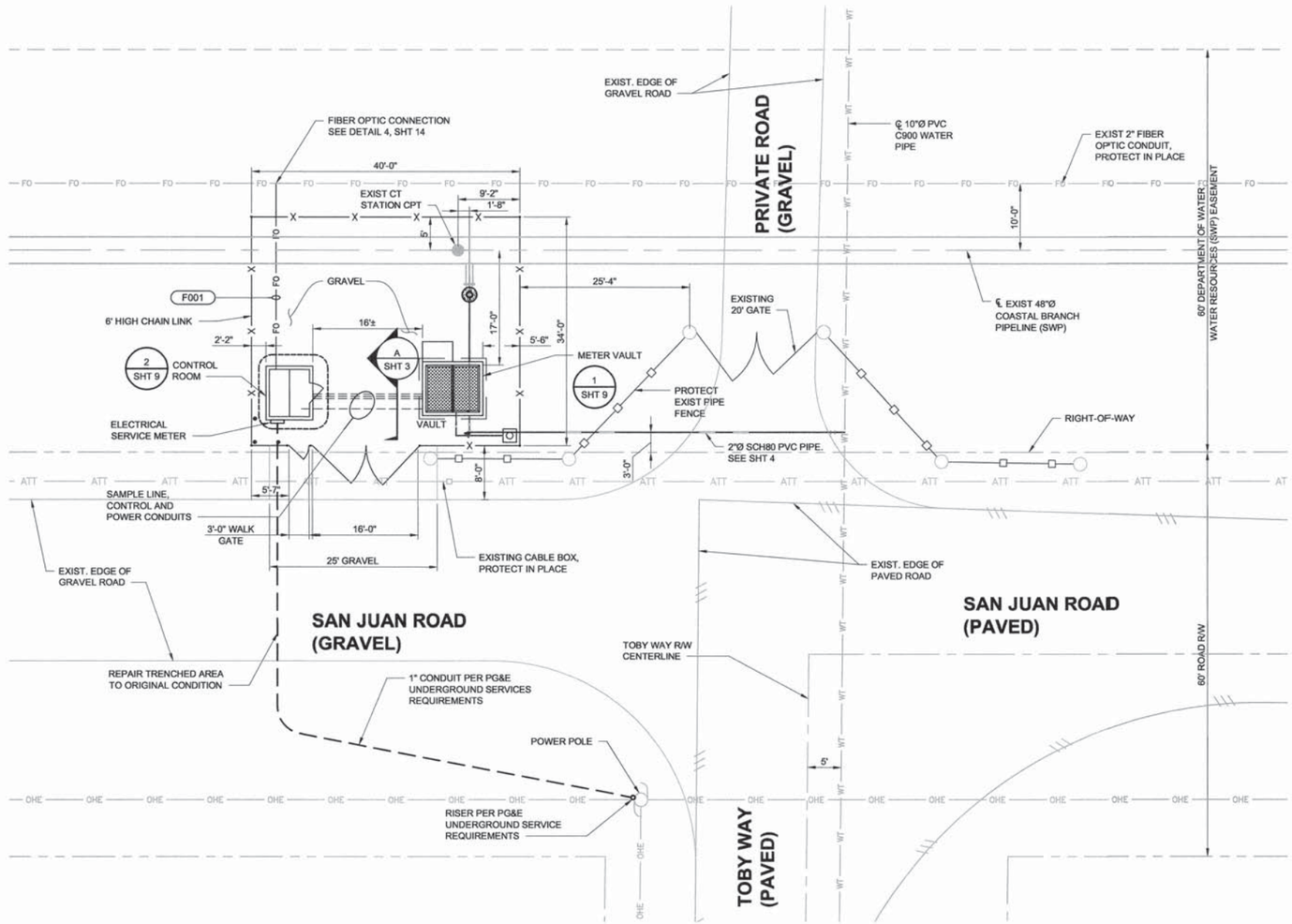
| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| MISCELLANEOUS SCHEDULES | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 12 | 15 |




1 | ELECTRICAL SITE PLAN

SCALE: 1" = 10'

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

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| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| ELECTRICAL SITE PLAN | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

## INTERNATIONAL SOCIETY OF AUTOMATION (ISA) TABLE

## IDENTIFICATION LETTERS

| | FIRST-LETTER | | SUCCEEDING-LETTERS | | |
|---|---|---|---|---|---|
| | MEASURED OR INITIATING VARIABLE | MODIFIER | READOUT OR PASSIVE FUNCTION | OUTPUT FUNCTION | MODIFIER |
| A | ANALYSIS | | ALARM | | |
| B | BURNER, COMBUSTION | | USER'S CHOICE | USER'S CHOICE | USER'S CHOICE |
| C | CONDUCTIVITY | | | CONTROL | |
| D | USER'S CHOICE | DIFFERENTIAL | | | |
| E | VOLTAGE | | SENSOR (PRIMARY ELEMENT) | | |
| F | FLOW RATE | RATIO (FRACTION) | | | |
| G | USER'S CHOICE | | GLASS, VIEWING DEVICE | | |
| H | HAND | | | | HIGH |
| I | CURRENT (ELECTRICAL) | | INDICATE | | |
| J | POWER | SCAN | | | |
| K | TIME, TIME SCHEDULE | TIME RATE OF CHANGE | | CONTROL STATION | |
| L | LEVEL | | LIGHT | | LOW |
| M | USER'S CHOICE | MOMENTARY | | | MIDDLE, INTERMEDIATE |
| N | USER'S CHOICE | | PLC/RTU INPUT | USER'S CHOICE | NORMAL |
| O | USER'S CHOICE | | ORIFICE, RESTRICTION | | |
| P | PRESSURE, VACUUM | | POINT (TEST) CONNECTION | | |
| Q | QUANTITY | INTEGRATE, TOTALIZE | | | |
| R | RADIATION | | RECORD | | |
| S | SPEED, FREQUENCY | SAFETY | | SWITCH | |
| T | TEMPERATURE | | | TRANSMIT | |
| U | MULTIVARIABLE | | MULTIFUNCTION | MULTIFUNCTION | MULTIFUNCTION |
| V | VIBRATION, MECHANICAL ANALYSIS | | | VALVE,DAMPER LOUVER | |
| W | WEIGHT, FORCE | | WELL | | |
| X | UNCLASSIFIED | X AXIS | UNCLASSIFIED(*) | UNCLASSIFIED(*) | UNCLASSIFIED(*) |
| Y | EVENT, STATE OR PRESENCE | Y AXIS | | RELAY, COMPUTE CONVERT | |
| Z | POSITION, DIMENSION | Z AXIS | | DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT | |

## INSTRUMENT LINE SYMBOLS

- PRIMARY PROCESS FLOW
- SECONDARY PROCESS FLOW, CONNECTION TO PROCESS FLOW, MECHANICAL LINK OR INSTRUMENT SUPPLY
- PNEUMATIC SIGNAL OR UNDEFINED SIGNAL FOR PROCESS FLOW DIAGRAMS
- CAPILLARY TUBING (FILLED SYSTEM)
- ELECTRIC SIGNAL (DISCRETE)
- A — ELECTRIC SIGNAL (ANALOG, TSP)
- A3 — ELECTRIC SIGNAL (ANALOG, TST)
- DATA COMMUNICATION
- BUILDING OR FACILITY BOUNDARY
- (2) — MULTI-CIRCUIT ELECTRIC SIGNALS ( NUMBER OF SIGNALS ILLUSTRATED IN PARENTHESIS)
- I-5 01 — LOGICAL OR HARDWIRE SIGNAL NUMBER (SHOWN SIGNAL "O1" ORIGINATED IN DWG. I-5)
- 01 I-5 — LOGICAL OR HARDWIRE SIGNAL NUMBER (SHOWN SIGNAL "O1" SENT TO DWG. I-5)

## VALVES & GATES

- BUTTERFLY
- GATE
- K — KNIFE GATE
- SWING CHECK
- BALL
- GLOBE
- DIAPHRAGM
- PLUG
- ECCENTRIC PLUG
- LUBRICATED PLUG
- 3-WAY GLOBE
- BALL CHECK
- PRESSURE RELIEF VALVE
- PINCH VALVE
- M — MOTOR OPERATED BUTTERFLY (MODULATING)
- M — MOTOR OPERATED BUTTERFLY (OPEN/CLOSE)
- PRESSURE REDUCING REGULATOR
- S — SOLENOID CONTROL
- S — 3-WAY SOLENOID
- NEEDLE VALVE
- PINCH VALVE
- DIAPHRAGM ACTUATED
- PRESSURE RELIEF
- AIR RELIEF

## ACTUATORS OR OPERATORS

- M — MOTOR (MODULATING)
- M — MOTOR (OPEN/CLOSE, START/STOP)
- S — SOLENOID
- P — PNEUMATIC

## INSTRUMENT ABBREVIATIONS

| | |
|---|---|
| AL | ALARM |
| AC | ALTERNATING CURRENT |
| AI | ANALOG INPUT |
| AO | ANALOG OUTPUT |
| AM | AUTO-MANUAL |
| AMR | AUTO-MANUAL-REMOTE |
| AVG | AVERAGE |
| BW | BACKWASH |
| CA | COMMON ALARM |
| C | CLOSE |
| CCC | CENTRAL CONTROL CENTER |
| CL | CHLORINE |
| DC | DIRECT CURRENT |
| DI | DISCRETE INPUT |
| DO | DISCRETE OUTPUT |
| ETM | ELAPSED TIME METER |
| HOA | HAND-OFF-AUTO |
| HLO | HIGH-LOW-OFF |
| HL | HIGH-LOW |
| HLOR | HIGH-LOW-OFF-REMOTE |
| I/O | INPUT/OUTPUT |
| LL | LOCAL LEVEL |
| LP | LOCAL PRESSURE |
| LR | LOCAL-REMOTE |
| LOS | LOCK-OUT-STOP |
| LOR | LOCAL-OFF-REMOTE |
| LPU | LINE PROTECTION UNIT |
| LCP | LOCAL CONTROL PANEL |
| MCC | MOTOR CONTROL CENTER |
| MCS | MASTER CONTROL STATION |
| MODEM | MODULATE-DEMODULATE |
| OIC | OPEN-INTERMEDIATE-CLOSED |
| OSCA | OPEN-STOP-CLOSE-AUTO |
| OOR | ON-OFF-REMOTE |
| O | OPEN |
| OO | ON-OFF |
| OOA | ON-OFF-AUTO |
| ORO | OFF-RESET-ON |
| OC | OPEN-CLOSE |
| OSC | OPEN-STOP-CLOSE |
| OSCR | OPEN-STOP-CLOSE-REMOTE |
| OCA | OPEN-CLOSE-AUTO |
| P/A | PULSE TO ANALOG |
| PF | PULSE FREQUENCY |
| PD | PULSE DURATION |
| PID | PROPORTIONAL-INTEGRAL-DERIVATIVE |
| PLC | PROGRAMMABLE LOGIC CONTROLLER |
| PS | DC POWER SUPPLY |
| P&ID | PROCESS & INSTRUMENTATION DIAGRAM |
| PRV | PRESSURE RELIEF VALVE |
| PRPRV | PRESSURE REDUCING-PRESSURE RELIEF VALVE |
| RIOP | REMOTE I/O PANEL |
| RSP | REMOTE SET POINT |
| RTD | RESISTANCE TEMPERATURE DETECTOR |
| RTDI | RTD INPUT MODULE |
| RTU | REMOTE TERMINAL UNIT |
| SCS | SUPERVISORY CONTROL STATION |
| SS | START-STOP |
| SP | SET POINT |
| TSP | TWISTED SHIELDED PAIR |
| TST | TWISTED SHIELDED TRIAD |
| TURB | TURBIDITY |
| TPC | TIME PROPORTIONAL CONTROL |
| TOT | TOTALIZATION |
| TEMP | TEMPERATURE |

## INSTRUMENT IDENTIFICATION

aabb
xxyy

- aa - FIRST LETTER
- bb - SUCCEEDING LETTERS
- yy - LOOP NO. MODIFIER (USED WITH TWO OR MORE INSTRUMENTS HAVING THE SAME FUNCTIONAL LOOP IDENTIFICATION)
- xx - LOOP NO.

- FIELD MOUNTED INSTRUMENT
- REAR OF PANEL MOUNTED INSTRUMENT
- FRONT OF PANEL MOUNTED INSTRUMENT
- ROTAMETER
- ILLUMINATED HANDSWITCH
- PLC (PROGRAMMABLE LOGIC CONTROLLER)
- SCS (SUPERVISORY CONTROL STATION)
- I — INTERLOCK

## PUMPS & COMPRESSORS

- CENTRIFUGAL PUMP
- VERTICAL TURBINE PUMP
- METERING PUMP
- SUMP PUMP

## PRIMARY ELEMENTS

- ULTRASONIC LEVEL SENSOR
- FLOW TUBE
- ANNUBAR
- PROPELLER METER
- M — MAGNETIC FLOW METER
- V — V-CONE
- FLOOD SWITCH

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

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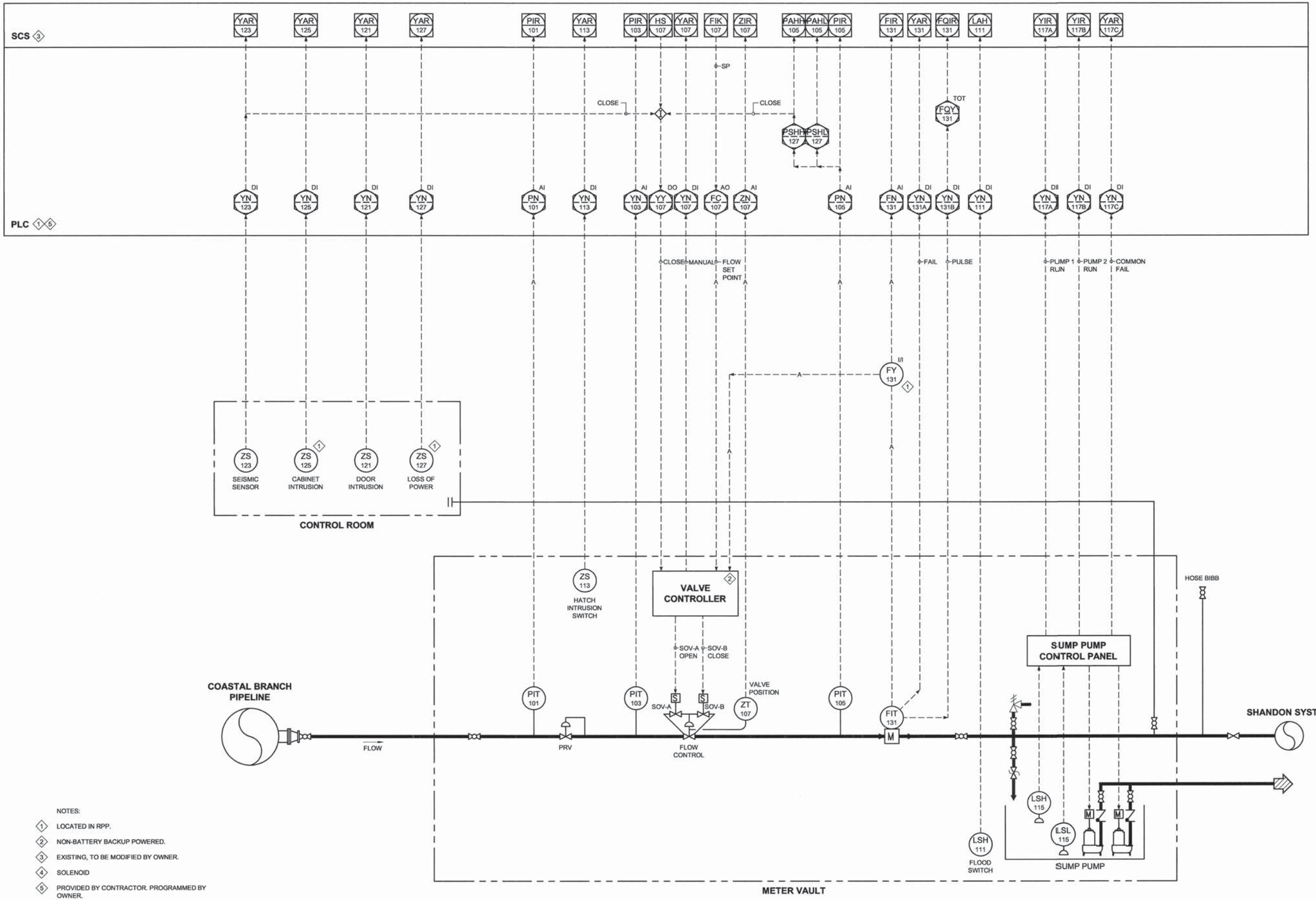
| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| INSTRUMENTATION LEGEND & SYMBOLS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 14 | 15 |




NOTES:

1. LOCATED IN RPP.
2. NON-BATTERY BACKUP POWERED.
3. EXISTING, TO BE MODIFIED BY OWNER.
4. SOLENOID
5. PROVIDED BY CONTRACTOR. PROGRAMMED BY OWNER.

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
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No. E17077
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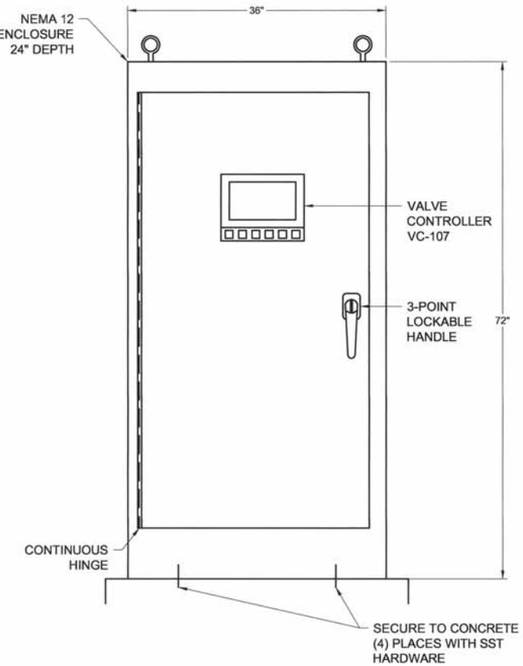
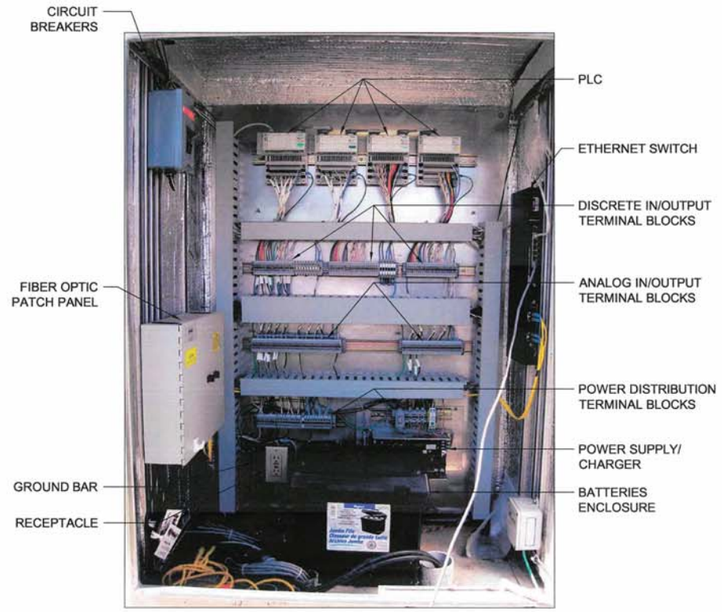
| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| SHANDON METER STATION P&ID | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

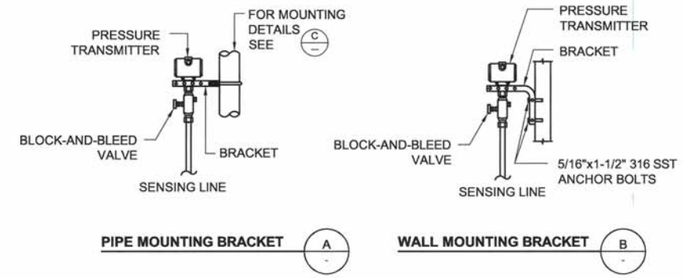
| ROAD NO. | JOB NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | 300463 | 15 | 15 |




1 | REMOTE PROCESS PANEL (RPP)
SCALE: NTS

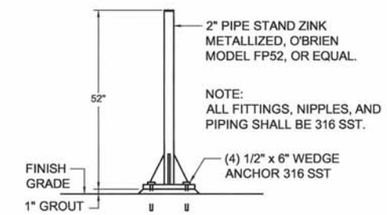



2 | SAMPLE RPP INTERIOR LAYOUT
SCALE: NTS



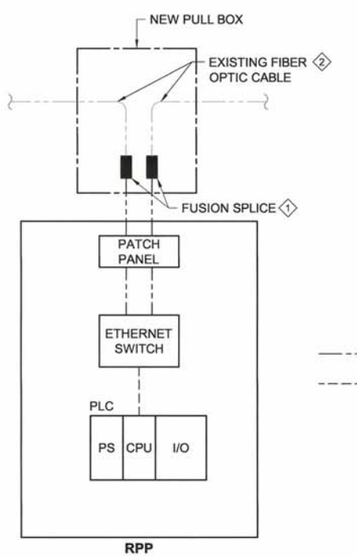

PIPE MOUNTING BRACKET A

WALL MOUNTING BRACKET B




INSTRUMENT PIPE STAND MOUNTING C

3 | PRESSURE TRANSMITTER MOUNTING
SCALE: NTS




LEGEND

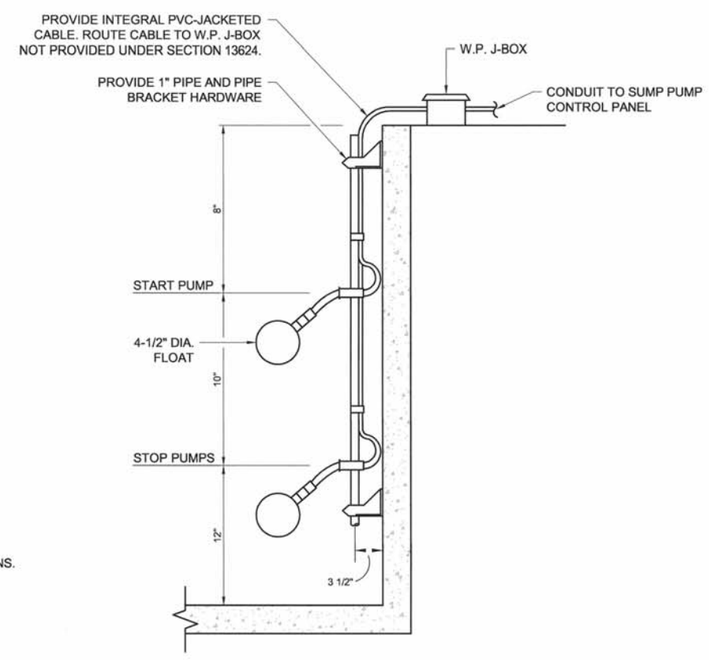
FIBER OPTIC CABLE

ETHERNET COPPER CABLE

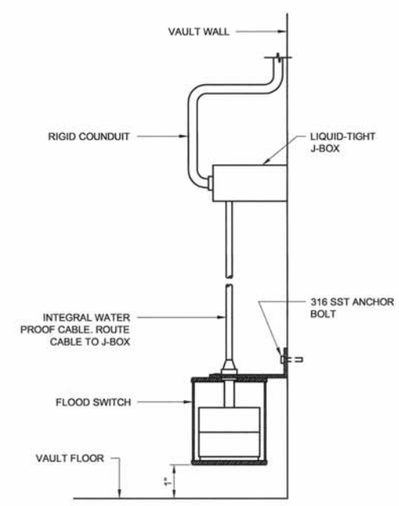
NOTES:

1. TO BE INSTALLED BY OWNER.
2. CUT CONDUIT AND CABLE. PROVIDE PULL BOX. PROVIDE NEW CONDUIT CONNECTIONS.

4 | COMMUNICATIONS BLOCK DIAGRAM
SHT 3, SHT 11
SCALE: NTS




5 | FLOAT SWITCH
SCALE: NTS




6 | FLOOD SWITCH
SCALE: NTS

APPROVED FOR CONSTRUCTION

State of California
Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
REFERRDO YNTAN
No. E17017
Exp. 9/30/15
ELECTRICAL
STATE OF CALIFORNIA

| COUNTY OF SAN LUIS OBISPO – PUBLIC WORKS DEPARTMENT | | | | | |
|---|---|---|---|---|---|
| INSTRUMENTATION DETAILS | | | | | |
| SHANDON STATE WATER PROJECT TURNOUT | | | | | |
| Designer | Date | Drawn By | Date | Design Engineer | Date |
| B. HALE | 12/05/14 | MG | 12/05/14 | M. ALVAREZ | 12/05/14 |

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS