

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

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- PROJECT PLANS

**COUNTY OF SAN LUIS OBISPO  
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION**

**NOTICE AND INSTRUCTIONS  
TO BIDDERS**

**FOR**

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

COUNTY OF SAN LUIS OBISPO  
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION  
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:

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

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.

Bids are required for the entire work described herein.

A bound copy of a reduced size set of the Project Plans, the Agreement, the General and Special Provisions, and blank forms suitable for use in bidding on said work may be obtained from the Department of Public Works, Room 207, County Government Center, San Luis Obispo, CA 93408 and may be purchased therefrom for (\$19.74) nineteen dollars and seventy-four cents, (tax included), per bound copy, said purchase cost not to be refunded. 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.**

**A portion of the work (approximate location at STA. 13+00) is not accessible to the public. Access behind the jail security gate will be provided during a non-mandatory pre-bid walk, to be held at 10:00 A.M., on Wednesday, May 4, 2011, at the parking lot located at 1585 Kansas Avenue, San Luis Obispo, CA 93405. If Contractor cannot attend the non-mandatory pre-bid walk, the contractor has the option of visiting the site as the area behind the jail security gate is partially visible from outside the gate.**

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 and available at the California Department of Industrial Relations' web site address at: [www.dir.ca.gov/DLSR/PWD](http://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.

The bidder's 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 with a minimum of a "B" rating and of adequate financial category as rated by the current edition of Best's Key Rating Guide as published by A.M. Best Company, Inc., Oldwick, New Jersey 08858.

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 and shall be covered in the bid. Bidders shall 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 County 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.

In accordance with San Luis Obispo County Code, Title 8, Health and Sanitation, Chapter 8.12, "Solid Waste Management", a project "Recycling Plan" and "Disposal Report" are required for this contract. The bidder's attention is directed to Sections 4-1.03, "Submittals", and 5-1.18, "Solid Waste Management" of the Special Provisions.

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.

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.

#### BID PROTESTS

Any bid protest must be submitted in writing to the Department of Public Works, Room 207, County Government Center, 976 Osos Street, San Luis Obispo, CA 93408; Attention: Design Engineer before 5 p.m. of the 7th business day following bid opening.

The initial protest document shall contain a complete statement of the basis for the protest and all evidence and documents supporting the protest available to the protesting party. The protest shall refer to the specific portion of the document which forms the basis for the protest. The protest shall include the name, address and telephone number of the person representing the protesting party. The party filing the protest shall concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the outcome of the protest. Such parties shall include all other bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest. The County Board of Supervisors will issue a decision on the protest.

The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest and failure to comply with these procedures shall constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

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

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

**Attention is directed to the requirements of Section 10-1.04 "Order of Work" of the special provisions. The Contractor's attention is directed to the requirements for maintaining water and fire service to the critical facilities at the project site, and the possibility of night work required to be performed by the contractor to meet service interruption constraints.**

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 County of San Luis Obispo made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

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

By \_\_\_\_\_  
Deputy Clerk

**COUNTY OF SAN LUIS OBISPO  
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION**

**BID PROPOSAL AND FORMS**

**FOR**

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

## BID PROPOSAL

TO: THE BOARD OF SUPERVISORS OF THE COUNTY OF SAN LUIS OBISPO,  
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 County of San Luis Obispo 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**

**WATER SYSTEM DISTRIBUTION UPGRADES FOR  
OPERATION CENTER ALONG KANSAS AVE.  
SAN LUIS OBISPO, CALIFORNIA  
CONTRACT NO. 320026  
BID PROPOSAL**

ITEM NO.	DESCRIPTION OF ITEM	APPROX. QUANTITY	UNIT OF MEASURE	UNIT PRICE (IN FIGURES) DOLLARS. CENTS	TOTAL AMOUNT DOLLARS. CENTS
1	ALLOWANCE FOR ADDITIONAL TRAFFIC CONTROL AND FLAGGING	1	LS	15,000	15,000
2	WATER POLLUTION CONTROL PROGRAM	1	LS		
3	SILT FENCE	150	LF		
4	FIBER ROLL	300	LF		
5	EROSION CONTROL BLANKET	50	SY		
6	TEMPORARY FENCE (TYPE ESA)	130	LF		
7	CONSTRUCTION AREA SIGNS	1	LS		
8	TRAFFIC CONTROL SYSTEM	1	LS		
9	RECONSTRUCT FENCE	30	LF		
10	REMOVE GATE VALVE	3	EA		
11	RECONSTRUCT LOOP DETECTORS	1	LS		
12	RECONNECT 2" RISER	1	LS		
13	RECONNECT WATER SAMPLING STATION	1	EA		
14	RECONNECT FIRE HYDRANT OR RISER	7	EA		
15	REPLACE FIRE HYDRANT	2	EA		
16	RELOCATE FIRE HYDRANT	1	LS		
17	CLEARING AND GRUBBING	1	LS		
18	CONNECTION TO EXISTING "POINT A"	1	LS		
19	CONNECTION TO EXISTING "POINT B"	1	LS		
20	CONNECTION TO EXISTING "POINT C"	1	LS		
21	8" PLASTIC PIPE (PVC C-900 DR25)	1438	LF		
22	8" PLASTIC PIPE (PVC C-900 DR14)	385	LF		

23	12" PLASTIC PIPE (PVC C-900 DR25)	20	LF		
24	8" GATE VALVE	5	EA		
25	BLOW-OFF ASSEMBLY	1	EA		
26	AIR AND VACUUM RELIEF ASSEMBLY	1	EA		
27	SLURRY BACKFILL	62	CY		
28	SERVICE LATERAL (2")	5	EA		
29	SERVICE LATERAL (2") WITH METER BOX ASSEMBLY	2	EA		
30	EROSION CONTROL (TYPE D)	50	SY		
				<b>TOTAL BID</b>	

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.

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 County of San Luis Obispo, 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 County of San Luis Obispo 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 County 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 County 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 County of San Luis Obispo 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 **Addenda Nos.**

<u>Addenda Number</u>	<u>Date</u>
_____	_____
_____	_____
_____	_____

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

**IMPORTANT NOTICE:**

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.

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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 \_\_\_\_\_

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 County prior to opening of bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

**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

**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 County of San Luis Obispo, State of California (hereinafter called "County") 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 County 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 County for certain construction specifically described as follows, for which bids are to be opened on \_\_\_\_\_, 20\_\_\_\_, has been submitted by Principal to County for:

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

Bidder's Bond

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 County, in the prescribed form, in accordance with the bid as accepted, and file with the County 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 County.

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 County and judgment is recovered, the Surety shall pay all costs incurred by County 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.

Bidder's Bond

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.

Bidder's Bond

**COUNTY OF SAN LUIS OBISPO  
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION**

**CONTRACT AGREEMENT**

**FOR**

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

**COUNTY OF SAN LUIS OBISPO**

**AGREEMENT**

THIS AGREEMENT, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_, between the County of San Luis Obispo, a political subdivision and county of the State of California, party of the first part, hereinafter called "County" 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. 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 County, for

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

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 County of San Luis Obispo, State of California.

ARTICLE 2. 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 County of San Luis Obispo, State of California.

ARTICLE 3. The Contractor shall begin work within ten (10) calendar days not including Saturdays, Sundays, or legal holidays, from the date of receipt of the County'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. The total Contract price is the amount of the Contractor's bid as set forth in the award of the Contract approved by the County's Board of Supervisors. The Contractor will receive and accept and the County 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 County; 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. 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.

**INDEMNIFICATION**

Contractor shall defend, indemnify and hold harmless the County, its officers, officials, employees, and volunteers from all claims, demands, damages, costs, expenses, judgments, attorney fees, or other losses that may be asserted by any person or entity, including Contractor, and that arise out of or are made in hereunder. The obligation to indemnify shall be effective and shall extend to all such claims or losses in their entirety. However, this indemnity will not extend to any claims or losses arising out of the sole negligence or willful misconduct of the County, its officers and employees.

**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.

(a) **SCOPE AND LIMITS OF REQUIRED INSURANCE POLICIES**

1. **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.) 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 thirty days prior written notice to the County of San Luis Obispo, Department of Public Works.

2. **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.) 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 thirty days prior written notice to the County of San Luis Obispo, Department of Public Works.

3. **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.
  - b. The policy shall not be cancelled or materially changed without first giving thirty days prior written notice to 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.

(b) **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 the County prior to commencement of this Agreement.

(c) **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 207, County Government Center, CA 93408, Attention Design Engineer, Contract No. 320026, 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.

(d) **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.

(e) **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.** Contractor shall defend, indemnify, and hold harmless the County, its officers, and employees from all claims, demands, damages, costs, expenses, judgments, attorney fees, liabilities, or other losses that may be asserted by any person or entity, and that arise out of or are made in connection with the acts or omissions relating to the performance of any duty, obligation, or work hereunder. The obligation to indemnify shall be effective and shall extend to all such claims and losses, in their entirety, even when such claims or losses arise from the comparative negligence of the County its officers and employees. However, this indemnity will not extend to any claims or losses arising out of the sole negligence or willful misconduct of the County, its officers and employees.

The preceding paragraph applies to any theory of recovery relating to said act or omission by the Contractor, or its agents, employees, or other independent contractors directly responsible to Contractor, including, but not limited to the following:

1. Violation of statute.
2. Professional malpractice.
3. Willful, intentional or other wrongful acts, or failures to act.
4. Negligence or recklessness.
5. Furnishing of defective or dangerous products.

6. Broad Form Property Damage (Including Completed Operations).
7. Premises Liability.
8. Strict Liability.
9. Inverse condemnation.
10. Violation of civil rights
11. Violation of any federal or state statute, regulation, or ruling resulting in a determination by the Internal Revenue Service, California Franchise Tax Board, or any other California entity responsible for collecting payroll taxes, when the Contractor is not an independent contractor.

Nothing contained in the foregoing indemnity provisions shall be construed to require the Contractor to indemnify the County, against any responsibility or liability in contravention of Civil Code 2782.

It is the intent of the parties to provide the County the fullest indemnification, defense, and "hold harmless" rights allowed under the law. If any word(s) contained herein are deemed by a court to be in contravention of applicable law, said word(s) shall be severed from this contract and the remaining language shall be given full force and effect.

ARTICLE 9. 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 10. 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 County of San Luis Obispo 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 County 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 County is or becomes defective during the period of said guarantee without expense whatsoever to the County.

ARTICLE 11. 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.

ARTICLE 12. 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 13. 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 14. 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 County of San Luis Obispo 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 14 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 15. 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 15 shall be considered as included in the other items of work and no additional compensation will be allowed therefor.

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

COUNTY OF SAN LUIS OBISPO

By: \_\_\_\_\_  
Chairperson of the Board of Supervisors  
County of San Luis Obispo

ATTEST:

\_\_\_\_\_  
Clerk of the Board of Supervisors  
of the County of San Luis Obispo

By: \_\_\_\_\_  
Deputy Clerk

APPROVAL RECOMMENDED  
PAAVO OGREN

By: *PAAVO OGREN*  
Director of Public Works

Date 4/7, 2011

APPROVED AS TO FORM AND  
LEGAL EFFECT:  
WARREN R. JENSEN  
County Counsel

By: *Warren R. Jensen*

Date 4/5/2011

CONTRACTOR

\_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

Date Signed: \_\_\_\_\_, 20\_\_

By: \_\_\_\_\_

\_\_\_\_\_  
(Printed Name and Title)

Date Signed: \_\_\_\_\_, 20\_\_

**PERFORMANCE BOND**

KNOW ALL BY THESE PRESENTS: That

WHEREAS, the Board of Supervisors of the County of San Luis Obispo, State of California, has awarded to \_\_\_\_\_

\_\_\_\_\_

(hereinafter designated as "Principal") a contract for \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_;

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 County of San Luis Obispo, (hereinafter called "County"), 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

Performance Bond

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 County, 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 County and judgment is recovered, Surety shall pay all costs incurred by County 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.

Performance Bond

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.

Performance Bond

**PAYMENT BOND**

KNOW ALL BY THESE PRESENTS:

WHEREAS, the Board of Supervisors of the County of San Luis Obispo, 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 County of San Luis Obispo, 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

Payment Bond

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 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.

Payment Bond

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.

**COUNTY OF SAN LUIS OBISPO  
DEPARTMENT OF PUBLIC WORKS AND TRANSPORTATION**

## **SPECIAL PROVISIONS**

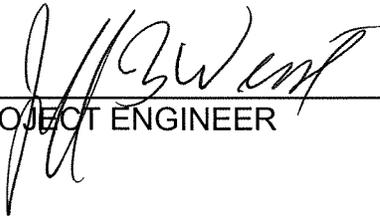
**FOR**

**WATERLINE IMPROVEMENTS ALONG  
KANSAS AVENUE FOR COUNTY JAIL EXPANSION  
SAN LUIS OBISPO, CA  
CONTRACT NO. 320026**

**CONTRACT NO. 320026**

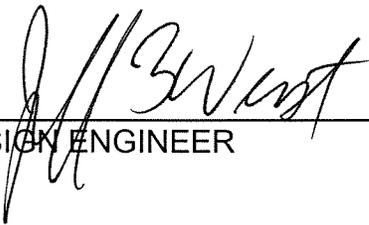
The Special Provisions contained herein have been prepared by or under the direction of the following registered engineer(s):

**PREPARED BY:**

  
PROJECT ENGINEER



4/7/11  
DATE

  
DESIGN ENGINEER



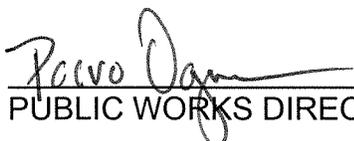
4/7/11  
DATE

**RECOMMENDED FOR APPROVAL AND ADVERTISING BY:**

  
DEPUTY PUBLIC WORKS DIRECTOR

4/7/11  
DATE

**APPROVED BY:**

  
PUBLIC WORKS DIRECTOR

4/7/2011  
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 County 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 County would lack the authority to implement the applicable provisions of the Standard Specifications or Standard Plans absent the County's election to have the County's election to have the County'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.

## 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.

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 4th 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 County of San Luis Obispo" 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 County of San Luis Obispo" 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 County of San Luis Obispo 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.

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 County of San Luis Obispo 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 County of San Luis Obispo 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 County of San Luis Obispo 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 County 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 County's "Notice to Proceed."

This work shall be diligently prosecuted to completion before the expiration of 45 WORKING DAYS from the date of receipt of the County's "Notice to Proceed." The Contractor shall not begin work in advance of receiving the County's "Notice to Proceed."

- 4-1.02 Liquidated Damages: 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 County of San Luis Obispo, and that it is and will be impractical and extremely difficult to ascertain and determine the actual damage which the County will sustain in the event of and by reason of such delay; and it is therefore agreed that the Contractor will pay to the County of San Luis Obispo the sum of NINE HUNDRED DOLLARS DOLLARS (\$900.00) 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 County 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:

- Water Pollution Control Program
- Recycling Plan
- Proposed Progress Schedule
- Identity of Project Safety Officer

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 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 County 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 County of San Luis Obispo acting by and through its Department of Public Works and Transportation."

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."

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 Department of Public Works and Transportation 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 County, 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 County of San Luis Obispo."

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: 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 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 and available at the California Department of Industrial Relations' web site at:

[www.dir.ca.gov/DLSR/PWD](http://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](http://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](http://www.dir.ca.gov/DLSR/PWD).

- 5-1.05 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, "Submittals," of these Special Provisions, and within 5 working days of the Engineer's written request at any other time.

- 5-1.06 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."

- 5-1.07 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 13<sup>th</sup> paragraph of Section 9-1.01, "Measurement of Quantities," of the Standard Specifications shall be amended to read as follows: "Whenever pay quantities of materials are determined by weighing, 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 9-1.065, "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 Determination of Disputes: Public Contract Code Sections 10240 through 10245.4 shall not be applicable to this contract. Section 9-1.10, "Arbitration," of the Standard Specifications is hereby deleted. All disputes and claims arising under or by virtue of this contract shall be directed to and be determined by the Public Works Director. The Public Works Director's determination of disputes and claims pursuant to these Special Provisions shall constitute the decision of the County.

The parties agree that to the extent Article 1.5 of the Public Contract Code (Public Contract Code Section 20104 et seq) is applicable to any claims made under this contract, nothing in Article 1.5 excuses Contractor's compliance with the claim procedures set forth in the Standard Specifications (as amended by these Contract Documents). Nothing in Article 1.5 extends the time limit or supercedes the notice requirements set forth in the Standard Specifications (as amended by these Contract Documents). The parties mutually agree that all information required of the Contractor under said Standard Specifications (as amended by these Contract Documents) is hereby incorporated into the requirements of Article 1.5.

Article 1.5 (commencing with Section 20104) of Chapter 1 of Part 3 of Division 2 of the Public Contract Code provides as follows:

Article 1.5 Resolution of Construction Claims

20104. (a) (1) This article applies to all public works claims of three hundred seventy-five thousand dollars (\$375,000) or less which arise between a contractor and a local agency. (2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b) (1) "Public work" has the same meaning as in Sections 3100 and 3106 of the Civil Code, except that "public work" does not include any work or improvement contracted for by the state or the Regents of the University of California. (2) "Claim" means a separate demand by the Contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.

(c) The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.

(d) This article applies only to contracts entered into on or after January 1, 1991.

20104.2. For any claim subject to this article, the following requirements apply: (a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars (\$50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant. (2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant. (3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation or within a period of time no greater than that taken by the claimant in producing the additional information, whichever is greater.

(c) (1) For claims of over fifty thousand dollars (\$50,000) and less than or equal to three hundred seventy-five thousand dollars (\$375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant. (2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant. (3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

20104.4. The following procedures are established for all civil actions filed to resolve claims subject to this article:

(a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to nonbinding mediation unless waived by mutual stipulation of both parties. The mediation process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced within 30 days of the submittal, and shall be

concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of both parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of 1986 (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 of Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration. (2) Notwithstanding any other provision of law, upon stipulation of the parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators, and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds. (3) In addition to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, any party who after receiving an arbitration award requests a trial de novo but does not obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other party arising out of the trial de novo.

(c) The court may, upon request by any party, order any witnesses to participate in the mediation or arbitration process.

20104.6. (a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

(b) In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

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, County, 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 County may exercise the remedies provided under violates Public Contract Code §4100. The County 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 subcontractor 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 correlation 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 ten (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 Means and Methods: 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.

- 5-1.15 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.

- 5-1.16 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.

- 5-1.17 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.)

- 5-1.18 Solid Waste Management: For the purpose of complying with San Luis Obispo County Code, Title 8, Health and Sanitation, Chapter 8.12, , "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, "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 County 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 COUNTY PROJECTS

### SECTION 1. PROJECT INFORMATION

Contract Title		Contractor Name	
Contract Number		Contractor Phone	Contractor Fax
Total Contract Amount		Street Address	
Print Name and Title		City, State, Zip	Date

### SECTION 2. RECYCLING PLAN

Materials	Before Construction (estimated tons)			
	Landfill (Tons)	Recycling Facility (Tons)	Location	Reuse (Tons) Location
Cleared Vegetation				
Asphalt Concrete				
Concrete				
Metals (including spent equipment)				
Lumber				
Drywall				
Mixed Recyclables				
Trash				
<b>Totals</b>				
<b>% Diversion</b>				

### Official Use Only

Recycling Plan Approved <input type="checkbox"/>	Recycling Plan Denied <input type="checkbox"/>
Information Required:	
Print Name and Title	Signature
Date	Date

# DISPOSAL REPORT FOR COUNTY PROJECTS

## SECTION 1. PROJECT INFORMATION

Contract Title	Contractor Name		
Contract Number	Contractor Phone	Contractor Fax	
Total Contract Amount	Street Address		
	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
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## SECTION 2. DISPOSAL REPORT

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

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

Resident Engineer's Name:	Signature:	Date:
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### Official Use Only

Disposal Report Approved <input type="checkbox"/>	Disposal Report Denied <input type="checkbox"/>
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Information Required	
Print Name and Title	Signature
	Date

**SECTION 6. (BLANK)**

**SECTION 7. (BLANK)**

**SECTION 8. (BLANK)**

## **SECTION 9. DESCRIPTION OF WORK**

The work involves upsizing the existing water distribution system along Kansas Avenue in San Luis Obispo, California for the County Jail Expansion. The work consists of constructing approximately 1,800 linear feet of 8-inch potable water pipeline, reconnection of service laterals, fire hydrants and risers, installation of gate valves, water pollution control, traffic control, reconstruction of pavement loop detectors, and such other items that are described in the Special Provisions and as shown on the plans and/or required for a complete working system.

## SECTION 10. CONSTRUCTION DETAILS

**10-1.01 CODES AND REGULATIONS:** The work performed under this contract shall be done in accordance with these Special Provisions.

All materials, including coatings, installed in a public water system shall be certified as meeting the requirements of ANSI/NSF Standard 61, Drinking Water System Components-Health Effects, in addition to the requirements of the Safe Drinking Water Act.

**10-1.02 REFERENCES:** The publications listed below form a part of these Special Provisions to the extent referenced. The publications are referred to in the text by basic designation only.

ACI	AMERICAN CONCRETE INSTITUTE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ASME	ASME INTERNATIONAL
AWWA	AMERICAN WATER WORKS ASSOCIATION
MSS	MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY
SSPC	THE SOCIETY FOR PROTECTIVE COATINGS
NAPF	NATIONAL ASSOCIATION OF PIPE FABRICATORS
NSF	NATIONAL SANITATION FOUNDATION

**10-1.03 GEOTECHNICAL ENGINEERING REPORT:** Previous subsurface explorations have been performed with additional exploratory borings along Kansas Avenue. Approximate locations and details pertaining to the explorations are presented in the following references:

*Geotechnical Engineering Report*

Geotechnical Investigation for the Sewer Line Replacement Project, Kansas Ave, San Luis Obispo, California prepared by GSI Soils Inc. dated October 29, 2002

*Letter Regarding Additional Borings*

Addendum to Geotechnical Investigation – Additional Borings for the Sewer Line Replacement Project, Kansas Ave, San Luis Obispo, California prepared by GSI Soils Inc. dated February 9, 2006

The Contractor shall conform to the recommendations provided in the *Geotechnical Engineering Report* for clearing and stripping, conventional sloped trench excavation, shored excavations, microtunneling (if needed), pipe zone backfill, trench backfill, thrust block requirements, preparation of paved areas, structural fill (if any), pavement design. A copy of the *Geotechnical Engineering Report* and *Addendum to Geotechnical Investigation - Additional Borings* can be found in the Attachments.

**10-1.04 ORDER OF WORK:** Order of work shall conform to the provisions in Section 5-1.05, "Order of Work" of the Standard Specifications and these Special Provisions.

The Contractor is responsible for sequencing the work and shall schedule items of work to accommodate the County's operational requirements during the construction period. To prevent unnecessary interruption of the present water supply to the existing system, a detailed schedule is required to be submitted for review and approval prior to construction. The schedule shall be submitted at least 10 days before the Contractor intends to begin construction. The Contractor is responsible for coordinating the construction schedule and operations with the Engineer and the Special Provisions herein, including the following requirements:

1. Attention is directed to Section 4-1.03, "Submittals," and Section 10-1.13, "Water Pollution Control Program," of these Special Provisions regarding the submittal and approval of the Water

Pollution Control Program (WPCP) prior to performing construction activities. The Contractor shall not perform any construction activities until the WPCP is approved by the Engineer.

2. Attention is directed to "Construction Site Management" regarding the implementation of Best Management Practices prior to, during, and following construction activities.
3. After having received written notice to proceed, Contractor shall install the required construction area signs as the first item of site work in accordance with the County Special Provisions. Contractor shall schedule all other items of site work after the placement of construction area signs has been approved by the Engineer. No other site work will be allowed until the placement of the construction signs is completed.
4. Attention is directed to Section 5-1.03 of the Special Provision regarding notification to the Engineer for requesting stakes or marks to be set.
5. The loop detectors for the jail security gate (see Section 10-1.28d "Reconstruct Loop Detectors") shall be out of service for no more than a maximum of two consecutive days.
6. The jail security gate (at approximate Station 13+00) shall remain operable at all times and access to traffic through the gate cannot be interrupted for more than 4 hours per day, and not before 9 am or after 3 pm unless otherwise approved by the Engineer.
7. The Contractor must pothole as the second item of site work for each and every underground utility line and buried facility within proximity to excavations for the pipeline, laterals, piping connections, etc., to confirm the locations and, to identify any conflicts with the proposed construction. Submit a report indentifying each underground utility, including photos, information on depth and location. Confirmation of underground utility line locations relative to the buried water system upgrades shall be reviewed, and adjusted if necessary, prior to commencement of excavation work for the water distribution system improvements.

If the Contractor does not expose all required utilities prior commencing affected work, including shop drawing preparation, he shall not be entitled to additional compensation for work necessary to avoid interferences, nor for repair to damaged utilities.

8. **The Contractor shall sequence and perform the work in order to provide service at all times and to maintain system operating pressures, unless the Engineer approves service to be shut down.**

**The Contractor shall be responsible to notify affected water users of outages a minimum of 72 hours before the start of the approved outage. The Contractor shall submit for approval the notification that will be sent to water users regarding outages prior to distribution. Contractor shall make necessary special arrangements, such as provisions for temporary and permanent thrust restraint, quick setting concrete, availability of spare fittings/couplings, temporary connections, etc., to accomplish the connection and testing of the new water system improvements to minimize system shutdown period.**

**All water service laterals, fire hydrants, and riser laterals serve critical facilities at the job site and shall not be interrupted except as follows:**

- A. **Service to water laterals shall not be interrupted for more than four hours and shall remain in service between the hours of 8:00 am to 5:00 pm, Monday through Friday.**
- B. **Fire hydrant and fire riser service shall not be interrupted for more than 8 hours.**
- C. **Water service to the jail shall not be interrupted for more than 1 hour and shall remain in service between the hours of 8:00 am to 5:00 pm, Monday though Friday.**
- D. **The Contractor's attention is directed to requirements for maintaining water service to the critical facilities at the site, and the Contractor shall plan and schedule his/her work to meet these requirements. The Contractor's project schedule must indicate**

when, or if, night work will be required to meet service interruption constraints described above and the Contractor shall receive approval from the Engineer in writing at least 72 hours in advance before performing such work.

9. It shall be the Contractor's responsibility to ensure positive grade for the new waterline. The Contractor shall be responsible to pothole and verify the alignment of the new waterline shown on the plans prior to construction. Refer to Section 10-1.25 "Obstructions" of the Special Provisions for additional requirements.

If any obstructions are noted that would prevent a constant positive grade, such conflicts shall be brought to the Engineer's attention immediately. If low or high points must be constructed in the waterline, the Contractor shall identify such locations and notify the Engineer in writing immediately. Blow-off and/or air and vacuum relief assemblies shall be constructed by the Contractor at such locations in accordance with Sections 10-1.48 and 10-1.49 of these Special Provisions, and as directed by the Engineer.

10. Contractor shall be required to obtain approval from the Engineer in writing at least 48 hours in advance for connection to existing water mains.
11. Contractor shall provide all additional valving, blind flanges, and thrust restraint as necessary to isolate lines that have been tied into the existing system but are not yet completed and ready to operate in their intended function.

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

**10-1.05 SUBMITTALS:** In addition to the information required to be submitted per Section 4-1.03 and Section 5-1.13 of the Special Provisions, the Contractor shall submit the following information:

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

Make submittals promptly in such sequence as to cause no delay in the work. Time allowed for Engineer to review original and any resubmittal shall be a minimum of 10 (ten) working days after receipt by the Engineer. 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 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 the 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.
- h. If the Contractor submits shop drawings of equipment by manufacturers other than those listed in the specifications, provide the following additional information with the submittal:

- The name and address of at least three companies or agencies that are currently using the equipment.
- The name and telephone number of at least one person at each of the above companies or agencies whom the Engineer may contact.

Provide a minimum of two copies of all manufacturer's operation manuals, maintenance manuals, manufacture's installation/application instructions, list of the equipment furnished for project with name, address, and telephone number of vendor, list of serial numbers of equipment furnished, a copy of shop drawings in final form, and any data pertinent to equipment supplied for the project.

Prepare and organize the material in three-ring binders with divider tabs and labels. Include a table of contents. Each manual shall contain complete parts list of replaceable parts, their part numbers, the name and address of their nearest vendor, copies of manufacturer's equipment guarantees and warranties.

The Contractor's attention is directed to the fact that shop drawings are reviewed by the Engineer for general conformance with the design concept of the project 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.

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).

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 APPROVAL OF EQUIVALENT MATERIALS:** The Engineer shall approve equivalent materials in accordance with Section 6-1.05, "Trade Names and Alternatives" of the Standard Specifications.

**10-1.07 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.

**10-1.08 FOREIGN MATERIALS:** The requirements of the fifth paragraph in Section 6-1.08, "Foreign Materials," of the Standard Specifications shall not apply.

**10-1.09 CONTRACTOR'S STORAGE AREA:** An area for Contractor's staging is shown on the plans at approximate Sta 23+50. The Contractor shall coordinate with the Engineer prior to using the area. Any other areas the Contractor proposes to use shall be reviewed and approved by the Engineer. The Contractor shall be responsible for his/her own security and weatherproofing. Missing or damaged material shall be replaced by the Contractor at no additional charge. Use of the staging area shall be subject to the approval of the Engineer and the Contractor shall be required to restore the site to the satisfaction of the Engineer after construction.

**10-1.10 ELECTRICAL POWER:** The Contractor shall furnish all power required for performance of all the work in this contract.

**10-1.11 CONSTRUCTION SITE MANAGEMENT:**

Prior to site disturbance, BMPs shall be implemented prior to, during, and following construction activities. Measures shall include, but are not limited to the following: a) silt fencing shall be placed

along the down-slope side of the construction zone; b) a spill and clean-up kit shall be stored onsite at all times; and c) temporary and permanent erosion and sedimentation measures shall be implemented (e.g., silt fencing, sterile straw bales (seed heads removed), straw wattles, etc.).

#### 10-1.11A 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

#### 10-1.11B 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 has 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 materials or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored.

## 10-1.11C 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.

#### 10-1.11D 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.

10-1.11E 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.

#### 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

#### 10-1.11F 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 your activities, as specified in the Standard Specifications and these Special Provisions, and as ordered by the Engineer, shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation will be allowed therefor.

**10-1.12 AIR POLLUTION CONTROL:** Air Pollution Control will be required for this project and shall conform to the provisions in Section 7-1.01F, "Air Pollution Control," of the Standard Specifications.

All portable internal combustion engines and other portable equipment used during construction activities and rated at 50 HP or above shall possess a California statewide portable equipment registration (issued by the California Air Resources Board). If any such portable equipment does not possess said registration, Contractor shall acquire a Permit to Operate for the unregistered equipment from the San Luis Obispo County Air Pollution Control District ("APCD"). For more information, contact the APCD at (805) 781-5912.

During construction/ground disturbing activities, the contractor shall implement the following measures to reduce ozone precursor emissions. These measures are as follows:

- a. The Contractor shall maintain all construction equipment in proper tune according to manufacturer's specifications.
- b. To reduce ozone precursor emissions, fuel all off-road and portable diesel powered equipment, including but not limited to bulldozers, graders, cranes, loaders, scrapers, backhoes, generator sets, compressors, auxiliary power units, with ARB certified motor vehicle diesel fuel (non-taxed version suitable for use off-road).
- c. Maximize to the extent feasible, the use of diesel construction equipment meeting the ARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.

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.

**10-1.13 WATER POLLUTION CONTROL PROGRAM:** Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, and these Special Provisions.

#### 10-1.13A 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 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)<sup>™</sup> 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.

#### 10-1.13B 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
4. Temporary solid fencing shall be installed to minimize drift of particles into the adjacent riparian habitat during sandblasting activities.

#### 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

#### 10-1.13C 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

### 10-1.13D 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.

The contract lump sum price paid **“WATER POLLUTION CONTROL PROGRAM”** includes full compensation for 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.

Payments for WPCP are made as follows:

1. After the Engineer accepts the WPCP, the County includes up to 75 percent of the bid item price in the monthly progress estimate
2. After contract acceptance, the County pays for the remaining percentage of the bid item price

The County does not pay for implementation of water pollution control practices in areas outside the highway right-of-way not specifically provided for in the drawings or in the Special Provisions.

The County does not pay for water pollution control practices installed at construction support facilities.

**10-1.14 SILT FENCE:** This work includes installing, maintaining, and removing silt fence. The WPCP must describe and include the use of silt fence as a water pollution control practice for sediment control. Install silt fence along toe of exposed and erodible slopes, down slope of exposed soil areas, around temporary stockpiles and along the top of streambank and channels, and as shown on the approved WPCP.

Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the Standard Specifications for silt fence fabric.

**Materials**

Materials: Geosynthetic fabric for silt fence must consist of one of the following:

1. Polyester
2. Polypropylene
3. Combined polyester and polypropylene

Sample under ASTM D 4354, Procedure C. Test under ASTM D 4759. All properties must be based on Minimum Average Roll Value (MARV). Identify, store, and handle under ASTM D 4873.

Protect geosynthetics from moisture, sunlight, and damage during shipping and storage. Label each unit with the manufacturer's name, identifying information, and product identification.

Silt fence fabric must comply with:

Property	ASTM Designation	Specification	
		Woven	Non-woven
Grab breaking load 1-inch grip, lb, min. in each direction	D 4632	120	120
Apparent elongation percent, min., in each direction	D 4632	15	50
Water Flow Rate max. average roll value, gallons per minute/square foot	D 4491	10-50	100-150
Permittivity 1/sec., min.	D 4491	0.05	0.05
Apparent opening size max. average roll value, U.S. Standard sieve size	D 4751	30	30
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	D 4595	70	

Posts must be wood or metal.

Wood posts must be:

1. Untreated fir, redwood, cedar, or pine and cut from sound timber
2. Straight and free of loose or unsound knots and other defects that would render the stakes unfit for use
3. Pointed on the end to be driven into the ground
4. At least 2" x 2" in size, and 4 feet long

Metal posts must:

1. Be made of steel.
2. Have a "U," "T," "L," or other cross sectional shape that can resist failure from lateral loads.
3. Be pointed on the end to be driven into the ground.
4. Weigh at least 0.75-pound per foot.
5. Be at least 4 feet long.
6. Have a safety cap attached to the exposed end. The safety cap must be orange or red plastic and fit snugly to the metal post.

### **Construction**

Silt fence must be:

1. Constructed with silt fence fabric, posts, and fasteners
2. Prefabricated or assembled at the job site

Silt fence fabric must be attached to posts using these methods:

1. If prefabricated silt fence is used, posts must be inserted into sewn pockets
2. If assembled on the job site:
  - 2.1. If wood posts are used, fasteners must be staples or nails
  - 2.2. If steel posts are used, fasteners must be tie wires or locking plastic fasteners
  - 2.3. Spacing of the fasteners must be no more than 8 inches apart

Place silt fence approximately parallel to the slope contour. For any 50 foot section of silt fence, do not allow the elevation at the base of the fence to vary more than 1/3 of the fence height.

Install silt fence by:

1. Placing the bottom of the fabric in a trench that is 6 inches deep
2. Securing with posts placed on the downhill side of the fabric
3. Backfilling the trench with soil and hand or mechanically tamping to secure the fabric in the trench

If you reinforce the silt fence fabric with wire or plastic mesh, Contractor may increase the post spacing to a maximum of 10 feet. The field-assembled reinforced silt fence must be able to retain saturated sediment without collapsing. Connect silt fence sections by:

1. Joining separate sections of silt fence to form reaches that are no more than 500 feet long
2. Securing the end posts of each section by wrapping the tops of the posts with at least two wraps of 16 gage diameter tie wire
3. Ensuring that each reach is a continuous run of silt fence from end to end or from an end to an opening, including joined panels

If you mechanically push the silt fence fabric vertically through the soil, you must demonstrate that the silt fence fabric will not be damaged and will not slip out of the soil, resulting in sediment passing under the silt fence fabric.

### **Maintenance**

Maintain silt fence to provide sediment holding capacity and to reduce runoff velocities.

Remove sediment deposits, trash, and debris from silt fence as needed or when directed by the Engineer. If removed sediment is deposited within project limits, it must be stabilized and not subject to erosion by wind or water. Trash and debris must be removed and disposed of as specified in

Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Maintain silt fence by:

1. Removing sediment from behind the silt fence when sediment is 1/3 the height of the silt fence above ground
2. Repairing or adjusting the silt fence when rills and other evidence of concentrated runoff occur beneath the silt fence fabric
3. Repairing or replacing the silt fence fabric when it become split, torn, or unraveled

Repair silt fence within 24 hours of discovering damage unless the Engineer approves a longer period. If your vehicles, equipment, or activities disturb or displace silt fence, repair silt fence at your expense.

The County does not pay maintenance costs for cleanup, repair, removal, disposal, or replacement due to improper installation or your negligence.

### **Removal**

When the Engineer determines that silt fence is not required, remove and dispose of fence under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Silt fence and other water pollution control measures shown in the approved WPCP may be abandoned in place when approved in writing by the Engineer.

Ground disturbance, including holes and depressions, caused by the installation and removal of the silt fence must be backfilled and repaired under Section 15-1.02, "Preservation of Property," of the Standard Specifications.

### **Measurement and Payment**

Silt fence is measured by the linear foot along the centerline of the installed fence. The contract price paid per linear foot for "**SILT FENCE**" includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the silt fence, complete in place, including removal of materials, cleanup and disposal of retained sediment and debris, and backfilling and repairing holes, depressions and other ground disturbance, as shown on the approved WPCP, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

**10-1.15 FIBER ROLL:** This work includes constructing, maintaining, and removing fiber roll. The WPCP must describe and include the use of fiber roll as a water pollution control practice for intercepting runoff, reduce its flow velocity, release the runoff as sheet flow, and provide some removal of sediment from the runoff. Install fiber rolls along the top, face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow, and as shown on the approved WPCP.

Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the Standard Specifications for fiber roll.

### **Materials**

Fiber roll must:

1. Last for at least one year after installation
2. Type 2 fiber roll must:
  - 2.1. Be filled with rice or wheat straw, wood excelsior, or coconut fiber
  - 2.2. Be covered with a biodegradable jute, sisal, or coir fiber netting
  - 2.3. Have the netting secured tightly at each end
  - 2.4. Be finished to be either:
    - 2.4.1. From 8 to 10 inches in diameter, from 10 to 20 feet long, and at least 1.1 pounds per linear foot
    - 2.4.2. From 10 to 12 inches in diameter, at least 10 feet long, and at least 3 pounds per linear foot

Wood Stakes

Wood stakes must be:

1. Untreated fir, redwood, cedar, or pine and cut from sound timber
2. Straight and free of loose or unsound knots and other defects which would render the stakes unfit for use
3. Pointed on the end to be driven into the ground

For fiber roll, wood stakes must be at least:

1" x 2" x 24" in size for Type 2 installation

Rope

For Type 2 installation, rope must:

1. Be biodegradable, such as sisal or manila
2. Have a minimum diameter of 1/4 inch

### **Construction**

Before placing fiber roll, remove obstructions including rocks, clods, and debris greater than one inch in diameter from the ground.

If fiber roll is to be placed in the same area as erosion control blanket, install the blanket before placing the fiber roll. For other soil stabilization practices such as hydraulic mulch or compost, place the fiber roll and then apply the soil stabilization practice.

Type 2 fiber roll may be installed using installation method Type 1, Type 2, or a combination:

For installation method Type 1, install fiber roll by:

1. Placing in a furrow that is from 2 to 4 inches deep
2. Securing with wood stakes every 4 feet along the length of the fiber roll
3. Securing the ends of the fiber roll by placing a stake 6 inches from the end of the roll
4. Driving the stakes into the soil so that the top of the stake is less than 2 inches above the top of the fiber roll

For installation method Type 2, install fiber roll by:

1. Securing with rope and notched wood stakes.
2. Driving stakes into the soil until the notch is even with the top of the fiber roll.
3. Lacing the rope between stakes and over the fiber roll. Knot the rope at each stake.
4. Tightening the fiber roll to the surface of the slope by driving the stakes further into the soil.

### **Maintenance**

Maintain fiber roll to provide sediment holding capacity and to reduce runoff velocities. Remove sediment deposits, trash, and debris from fiber roll as needed or when directed by the Engineer. If removed sediment is deposited within project limits, it must be stabilized and not subject to erosion by wind or water. Trash and debris must be removed and disposed of as specified in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Maintain fiber roll by:

1. Removing sediment from behind the fiber roll when sediment is 1/3 the height of the fiber roll above ground
2. Repairing or adjusting the fiber roll when rills and other evidence of concentrated runoff occur beneath the fiber roll.
3. Repairing or replacing the fiber roll when they become split, torn, or unraveled
4. Adding stakes when the fiber roll slump or sag
5. Replacing broken or split wood stakes

Repair fiber roll within 24 hours of discovering damage unless the Engineer approves a longer period. If your vehicles, equipment, or activities disturb or displace fiber roll, repair fiber roll at your expense. The County does not pay maintenance costs for cleanup, repair, removal, disposal, or replacement due to improper installation or your negligence.

## Removal

When the Engineer determines that fiber roll is not required, Contractor must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Fiber roll and other water pollution control measures shown in the approved WPCP may be abandoned in place when approved in writing by the Engineer.

Ground disturbance, including holes and depressions, caused by the installation and removal of the fiber roll must be backfilled and repaired under Section 15-1.02, "Preservation of Property," of the Standard Specifications.

## Measurement and Payment

Fiber roll is measured by the linear foot along the centerline of the installed roll. Where fiber roll is joined and overlapped, the overlap is measured as a single installed roll. The contract price paid per linear foot for "FIBER ROLL" includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the fiber roll, complete in place, including removal of materials, cleanup and disposal of retained sediment and debris, and backfilling and repairing holes, depressions and other ground disturbance, as shown on the approved WPCP, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

**10-1.16 EROSION CONTROL BLANKET:** This work includes constructing, maintaining, and removing erosion control blanket. Erosion control blanket is used to cover and protect disturbed soil areas from erosion by wind or water. Install erosion control blanket on all fill slopes and to cover stockpiles. The approved WPCP must describe and include the use of erosion control blanket as a water pollution control practice for soil stabilization.

Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the Standard Specifications for erosion control blanket. If you substitute the steel wire staple with an alternative attachment device, submit a sample of the device for approval at least 5 business days before installation.

## Materials

Erosion control blanket must be:

1. Described as a rolled erosion control product (RECP)
2. Classified as temporary and degradable or long-term and non-degradable
3. Machine-made mats
4. Provided in rolled strips
5. Classified by the Erosion Control Technology Council (ECTC)

Jute netting:

1. Classified as ECTC Type 3B
2. Classified as an open weave textile and have from 14 to 20 strands per foot in each direction
3. Designed to last for at least one year after installation
4. With a USLE C-Factor of not more than 0.25 at a 1.5:1 (horizontal:vertical) slope
5. Comprised of 100 percent unbleached and undyed spun yarn made of jute fiber
6. With an average open area from 63 to 70 percent
7. From 48 to 72 inches in width
8. Capable to withstand a maximum shear stress of 2.0 pounds per square foot under ASTM D6460
9. With a minimum tensile strength of 100 pounds per foot under ASTM D 5035
10. From 0.90 to 1.20 pounds per square yard in weight

Erosion control blanket classified as long-term and non-degradable must:

1. Be a geosynthetic fabric
2. Comply with the specifications for rock slope protection fabric (Class 8) in Section 88-1.06, "Channel and Shore Protection," of the Standard Specifications.

## Staples

You may use an alternative attachment device such as a geosynthetic pins or plastic pegs to install erosion control blanket.

## Construction

Before placing erosion control blanket, remove obstructions including rocks, clods, and debris greater than 1 inch in diameter from the ground. If fiber rolls are to be placed in the same area as erosion control blankets, install the blankets before placing the fiber rolls.

If erosion control blanket is installed on disturbed soil areas including embankment slopes:

1. Place the blanket loosely on the embankment slope with the longitudinal joints perpendicular to the slope contour lines
3. Place the blanket on the upper portion of the slope overlapping the blanket on the lower portion of the slope for transverse joints
4. Place the blanket on the side of the prevailing wind shall overlapping the blanket on the downwind side of the slope for longitudinal joints
2. Overlap and staple the longitudinal and transverse joints

## Maintenance

Remove sediment deposits, trash, and debris from erosion control blanket as needed or when directed by the Engineer. If removed sediment is deposited within project limits, it must be stabilized and not subject to erosion by wind or water. Trash and debris must be removed and disposed of as specified in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Maintain erosion control blanket by:

1. Removing sediment from the surface of the blanket when it is deeper than 2 inches
2. Repairing or replacing the blanket when the area treated with erosion control blanket becomes exposed or exhibits visible erosion
3. Repairing or replacing the erosion control blanket when washouts occur between joints or beneath the erosion control blanket
4. Repairing or replacing the erosion control when it becomes detached, torn, or unraveled

Repair erosion control blanket within 24 hours of discovering damage unless the Engineer approves a longer period. If your vehicles, equipment, or activities disturb or displace erosion control blanket, repair erosion control blanket at your expense. The County does not pay maintenance costs for cleanup, repair, removal, disposal, or replacement due to improper installation or your negligence.

## Removal

When the Engineer determines that erosion control blanket is not required, it must be removed and disposed of under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Erosion control blanket and other water pollution control measures shown in the approved WPCP may be abandoned in place when approved in writing by the Engineer.

Ground disturbance, including holes and depressions, caused by the installation and removal of the erosion control blanket must be backfilled and repaired under Section 15-1.02, "Preservation of Property," of the Standard Specifications.

## Measurement and Payment

Erosion control blanket is measured by the square yard of the actual area covered excluding overlaps. The contract price paid per square yard for "**EROSION CONTROL BLANKET**" includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing erosion control blanket, complete in place, including trench excavation and backfill, and removal of erosion control blanket, as shown on the approved WPCP, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

**10-1.17 ENVIRONMENTALLY SENSITIVE AREA:**

No archaeological monitoring is required during construction unless undiscovered cultural materials are accidentally unearthed. If any archaeological resources are found during construction, work shall stop within the immediate vicinity (50 feet) of the resource until such time as the resource can be evaluated by an archaeologist and any other appropriate individuals. The applicant shall implement the mitigations as required by the County's Environmental Coordinator.

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

**10-1.18 TEMPORARY FENCE (TYPE ESA):**

This work includes constructing, maintaining, and removing temporary fence (Type ESA). Temporary fence (Type ESA) provides a visible boundary adjacent to environmentally sensitive areas, such as existing trees to be protected in place, and to delineate private property, easement boundaries and/or temporary construction easement boundaries.

**Submittals**

Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the Standard Specifications for:

- 1. High visibility fabric
- 2. Safety cap for metal posts

**Materials**

High visibility fabric for temporary fence (Type ESA) must consist of one of the following:

- 1. Polyethylene
- 2. Polypropylene
- 3. Combined polyethylene and polypropylene

Sample under ASTM D 4354, Procedure C.

Test under ASTM D 4759. All properties must be based on Minimum Average Roll Value.

Identify, store, and handle under ASTM D 4873.

High visibility fabric must:

- 1. Contain ultraviolet inhibitors
- 2. Comply with the following:

Property	Specifications	Requirements
Width, inches, Min	Measured	48
Opening size inches	Measured	1" x 1" (Min) 2" x 2" (Max)
Color	Observed	Orange
Grab breaking load 1-inch grip, lb, Min. in each direction	ASTM D4632	260
Apparent elongation percent, Min., in each direction	ASTM D4632	5
Ultraviolet Degradation percent of original unexposed grab breaking load 500 hr, minimum	ASTM D4355	70

Posts

Posts must be wood or steel.

Wood posts must be:

- 1. Untreated fir, redwood, cedar, or pine and cut from sound timber

2. Straight and free of loose or unsound knots and other defects that would render the stakes unfit for use
3. Pointed on the end to be driven into the ground
4. At least 2" x 2" in size and 6 feet long

Steel posts must:

1. Have a "U," "T," "L," or other cross sectional shape that can resist failure from lateral loads.
2. Be pointed on the end to be driven into the ground.
3. Weigh at least 0.75-pound per foot.
4. Be at least 6 feet long.
5. Have a safety cap attached to the exposed end. The safety cap must be yellow, orange or red plastic and fit snugly to the metal post.

### **Construction**

Install temporary fence (Type ESA):

1. With high visibility fabric, posts, and fasteners as follows:
  - 1.1. If wood posts are used, fasteners must be staples or nails
  - 1.2. If steel posts are used, fasteners must be tie wires or locking plastic fasteners
  - 1.3. Spacing of the fasteners must be no more than 8 inches apart
2. Before clearing and grubbing activities
3. From outside of the protected area
4. With posts spaced 8 feet apart and embedded at least 16 inches in the soil

If trees and other plants need protection, install fence to:

1. Enclose the foliage canopy (drip line) of protected plants
2. Protect visible roots from encroachment

Maintain temporary fence (Type ESA) by:

1. Keeping posts in a vertical position
2. Reattaching fabric to posts
3. Replacing damaged sections of fabric
4. Replacing and securing signs

### **Removal**

When the Engineer determines that temporary fence (Type ESA) is no longer required, remove and dispose of it under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Backfill and repair ground disturbance caused by the installation and removal of temporary fence (Type ESA), including holes and depressions, under Section 15-1.02, "Preservation of Property," of the Standard Specifications.

### **Measurement and Payment**

**"TEMPORARY FENCE (TYPE ESA)"** is measured and paid for by the linear foot in the same manner specified for fence (Type BW or WM) in Section 80, "Fences," of the Standard Specifications. The contract price paid per linear foot for temporary fence (Type ESA) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the temporary fence (Type ESA), complete in place, including maintenance, removal of materials, and backfilling and repairing holes, depressions and other ground disturbance, as shown on the plans, as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer.

**10-1.19 TRENCH SAFETY:** Attention is directed to Section 7-1.01E, "Trench Safety" of the Standard Specifications, Article 15 of the Contract Agreement, and these Special Provisions.

Attention is direction to Section 10-1.03 "Geotechnical Engineering Report" regarding shoring recommendations.

Excavation safety shall conform to Section 5-1.02A, "Excavation Safety Plans" of the Standard Specifications. All excavations shall be performed, protected and supported as required for safety and in the manner set forth in the operation rules, orders, and regulations prescribed by the Division of Occupational Safety and Health of the State of California and any other applicable safety regulations.

Contractor shall submit a detailed plan in advance of any trench excavation work as part of this contract showing the design of shoring, bracing, sloping or other provisions for worker protection from the potential hazard of caving ground resulting from excavation of any trench or trenches over five (5) feet in depth. The detailed plan must be prepared by a registered civil engineer or structural engineer if the design varies from the shoring system standards required by the Construction Safety Orders.

Payment for compliance with the requirements of "Trench Safety" and for fulfilling the recommendations in the Geotechnical Engineering Report, shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.20 SAFETY AND HEALTH PROVISIONS:** Safety and Health Provisions will be required for this contract and shall conform to the provisions in Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications.

Attention is directed to Section 10-1.28k "Abandon or Remove Existing Pipelines", regarding procedure used to remove and dispose of asbestos cement pipe.

Removal of existing waterlines can result in potentially negative air quality impacts, especially where material exists containing asbestos material. "Naturally-occurring asbestos" has been identified by the state Air Resources Board as a toxic air contaminant. Serpentine and ultramafic rocks are very common in the state and may contain naturally occurring asbestos.

If naturally occurring asbestos, serpentine, or ultramafic rock is disturbed at the site during construction activities including grading, excavation, or trenching, the County must comply with all requirements as determined necessary by APCD. The requirements include but are not limited to the following:

1. If naturally-occurring asbestos, serpentine, or ultramafic rock are discovered at the site during construction, the Contractor shall report to the APCD no later than the next business day;
2. The Contractor must comply with the requirements of CCR 93105; and
3. The exemption under CCR 93105 subsection (c) (1) shall expire and cease to be effective.  
(For any questions regarding these requirements, contact Karen Brooks (APCD) at (805) 781-5912 or go to <http://www.slocleanair.org/business/asbestos.asp>).

Payment for compliance with the requirements of the "Safety and Health Provisions", and the forms and fees required by this section shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.21 MAINTAINING TRAFFIC:** Attention is directed to the provisions of Sections 7-1.08, "Public Convenience," 7-1.09 "Public Safety," and 12, "Construction Area Traffic Control Devices," of the Standard Specifications and to these Special Provisions.

Attention is directed to Section 10-1.04 "Order of Work" regarding restrictions on out-of-service periods for the jail security gate.

**"ALLOWANCE FOR ADDITIONAL TRAFFIC CONTROL AND FLAGGING"** is a lump sum bid item that provides an allowance as part of the Contract Price for payment for the County's share of cost for flagging or additional flagging directed by the Engineer, in accordance with the provisions of this section, as directed or approved by the Engineer.

Public traffic shall be permitted to pass through construction at all times. During the times when men or equipment are actually working within the public roadway, a minimum of one 10-foot wide lane shall

be provided for public traffic. At all other times a minimum of two 10-foot wide lanes reasonably smooth and satisfactory for the use of public traffic shall be provided and maintained irrespective of the state of construction. Adequate sight distance for vehicles exiting driveways shall be maintained. In addition, the Contractor shall backfill the excavated shoulder trench to match the edge of pavement on a 4:1 slope. The material shall be compacted in order to provide a temporary shoulder.

The Contractor shall conduct his/her operations in such a manner that access of abutting property owners along the county road is not obstructed. Care will be taken by the Contractor that materials, parked equipment or open trench within the county road right-of-way will not block driveways or other access means used by the adjacent property owners.

To accommodate excavation work, steel plate bridging may be necessary. Excavated areas within the roadway shall be covered with steel plate bridging or shall be backfilled and temporarily patched at the end of each work day and prior to opening for traffic.

**Temporary Pavement Patching**

The temporary patching shall be kept in a smooth, firm, dust-free condition for the safe use of the public until the final surface patching is completed. Patch material shall be cold mix asphalt at least 3-inches thick. The temporary cold mix asphaltic concrete shall be cut out and replaced at a later date with permanent hot mix asphalt concrete pavement.

**Steel Plate Bridging**

When backfilling operations of an excavation in the traveled way, whether transverse or longitudinal, cannot be properly completed within a work day, steel plate bridging with a non-skid surface and shoring (see Trenching & Shoring) shall be required to preserve unobstructed traffic flow. In such cases, the following conditions shall apply:

- a. Steel plates used for bridging must extend a minimum of 12" beyond the edges of the trench.
- b. Steel plate bridging shall be installed to operate with minimum noise.
- c. The trench shall be adequately shored to support the bridging and traffic loads.
- d. Temporary paving with cold mix asphalt concrete shall be used to feather the edges of the plates at the end of each day prior to permitting traffic to drive over the plated trenches..
- e. Bridging shall be secured against displacement by using adjustable cleats, shims, or other devices.
- f. Approach plate(s) and ending plate (if longitudinal placement) shall be attached to the roadway by a minimum of 2 dowels pre-drilled into the corners of the plate and drilled 2" into the pavement. Subsequent plates are butted to each other. Fine graded asphalt concrete shall be compacted to form ramps, maximum slope 8.5% with a minimum 12" taper to cover all edges of the steel plates. When steel plates are removed, the dowel holes in the pavement shall be backfilled with either graded fines of asphalt concrete mix, concrete slurry or equivalent slurry that is satisfactory to the Caltrans' representative.
- g. The contractor shall maintain the steel plates, shoring, asphalt concrete ramps, and ensure that they meet minimum specifications.
- h. Unless specifically noted in the Special Provisions, or approved by the Engineer, use of steel plate bridging shall not exceed 4 consecutive working days in any given week.

The following table shows the required minimal thickness of steel plate bridging required for a given trench width (A-36 grade steel, designed for HS20-44 truck loading per Caltrans Bridge Design Specifications Manual.).

<b>Trench Width</b>	<b>Minimum Steel Plate Thickness (inches)</b>
10"	1/2
1'-11"	3/4
2'-7"	7/8
3'-5"	1
5'-3"	1-1/4

Note: For spans greater than 5'-3", a structural design by a registered civil engineer shall be prepared and submitted to the Engineer for review and approval.

All steel plates within the right of way whether used in or out of the traveled way shall be without deformation. Inspectors can determine the trueness of steel plates by using a straight edge and should reject any plate that is permanently deformed.

All steel plates used in the traveled portion of the highway shall have a surface that was manufactured with a nominal Coefficient Of friction (COF) of 0.35 as determined by California Test Method 342.

A Rough Road sign (W8-8) with black lettering on an orange background may be used in advance of steel plate bridging. This sign is used along with any other required construction signing.

Maintaining traffic will be measured and paid for on a lump sum basis in the manner specified in Section 12-4.01 of the Standard Specifications and no separate payment will be made therefor.

**10-1.22 PRESERVATION OF PROPERTY:** In addition to Section 5-1.06 of the Special Provisions regarding "Preservation of Property," the Contractor's shall

Any damage to County property caused by the Contractor's operations shall be repaired or replaced in kind by the Contractor at the Contractor's expense.

Payment for preservation of property shall be considered as included in the contract prices paid for the various contract items of work involved and no separate payment will be made therefor.

**10-1.23 DUST CONTROL:** Dust control shall conform to the provisions in Section 10, "Dust Control," of the Standard Specifications and these Special Provisions.

Dust control operations shall be performed by Contractor as follows:

- a. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site. Their duties shall include holiday and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the APCD prior to commencement of construction.
- b. Reduce the amount of disturbed area where possible.
- c. Prevent airborne dust from leaving the site.
- d. Control dust from dirt and stock pile areas.
- e. All trucks hauling dirt, sand, soil or other loose materials are to be covered or should maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114.
- f. Ensure that trucks and equipment leaving the site do not carry soil material onto adjacent paved roads; clean adjacent paved roads at the end of each day if visible soil material is carried from the site onto those roads.

The Contractor shall prevent airborne dust from leaving the work site to the fullest extent possible. Any and all stockpiles shall have measures to control dust during construction. All exposed ground areas resulting from the construction shall be planted with erosion control planting as soon as practical.

Exposed ground areas that are planned to be reworked at dates greater than one month after initial grading shall be subject to dust control measures (watering, etc.) or shall be sown with an approved fast germinating native grass seed mixture and watered until a temporary vegetative cover is established.

All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114.

Ensure that trucks and equipment leaving the site do not carry soil material onto adjacent paved roads; clean adjacent paved roads at the end of each day if visible soil material is carried from the site onto those roads.

Payment for dust control shall be considered as included in the contract prices paid for the various contract items of work involved and no separate payment will be made therefor.

**10-1.24 PROGRESS SCHEDULE:** Attention is directed to Section 5-1.05 of the Special Provisions regarding submittal of progress schedules. The Contractor's attention is directed to the service interruption constraints described in Section 10-1.04 "Order of Work" of these Special Provisions.

**10-1.25 OBSTRUCTIONS:** Attention is directed to Section 8-1.10, "Utility and Non-Highway Facilities," and Section 15, "Existing Highway Facilities," of the Standard Specifications.

Attention is directed to Section 10-1.04 "Order of Work" of the Special Provisions regarding the Contractor's responsibility to ensure positive grade for the new waterline.

The Contractor shall perform pothole/exploratory excavations along the alignment of the new water pipeline to determine if any utility obstructions will prevent a minimum clearance between the pipeline being the existing substructure.

Utility separation criteria for new water main constructed parallel or crossing underground sewer, storm drain, or hazardous fluids such as fuel facilities shall conform to County Standard Drawing No.s U-3 and U-3b, unless otherwise shown on the plans. Utility separation criteria for new water main crossing all other types of underground facilities (including communication cables, gas, electric, etc.) shall have a minimum clearance of 12", unless otherwise shown on the plans, or unless approved by the Engineer. If these distances cannot be achieved, the Contractor shall notify the Engineer prior to construction.

The maximum horizontal angle for new water main crossing utility such as sewer, storm drain, or hazardous fluids such as fuels, shall be 45 degrees and at least one foot above that pipeline unless otherwise shown on the plans.

The Contractor shall coordinate work activities with the related utility work that may be necessary during construction of the project which must occur during the progress of the Contractor's work. The contract time specified in Section 4, "PROSECUTION AND PROGRESS OF WORK" of the contract Special Provisions includes an allowance of 5 non-consecutive working days for the utility companies to perform their respective work. During this time, the Contractor may only work on those portions of the project that do not interfere with the utility companies' work.

Compensation for delay to permit rearrangement of utilities shall be considered as included in the contract items of work involved and the Contractor will not be entitled to any compensation for such delay, nor entitled to an extension of time for such delay, without due cause.

The Contractor shall notify the Engineer in writing at least 5 working days prior to the date upon which the utility companies may begin their rearrangement work. In the event that the work area is not satisfactorily prepared, as determined by the Engineer, the Contractor shall supply the Engineer with another 5 working days notice, in writing, upon which the utility companies may begin their rearrangement work.

The Contractor is responsible for maintaining the roadway for traffic at all times. During utility rearrangement work, the Contractor shall avoid activities that could conflict with the utility work and shall coordinate activities that could facilitate utility work.

The Contractor must contact Underground Service Alert ("USA") at (800) 227-2600 a minimum of 48 hours prior to the start of construction. For best response, provide as much notice as possible, up to 10 working days.

Payment for furnishing labor, materials, tools, equipment, and incidentals, and for doing the work involved in locating, protecting, or repairing property as specified herein shall be considered as included in the contract unit price paid for the various contract items of work involved and no separate payment will be made therefor.

**10-1.26 CONSTRUCTION AREA SIGNS:** 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 as provided 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 needed, 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 furnished. If determined by the Engineer, signs damaged by any cause shall be repaired or replaced by the Contractor at the Contractor's own expense.

**"CONSTRUCTION AREA SIGNS"** will be paid for on a lump sum basis in the manner specified in Section 12-4.01 of the Standard Specifications.

**10-1.27 TRAFFIC CONTROL SYSTEM:** A traffic control system shall consist of closing traffic lanes in accordance with the details shown in Standard Plan T13 and to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications.

The provisions in this section will not relieve the Contractor from the responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

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 traveled way, shall be removed from the traveled 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.

The contract lump sum price paid for, **"TRAFFIC CONTROL SYSTEM"** shall include full compensation for furnishing all labor, (except for flagging costs for the lane closures on two-lane highways), 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 as shown on the plans or as specified in the Standard Specifications and these Special Provisions and no additional compensation will be allowed therefor. Flagging costs for lane closures on two-lane highways will be paid for as provided in Section 12-2.02, "Flagging Costs," of the Standard Specifications.

Full compensation for furnishing and operating a pilot car (including driver, radio communications and any other equipment and labor required) shall be considered as included in the contract lump sum price paid for, "TRAFFIC CONTROL SYSTEM" and no additional compensation will be allowed therefor.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications shall not apply to the item of, "TRAFFIC CONTROL SYSTEM". Adjustments in compensation for, "TRAFFIC CONTROL SYSTEM" will be made only for increased or decreased traffic control system components required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased component necessary. Such adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work, and estimated on the same basis in the case of decreased work.

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.

**10-1.28 EXISTING HIGHWAY FACILITIES:** The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these Special Provisions.

**10-1.28a Reconstruct Fence:**

Work related to construction of the 12-inch PVC waterline may require reconstruction of the existing fence (located adjacent to the utility bridge approximately near Station 27+50. Install temporary fence (Type ESA) until permanent fence is reconstructed per Section 10-1.18 of these Special Provisions.

Chain link fence shall be Type CL-6 with 3-strand barbed wire. Chain link fence posts shall be metal and equipped with extension arms for 3 lines of barbed wire. Post locations shall be the same as existing.

Construction shall conform to the provisions in Section 80, "Fences," and Standard Plan A85 of the Standard Specifications.

Quantities of chain link fence (Type CL-6 with 3-strand barbed wire) shall be determined in the same manner specified in Section 80-4.03 of the Standard Specifications.

The contract unit price paid per linear foot for "**RECONSTRUCT FENCE**" shall be paid for in the same manner specified in Section 80-4.04 of the Standard Specifications, including removal and replacement of fence and posts with new materials, and connecting to existing 3-strand barbed wire, as directed by the Engineer, as specified in the Standard Specifications and these Special Provisions, and no additional compensation will be allowed therefor.

**10-1.28b Remove Gate Valve:**

Sawcut existing pipe, remove and dispose of gate valve, valve box assembly, concrete collar, including anchor block and pipe at locations shown on the plans. Sawcut and remove existing AC pavement per Section 10-1.28l of these Special Provisions. The pavement shall be restored as shown on the plans and as specified per Section 10-1.55 "Hot Mix Asphalt Concrete Pavement" per these Special Provisions.

The contract unit price paid per each "**REMOVE GATE VALVE**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing the gate valve, box assembly, concrete collar, anchor block, disposal, including pavement restoration at locations as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and no additional compensation will be allowed therefor.

The approximate locations for the work paid for each "REMOVE GATE VALVE" are as follows:

- 1) Station 13+50 – In-line gate valve

- 2) Station 14+00 – Isolation gate valve for fire hydrant
- 3) Station 20+00 – In-line gate valve

Gate valves that are shown on the plans to be removed as part of items to be paid for separately shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.28c Reconstruct Concrete Curb, Gutter, and Sidewalk:**

Cut bituminous and concrete pavements regardless of the thickness of curbs and sidewalks prior to excavation of the trenches with a pavement saw or pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface.

Pavement and concrete materials removed shall be considered as excess material and disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Do not use said materials for trench backfill.

Concrete removed shall be repaired the full depth of the existing concrete pavement per Section 73 "Concrete Curbs and Sidewalks" of the Standard Specifications. Install new dowel bars between existing dowel bars equally spaced. Concrete shall conform to Section 10-1.53 "Minor Concrete" of the Special Provisions.

Full compensation for removing and reconstruction of concrete curb, gutter, and sidewalk, including disposal, reinforcing steel, formwork, tie wire, joints, aggregate, and for other work involved in conforming to these Special Provisions and Standard Specifications, shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.28d Reconstruct Loop Detectors:**

Work related to construction of the 8-inch PVC waterline at approximately Station 13+00 will require reconstruction of the pavement loop detectors. Attention is directed to Section 10-1.04 "Order of Work" regarding restrictions on out-of-service periods for the jail security gate.

Detector Loop sensor units and asphaltic concrete sealant for inductive detector loop installation will be Contractor-furnished and approved by the engineer.

Loop wire shall be Type 2.

Detector Loop lead-in cable shall be Type B.

Loop configuration shall be Type A.

Slots shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant.

For detector loops, sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 1 ½ inches. Slot width shall be a maximum 1 ¾ inch. Loop wire for circular loops shall be Type 2. Slots of circular loops shall be filled with elastomeric sealant or hot melt rubberized asphalt sealant.

The depth of loop sealant above the top of the uppermost loop wire in the sawed slots shall be 2 inches, minimum.

Slots in asphalt concrete pavement shall be filled with asphaltic concrete sealant as follows:

A. After conductors are installed in the slots cut in pavement, paint binder (tack coat) shall be applied to the vertical surfaces of slots in conformance with the provisions in Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," of the Standard Specifications

B. Temperature of sealant material during installation shall be above 21° C. Air temperature during installation shall be above 10° C. Sealant placed in the slots shall be compacted by use of a 8-inch diameter by 1/8 inch thick steel hand roller or other tool approved by the Engineer. Compacted sealant shall be flush with the pavement surface. Minimum conductor coverage shall be one inch. Excess sealant remaining after rolling shall not be used. On completion of rolling, traffic will be permitted to travel over the sealant.

Slots in Portland cement concrete shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant, or shall be filled with an epoxy sealant conforming to the provisions in Section 95-2.09, "Epoxy Sealant for Inductive Loops (State Specification 8040-06)," of the Standard Specifications.

The contract lump sum price paid for "**RECONSTRUCT LOOP DETECTORS**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing loop detectors, to replace the damaged loop, detectors at the jail security gate, including, but not limited to connection to existing systems, start-up and testing to ensure a fully operational system to the satisfaction of the Engineer, and all incidentals, complete and in place, as detailed in these Special Provisions and as directed by the Engineer, and no additional compensation shall be allowed therefor.

**10-1.28e Isolation of Existing System:**

Contractor shall provide all additional valving, blind flanges, and thrust blocks as necessary to isolate lines that have been tied into the existing system but are not yet completed or ready to operate in their intended function.

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 before being connected to the existing distribution system.

Full compensation for additional valving, blind flanges, and thrust blocks as needed to isolate any portion of the existing waterline to perform the work as shown on the plans shall be considered as included in the contract prices paid for the various contract items of work involved and no separate payment will be made therefor.

**10-1.28f Reconnect 2" Riser:**

The existing 2" riser shall be connected to the new waterline located at approximately Station 12+78. See profile for limits where no joints are allowed in the new 8" watermain when pipe is crossing underneath the existing 24" diameter storm drain. Install valve can assembly for the corporation stop at the watermain. Existing aboveground riser pipe is located behind the existing concrete curb and gutter. Sawcut existing concrete curb, gutter, and sidewalk and install new water meter box assembly in between the aboveground riser pipe and the existing concrete curb. Connect new water lateral to existing riser lateral with coupling. Reconstruct concrete curb, gutter, and sidewalk per Section 10-1.28c.

Full compensation for all the work involved in reconnecting the 2" riser including furnishing all labor, materials, tools, equipment, and incidentals, shall be considered as included in the contract lump sum price paid for "**RECONNECT 2" RISER**" as shown on Detail E on Sheet 4 complete in place, including potholing/exploratory excavation, sawcutting, remove and reconstruct curb, gutter, sidewalk, and AC pavement, disposal, backfilling, installing valve can assembly over corporation stop at the watermain, installing new meter box assembly, pavement and/or surface restoration, coordination with County Water Operations Personnel, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.28g Reconnect Water Sampling Station:**

The existing water sampling station shall be reconnected to the new watermain located approximately at Station 14+28. Replace concrete curb and gutter per Section 10-1.28c of these Special Provisions, and/or use trenchless boring methods, if approved by the Engineer.

The existing water sampling station is located in curbed landscaped area and may require clearing and grubbing. Perform clearing and grubbing necessary to perform the work. Clearing and Grubbing shall conform to Section 10-1.29 of the Special Provisions. Replace in-kind landscaping in areas where the ground is disturbed by excavation activities. Attention is directed to the presence of existing exposed irrigation piping in the curbed landscaped area. Any damage to existing facilities shall be replaced per Section 10-1.22 "Preservation of Property".

Full compensation for all the work involved in reconnecting the water sampling station including furnishing all labor, materials, tools, equipment, and incidentals, shall be considered as included in the contract lump sum price paid for "**RECONNECT WATER SAMPLING STATION**" as shown on Detail F on Sheet 4 complete in place, including clearing and grubbing, potholing/exploratory excavation, sawcutting, removal and reconstruction of concrete curb, gutter, and AC pavement, disposal, backfilling, pavement and/or surface restoration, in-kind replacement of landscaping and irrigation, coordination with County Water Operations Personnel, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

#### **10-1.28h Reconnect Fire Hydrant or Riser:**

This work includes reconnecting fire hydrants or fire risers at locations shown on the plans. **The Contractor's attention is directed to Section 10-1.04 "Order of Work" of these Special Provisions regarding restrictions on interruptions to fire service.** Reconnect fire hydrant or riser laterals per Detail H of the plans, except as modified as follows:

#### **Station 11+12**

The existing gate valve for this lateral is located in existing AC pavement. Note that there is an existing service lateral connected to the fire hydrant lateral with a tee connection (see Section 10-1.50 "Service Lateral" of these Special Provisions for related work). Install a new gate valve assembly at the new watermain. Remove the existing gate valve per Section 10-1.28b of these Special Provisions. Connect the new lateral to the existing lateral with a transition coupling located in between the gate valve to be removed and service lateral tee connection. Reconstruct AC pavement per Section 10-1.55 "HMA Concrete Pavement" of these Special Provisions.

#### **Station 13+39**

The existing gate valve for the lateral is located in the existing concrete sidewalk adjacent to the jail security gate. Install a new gate valve assembly at the new watermain and install the new lateral in location as shown on the plans. Thrustblocks will be required at the 8"x8"x6" tee, and at the angle fittings conforming to Sections 10-1.49 "Thrust Restraint Devices" and 10-1.50 "Concrete Thrust Blocks" of these Special Provisions. Remove the existing gate valve box and lid and reconstruct the concrete sidewalk per Section 10-1.28c of these Special Provisions. Connect the new lateral to the existing lateral using a transition coupling.

#### **Station 15+14**

The existing gate valve for the lateral is located in the existing concrete sidewalk in between grass landscaped area and the curb. Install a new gate valve assembly at the new watermain. Sawcut existing concrete curb, gutter and sidewalk and remove existing gate valve box and lid. Connect to the new lateral to the existing lateral with a transition coupling located in between the existing meter utility box and the gate valve to be removed. Reconstruct concrete curb, gutter and sidewalk per Section 10-1.28c of these Special Provisions. Replace grass landscaped area shall in areas of excavation per Section 10-1.22 "Preservation of Property" of these Special Provisions.

#### **Station 19+25**

The existing gate valve for the lateral is located in between two bollards in the wood bark landscaped area behind the existing AC pavement. Install a new gate valve assembly at the new watermain. Sawcut existing AC pavement and remove the existing gate valve per Section 10-1.28b of these Special Provisions. Reconstruct AC pavement per Section 10-1.55 "HMA Concrete Pavement" of these Special Provisions. Connect to the new lateral to the existing lateral with a transition coupling

located in between the existing gate valve to be removed and the fire riser above ground piping. Replace grass wood bark landscaped area in areas of excavation per Section 10-1.22 "Preservation of Property" of these Special Provisions. Replace any damage to existing facilities such as bollards shall be replaced per Section 10-1.22 "Preservation of Property".

#### **Station 23+06**

The existing gate valve located in the un-paved shoulder. Install new gate valve assembly at the new watermain. Sawcut existing pipe and remove the existing gate valve per Section 10-1.28b of these Special Provisions. Connect the new lateral to the existing lateral with a transition coupling located in between the existing gate valve to be removed and the fire hydrant bury.

#### **Station 25+01**

The existing gate valve located in the un-paved shoulder. Install new gate valve assembly at the new watermain. Remove the existing gate valve per Section 10-1.28b of these Special Provisions. Connect the new lateral to the existing lateral with a transition coupling located in between the existing gate valve to be removed and the fire riser above ground piping.

#### **Station 26+27**

The existing gate valve located in the un-paved shoulder. Install new gate valve assembly at the new watermain. Remove the existing gate valve per Section 10-1.28b of these Special Provisions. Connect the new lateral to the existing lateral with a transition coupling located in between the existing gate valve to be removed and the fire riser above ground piping.

The contract unit price paid per each "**RECONNECT FIRE HYDRANT OR RISER**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in reconnecting service to existing fire hydrants and fire risers, complete in place, in conformance with Detail H on Sheet 4 of the plans with the above described modifications, including potholing/exploratory excavation, sawcutting, removal and reconstruction of curb, gutter, sidewalk, and AC pavement, disposal, removal and disposal of existing valve assemblies, fittings and pipes. backfilling, thrustblocks, thrust restraint, temporary thrust restraint, pavement and/or surface restoration, coordination with County Water Operations Personnel, as directed by the Engineer, and incidentals associated with removal of the existing fire hydrant and all appurtenant work and materials as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and no additional compensation will be allowed therefor.

#### **10-1.28i Replace Fire Hydrants**

This work includes replacing the existing fire hydrant at the same locations as the existing hydrants as shown on the plans. The existing fire hydrants shall be salvaged and delivered to the County CSA23 service yard off El Camino Real in Santa Margarita. Sawcut, remove, and dispose of AC Pavement in order to remove existing gate valve and replace fire hydrant assembly. Remove the existing gate valve per Section 10-1.28b of these Special Provisions. Reconstruct AC pavement per Section 10-1.55 "HMA Concrete Pavement".

The existing fire hydrants shall be salvaged which includes removing the fire hydrant at location shown on plan, and hauling it to the County Service Area No. 23's water yard in Santa Margarita.

#### **Station 14+32**

Attention is directed to the presence of existing exposed irrigation piping in the curbed landscaped area. Any damage to existing facilities shall be replaced per Section 10-1.22 "Preservation of Property". Replace plant landscaping in areas of excavation per Section 10-1.22 "Preservation of Property".

#### **Station 18+83**

The existing hydrant is located in a plant and rock landscaped area behind existing vehicle parking concrete wheel stops. Replacement of plant and rock landscaping in areas of excavation, and any

damage to the existing concrete sidewalk or concrete wheel stops shall be replaced in-kind per Section 10-1.22 "Preservation of Property".

The contract unit price paid per each "**REPLACE FIRE HYDRANT**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in replacing fire hydrant, complete in place, including potholing/exploratory excavation, salvage and delivery of two fire hydrants, sawcutting, removal and reconstruction of curb, gutter, sidewalk, and AC pavement, disposal, backfilling, thrustblocks, thrust restraint, temporary thrust restraint, pavement and/or surface restoration, in-kind replacement of landscaping and irrigation, coordination with County Water Operations Personnel, as directed by the Engineer, and incidentals associated with removal of the existing fire hydrant and all appurtenant work and materials as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and no additional compensation will be allowed therefor.

#### **10-1.28j Relocate Fire Hydrants**

This work includes relocating the existing fire hydrant to location shown on the plans and as directed by the Engineer. Remove the existing gate valve per Section 10-1.28b of these Special Provisions.

The contract unit price paid per each "**RELOCATE FIRE HYDRANT**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in relocating fire hydrant, complete in place, including potholing/exploratory excavation, sawcutting, salvage existing gate valve, pavement removal, disposal, backfilling, thrustblocks, thrust restraint, temporary thrust restraint, pavement and/or surface restoration, coordination with County Water Operations Personnel, and incidentals associated with relocating of the existing fire hydrant and all appurtenant work and materials as shown on the plans, as specified in the Standard Specifications and these Special Provisions, and no additional compensation will be allowed therefor.

#### **10-1.28k Abandon or Remove Existing Pipelines:**

Contractor shall abandon and/or remove a section of existing water line at the locations shown on the plans and as necessary to access and install the new work.

Existing utility pipelines, where shown on the plans to be abandoned, shall be abandoned in place or, at the option of the Contractor, the pipelines shall be removed and disposed of. Resulting openings into existing structures that are to remain in place shall be plugged with concrete conforming to the provisions in Section 10-1.53 "Minor Concrete" of these Special Provisions.

#### **Asbestos Cement Pipe**

The Contractor shall obtain proper certification and training through CAL/OSHA to remove and dispose of asbestos cement pipe.

The Contractor shall submit the procedure used to remove and dispose of asbestos cement pipe 10 (ten) working days prior to the beginning of the asbestos removal activity or demolition. Provide name, address, and phone number of properly-permitted landfill that is to be used for disposal of asbestos waste and debris. Such landfill must be operated in compliance with all applicable federal, state, and local legal requirements. Non-friable asbestos-containing material that has or will become friable, crumbled, pulverized, or reduced to powder by the forces expected to act on the material during the course of construction shall conform to CAL/OSHA, Section 1529 regulations.

Full compensation for abandoning or removing existing pipelines shall be considered as included in the contract prices paid for the various contract items of work involved and no separate payment will be made therefor.

#### **10-1.28l Remove Asphalt Concrete (AC) Pavement:**

The approximate areas of existing AC surfacing to be removed are as shown on the plans. The existing asphalt concrete surfacing to be removed shall be saw cut along the line as shown on the plans, broken up and removed. The saw cut shall be a neat vertical cut no less than 0.2-feet in depth. Care is to be taken for the surfacing that is to remain in place.

The asphalt concrete material removed shall be considered as excess material and disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. The asphalt concrete material removed may be buried in embankments in the same manner provided in Section 19-6, "Embankment Construction," of the Standard Specifications.

Full compensation for "Remove Asphalt Concrete (AC) Pavement" shall be considered as included in the contract prices paid for the various contract items of work involved and no separate payment will be made therefor.

**10-1.29 CLEARING AND GRUBBING:** Clearing and grubbing shall conform to provisions in Section 16, "Clearing and Grubbing", of the Standard Specifications.

All existing vegetation, outside the areas to be cleared and grubbed, shall be protected from injury or damage resulting from the Contractor's activities.

Any trees and/or branches to be removed necessary for construction shall be verified by the Contractor in coordination with the Engineer prior to removal.

Full compensation for removing and disposing all trees and/or stumps which will be affected by the construction activities, and in accordance with the Standard Specifications, shall be considered as included in the contract lump sum price paid for, "**CLEARING AND GRUBBING**," and no additional compensation will be allowed therefor.

**10-1.30 WATERING:** Watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications, except that County will permit the Contractor to use water from the existing water system free of charge for his/her construction operations on this project only. The County will provide a construction water meter for the Contractor's use in extracting water from the existing waterline system. The Contractor may obtain water from an existing system outlet provided the Contractor provides and utilizes an approved backflow device. Extravagant, inappropriate or wasteful use of water will result in charges to the Contractor for excess water used as determined by the Engineer.

Nothing in this section "Watering" shall relieve the Contractor from furnishing an adequate supply of water required for the proper construction of this project in conformance with the provisions in the Standard Specifications or these Special Provisions or relieve the Contractor from the legal responsibilities defined in Section 7.

The Contractor shall, whenever possible and not in conflict with the above requirements, minimize the use of water during construction of the project. Watering equipment shall be kept in good working order; water leaks shall be repaired promptly; and washing of equipment, except when necessary for safety or for the protection of equipment, shall be discouraged.

Concrete slope protection, concreted rock slope protection, minor structures, and miscellaneous concrete construction shall not be cured by using water.

Payment for watering shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.31 BRACING EXCAVATION:** Attention is direction to Section 10-1.03 "Geotechnical Engineering Report" regarding shoring recommendations.

Adequate shoring, as required by the Division of Occupational Safety and Health of the State Department of Industrial Relations (CAL/OSHA), to protect personnel, adjacent property and roadway area shall be installed through unstable material to limit the trench width to the amount specified

herein. If any damage does result from such improvements, the Contractor at his/her own expense shall make the necessary repairs or reconstruction required as directed by the Engineer.

The sheeting, shoring and bracing shall be so arranged as not to place any stress on portions of the completed work until the general construction thereof has proceeded far enough to provide ample strength. Any damage to structures occurring through settlements, water or earth pressures, slides, caves or other causes due to failure or lack of sheeting or bracing or improper bracing, or through negligence or fault of the Contractor in any other manner shall be repaired by the Contractor at his/her own expense.

Care shall be exercised in the drawing or removing of sheeting, shoring, bracing and timbering to prevent the caving or collapsing of the excavation faces which are being supported.

No trenches will be allowed to be open during non-work hours. All trenches shall be backfilled to within 6" of the finish grade or steel plating is provided during non-work hours.

Payment for bracing excavations shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.32 EARTHWORK:** Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these Special Provisions.

This section describes excavations, trenching, bedding and backfilling, and testing for compaction for the construction of the potable water pipelines, and other items as shown in the plans.

The Contractor's attention is directed to the Geotechnical Engineering Report, see Section 10-1.03, "Geotechnical Engineering Report" of these Special Provisions. The Contractor shall perform work in conformance with the recommendations of this report and these specifications as it relates to all earthwork operations and as directed by the Engineer.

**10-1.32a Excavation:** Excavation operations shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these Special Provisions.

The surplus excavated material shall be disposed of by the Contractor outside the highway right of way in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Payment for excavation shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.32b Trenching:** The trench shall be excavated to 6 inches below the bottom of the pipe. The excavations for valves and fittings shall be performed by hand and the bedding material shall be hand shaped so that the bottom segment of the pipe is firmly supported. It is the intention of these requirements to provide firm, uniform bearing for the piping systems.

Refer to the Geotechnical Engineering Report regarding conventional sloped trench excavation, shored excavations, and microtunneling (if used).

Limit the length of open trench in advance of the pipeline to the length of pipe that can be installed in one working day. All in-place pipeline segments shall be capped daily until buried to prevent the entry of animals or foreign materials.

Payment for trenching shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.32c Steel Plating Trenches:** The Contractor's attention is directed to Section 10-1.21 "Maintaining Traffic" of these Special Provisions regarding steel plating. All trenches shall be plated at the end of each day and temporarily paved with cold asphalt concrete.

Payment for steel plating trenches shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.32d Bedding and Backfill:** All fill and backfill shall be placed in loose lifts not exceeding 6 to 8 inches. Bedding and structural backfill material shall be in accordance with San Luis Obispo Standard Drawing. No U-4 and U-4a except as noted in the Geotechnical Engineering Report and the following:

**Bedding and structural backfill material**

The bedding material shall be placed in the pipe zone (pipe zone is defined as the material that extends 6" below the pipe to 12" above) and shall have 100% passing the 3/4" sieve, 29-90% passing the No. 4 sieve, and 0-12% passing the No. 200 sieve. In addition, backfill shall have a minimum sand equivalent of 30 (California Standard Test No. 217).

Structural material extends from 12" above the pipe to below the pavement and base section and shall be compacted to 95 percent relative compaction. Structural material shall consist of native material excavated from the trench, and shall be fine-grained materials free from roots, debris, rocks larger than 3 inches, asbestos, organic matter, clogs, clay balls, broken pavement, and other deleterious materials. Materials that are classified as Pt, OH, CH, MH, or OL according to ASTM D2487, should not be used as structural material. The structural material shall be moisture conditioned to within +1% to +3% if the optimum moisture content prior to placement in the trench.

**Bedding Material Placement**

After the pipe has been laid on the bedding material, bedding of the same material shall be placed on the sides and to a minimum of twelve (12) inches above the pipe in the following manner:

Bedding material shall be filled to the top of the pipe and then compacted around the pipe prior to placing next layer of material. Water consolidation by flooding or jetting will not be permitted except by written permission of the Engineer. Hand tamping may be supplemented by the use of vibratory or other compaction equipment provided that the equipment used is approved by the Engineer and does not strike, move or damage the pipe while in the process of compacting.

**Subsequent Backfilling**

The minimum cover of the pipe shall be thirty six (36) inches. All trenches shall be backfilled for the full width of the trench, including joints, after pipe, fittings, appurtenances and bedding material have been installed, and before the required pressure and leakage tests are performed.

Full compensation for trench backfill shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.32e Compaction:** After the placing of backfill has been started, the Contractor shall proceed as soon as practicable with densification.

Compaction testing shall be per the California Test Method performed in accordance with the County of San Luis Obispo Standard Drawing No. U-4 & U-4a and as directed by the Engineer.

Compaction of trench backfill soils by jetting operations shall be subject to review by the Engineer. The water must have a free drainage path that will allow the water to dissipate very rapidly without causing erosion in the trench.

Compaction of native and fill soils, and backfill of excavations and trenches shall comply with Section 1704.7, "Soils", of the CBC.

Special inspection of grading/backfill shall be provided in compliance with Section 1704.7 and Table 1704.7 of the CBC. The special inspector shall be directed by the Engineer.

Determination of the "relative compaction" shall be per ASTM D 1557-09, or other methods approved by the Engineer. "Relative Compaction" is the ratio, expressed as a percentage, of the in place dry density to the laboratory maximum dry density.

A minimum of one compaction test is required to be taken in each utility trench for every 1.5 feet above the pipe for every 50 linear feet of trench, or fraction thereof. A minimum of three compaction tests are required to be taken in the AC pavement areas at subgrade and at aggregate base grade for every 1,000 square feet or fraction thereof.

The County will pay for the initial cost of all compaction tests. If the backfill compaction fails to meet the relative density requirements set forth herein, the Contractor shall pay for subsequent compaction tests at the rate of \$25.00 per individual test.

The Contractor shall make all necessary excavations for compaction tests, as directed by the Engineer, and shall refill and recompact these excavations to the densities specified herein.

**10-1.33 EXISTING WATER DISTRIBUTION SYSTEM:** In the event that the new waterline is not in service within the time specified in Section 10-1.04 "Order of Work" of these Special Provisions, the Contractor shall restore service using temporary means approved by the Engineer as soon as possible until such time that the new waterline can be connected. The Contractor shall not operate a gate valve or any waterworks appurtenances.

**10-1.34 CONNECTIONS TO THE EXISTING WATER MAINS:** The Contractor shall determine material and the exact outside diameter of the existing pipe and the type of fitting or gate valve and shall have on hand the correct size of couplings or adapters to connect the existing mains or services to the new system prior to cutting into the existing mains or services.

Contractor shall request from the Engineer in writing at least 48 hours in advance for connections to existing water mains. Contractor shall receive permission from the Engineer prior to undertaking connections.

If at any time, the system pressure drops to less than five (5) psi at any portion in the water distribution system, bacteriological samples shall be collected from water representative of the water quality in the affected portions of the system. Direct connection to the existing water system shall be performed during the hours indicated in Section 10-1.04 "Order of Work" and as directed by the Engineer, and connection shall not be permitted until the newly installed portion has passed bacteriological testing and a physical check by the Engineer.

Separation shall be achieved by the installation of a temporary steel plate or temporary blocking device per County Standard Drawing W-8.

Facilities shall be provided for dewatering and for disposal of the water removed from the dewatered lines and excavations without damage to adjacent property.

Special care shall be taken to prevent contamination when dewatering, cutting into, and making connections with potable water piping. Trench water, mud, or other contaminating substances shall not be permitted to enter the lines. The interior of all pipe, fittings, and valves installed in such connections shall be thoroughly cleaned and then swabbed with or dipped in a 200 mg/L chlorine solution.

Pavement restoration shall conform County Standard Drawing No. R-4 or R-4a. Hot mix asphalt pavement thickness shall be 3.5" thick or 2" plus existing pavement thickness, whichever is greater. Aggregate base shall be 12" thickness.

The contract lump sum unit price paid for the following connections to existing:

- 1) "CONNECTION TO EXISTING "POINT A"" as shown on Detail A, Sheet 2 of the plans,
- 2) "CONNECTION TO EXISTING "POINT B"" as shown on Detail B on Sheet 3 of the plans,
- 3) "CONNECTION TO EXISTING "POINT C"" as shown on Detail C on Sheet 3 of the plans,

shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in pothole/exploratory excavations, sawcutting pavement, excavation, trenching, removal of water, concrete encasement for abandoned pipe, removal and disposal of existing pipe or gate valves or fittings or thrustblocks, necessary for installation of new piping, flanges, mechanical joint fittings, mechanical joint restraint, transition couplings, reducers, tees, bends, crosses, blind flange caps, coating, temporary steel plates, temporary thrust restraint, thrust blocks and thrust restraints, flushing, pressure testing, bacteriological disinfection, tracer wire, detection tape, bedding and backfilling, and compaction, complete in place, including pavement restoration, and providing gate valve anchor and box assemblies at the locations as shown on the plans, as specified in the Standard Specifications, these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.35 NON-DETECTABLE WARNING TAPE:** Non-detectable warning tape (detection tape) shall be installed over the main waterline pipe per San Luis Obispo County Standard Drawing No. U-4 or U-4a. Non-detectable warning tape shall be of stretch-type, be color-durable, blue in color, chemically resistant, a minimum of 3" wide, and 4 mils thick.

Payment for the detectable warning tape shall be considered as included in the various contract items of work and no separate payment will be made therefor.

**10-1.36 TRACER WIRE:**

A 14-gauge copper wire shall be firmly attached to the top of the pipe along the entire length of the pipe per County of San Luis Obispo Standard Drawing No. U-4 or U-4a. The tracer wire shall run up into each valve box and terminate. Tracer Wire shall be Coleman Cable Model 54492-12, Copperhead Cable Model 1230-HS-2500, or equal.

Payment for the tracer wire shall be considered as included in the various contract items of work and no separate payment will be made therefor.

**10-1.37 DUCTILE IRON FITTINGS:**

Ductile-iron fittings shall be used for PVC pipe. Fittings shall meet the requirements of AWWA C104, C110, C111, C115, C116, C150, C151, and C153. All fittings shall be rated for 250 psi.

Delivery, storage, and handling of ductile-iron fittings shall be in accordance with AWWA C600.

Plain ends shall conform to the requirement of AWWA C151 and to the dimensions included within AWWA C110 to accept a mechanical joint, flanged coupling adaptor, flexible coupling, or grooved coupling. When connecting old pipe to new pipe, appropriate transition coupling adapter fittings shall be used to connect plain end pipes with dissimilar materials.

**Submittals**

Submit the following data for review and approval:

1. Certification by manufacturer for each item furnished in accordance with the ANSI/AWWA Standards.
2. Certification of gaskets, certifying that gasket material is suitable for services intended and are compatible with the joints specified.
3. Dimensions
  - a. Dimensions of bends, both in horizontal and vertical alignment.
  - b. Pipe internal diameter, wall thickness, and internal design pressure.
  - c. Locations of valves, flanges, appurtenances and other mechanical equipment.

#### 4. Lining and coating systems

##### **Lining and Coating**

Ductile-iron fittings shall be cement mortar lined or epoxy lined. Ductile iron fittings located above ground shall be coated per Section 10-1.44 "Painting" of these Special Provisions. The primer, intermediate, and finish coat shall be shop-applied. The color of the coating system shall match existing exposed piping.

Irregular surfaces, any remaining exposed piping, flange, bolts, and nut surfaces, shall be coated with wax tape per Section 10-1.43 "Wax Tape" of these Special Provisions, prior to placing concrete anchors, collars, supports, or thrust blocks.

The exterior surfaces of buried pipe and fittings shall be factory coated with a minimum one (1) mil thick petroleum asphaltic material per AWWA C110 and C151. For buried fittings, lubricate bolts and nuts with corrosion resistant grease per Section 10-1.41 "Corrosion Resistant Grease" of these Special Provisions, and wrap pipe with polyethylene sheet wrap and tape per Section 10-1.42 "Polyethylene Sheet Wrap" of these Special Provisions. The pipe manufacturer shall supply the polyethylene sheet wrap for the ductile iron pipe that he supplies.

##### **Mechanical Joint**

Joints for buried piping shall be mechanical joints per AWWA C110/A21.10, C110/A21.11, and AWWA C153/A21.53-06. Fittings and specials for grooved and shouldered end pipe shall conform to AWWA C606.

Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned, and reassembled. Bolts shall be uniformly tightened to the torque values listed in Appendix A of ANSI/AWWA C111/A21.11. Over-tightening of bolts to compensate for poor installation practice will not be acceptable. The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece at the foundry.

Gaskets shall be ASTM D1330, Grade I rubber in accordance with AWWA C111. Gaskets shall be of the full face type, 1/8 inch thick. Natural rubber will not be accepted. Gaskets shall be furnished by the pipe manufacturer.

##### **Restrained Joints**

Restrained joints for ductile iron pipe shall be installed at locations shown on the plans. Acceptable joint restraint devices include special joint designs that are standard products of domestic DIP manufacturers. The Contractor shall submit to the Engineer for review and approval information of the type of joint proposed.

##### **Flanges**

Joints in aboveground piping shall be flanged unless otherwise shown on the plans. Crosses or tees shall have flanged joints for connecting to flanged gate valves.

Flanges shall be in accordance with AWWA C115/A21.10-03. Flanges shall be flat faced, solid back with ANSI/ASME B16.20.

##### **Bolts and Nuts**

Bolts for aboveground service shall conform to ASTM A 307, Grade B, chamfered or rounded ends projecting  $\frac{1}{4}$  to  $\frac{1}{2}$  inch beyond outer face of nut. Nuts shall conform to ASTM A 194, Grade 1, 2, or 2H, hexagonal.

Bolts and nuts for underground service shall be Type 316 stainless steel.

**Installation**

Before fittings are laid, all lumps, blisters and excess coating shall be removed from the bell. The inside of the bell shall then be wire-brushed and both the inside of the bell and the spigot will be required if necessary to fit the PVC pipe to the hubs of ductile iron fittings. If a joint is defective, it shall be cut out and replaced entirely with new material.

**Payment**

Full compensation for "Ductile Iron Fittings" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.38 POLYVINYL CHLORIDE (PVC) PIPE:****Material**

All PVC pipe shall be in accordance with the requirements of AWWA Standard C900, Class 165, DR 25 for use in water supply and distribution systems. Each length of pipe shall be furnished with a molded bell on the end of the pipe, suitable for connecting lengths of pipe and meeting all the requirements for the pipe on which it is to be used.

Gaskets and lube shall conform to ASTM Standard F477. AWWA Standard C111.

The PVC pipe shall be Johns-Manville Blue Ring-Tite PVC Pressure Pipe, PW Pipe PVC Water Pipe, or approved equal.

**Receiving, Storing, Handling and Installation**

The PVC pipe shall be received, stored, handled and installed in accordance with AWWA Manual M23, "PVC Pipe Design and Installation."

The PVC pipe shall at all times be handled with care to avoid damage. Whether moved by hand, skidways, or hoists, the material shall not be dropped or bumped. The interior and machined ends of all pipe and fittings shall be kept free from dirt and foreign matter at all times. Pipe or fittings which have been damaged at the machined ends, or at such other points that cannot be repaired to the Engineer's satisfaction, shall be replaced at the Contractor's expense.

The machined ends of pipe to be jointed, the coupling grooves, and rubber rings shall be cleaned immediately before assembly. Each pipe joint shall be sealed with a coupling consisting of a PVC sleeve and two rubber rings or molded bell with rubber rings. The location of field assembled rings shall be checked with a suitable gage to verify that the rubber rings are in the required position.

Pipe shall be laid directly on the bottom of the trench containing bell holes shaped to provide continuous contact with the pipe between bell holes. Before the pipe is lowered into the trench, a bell hole shall be dug with sufficient length, width, and depth to permit accessibility and provide a minimum clearance of 2 inches between bell and the trench bottom.

Pipe shall not be deflected either vertically or horizontally more than the limits recommended by the manufacturer.

When pipe laying is not in progress, the open ends of the installed pipe shall be temporarily closed by a means approved by the Engineer to prevent entrance of trench water or other foreign material into the line. Whenever water is present in the trench, enough backfill shall be placed on the pipe to prevent floating. Any pipe that has floated shall be removed from the trench and relaid as directed by the Engineer. No pipe shall be laid in wet trench conditions that preclude proper bedding, or when, in the opinion of the Engineer, the trench conditions or the weather are unsuitable for proper installation.

Unless shown otherwise on the plans or as directed by the Engineer, cover shall be a minimum of 36 inches and such additional depth as necessary to connect to existing pipelines and avoid existing utilities.

At minor changes in alignment or grade where the pipe can not be deflected, the Contractor shall install a coupling that allows for minor deflections in accordance with the pipe manufacturer's recommendations. If the manufacturer's recommended coupling cannot provide adequate deflection, the Contractor shall install a ductile iron fitting to allow for the changes in alignment or grade.

Measurement shall be made along the centerline of pipe in the horizontal plane from the center of fitting to the center of fitting. Deductions are not made for fittings and valves. The County will not release retention until the pipeline has passed pressure testing and bacteriological testing.

The contract unit price paid per linear foot for "**8" PLASTIC PIPE (PVC C-900 DR25)**" or "**8" PLASTIC PIPE (PVC C-900 DR14)**" or "**12" PLASTIC PIPE (PVC C-900 DR25)**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals such as providing temporary water supply, and for doing all the work involved in the installation of PVC pipe sizes complete in place including flanges, mechanical joint fittings, transition couplings, isolation of dissimilar materials to prevent corrosion protection reducers, tees, bends, caps, thrust blocks and thrust restraints, concrete plugs, tracer wire, detection tape, pothole/exploratory excavations, sawcutting, excavation, trenching, bedding and backfilling, compaction, removal of water, disposing of excess or unsuitable excavated material, pressure testing, flushing, disinfection and bacteriological testing, pavement and/or surface restoration, and all appurtenant work and materials, as shown on the plans, the Standard Specification and Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.39 BOLTS AND NUTS:** Bolts and nuts for flanges located above ground, or in vaults shall be carbon steel, ASTM A 307, Grade B. Bolts for AWWA C207 Class E or F flanges shall be ASTM A 193, Grade B7, with nuts conforming to ASTM A 194, Grade 2H.

Bolts and nuts for buried or submerged flanges shall be Type 316 stainless steel conforming to ASTM A 193, Grade B8M, for bolts and ASTM A 194, Grade 8M, for nuts.

Bolts used in flange insulation kits shall conform to ASTM A 193, Grade B7. Nuts shall conform to ASTM A 194, Grade 2H.

Provide washers for each nut. Washers shall be of the same material as the nuts.

Submit certified copies of mill test reports for bolts and nuts, including coatings if specified.

Full compensation for "Bolts and Nuts" shall be considered as included in the contract items of work involved and no separate payment will be made therefor

**10-1.40 LUBRICANT FOR BOLTS AND NUTS:** Apply to metal bolts, bolt threads, tie rods, and nuts above ground or in vaults. Lubricant shall be chloride free, waterproof, and shall be Ramco Specialty Products Inc. TG-50, Husk-ITT Huskey Lube "O" Seal grease, or approved equal.

Full compensation for "Lubricant for Bolts and Nuts" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.41 CORROSION RESISTANT GREASE:** Apply to buried metal, such as bolts, bolt threads, tie rods and nuts. Surface preparation is per SSPC SP-3 or SP-6. Coating shall be NO-OX-ID GG-2 as manufacture red by Sanchem, Inc. or approved equal. Apply to a minimum thickness of ¼ inch.

Full compensation for "Corrosion Resistant Grease" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.42 POLYETHYLENE SHEET WRAP:** Polyethylene sheet wrap shall be used to encase and cover all exposed metal surfaces including buried ductile iron pipe, including, odd-shaped appurtenances such as valves, tees, crosses, bends, adapters, couplings, tapping sleeves, and other fittings or specials prior to placing concrete anchors, supports, or thrust blocks in accordance to

AWWA C105, Installation Method C. If polyethylene sheet wrap cannot wrap around the object, then use wax tape per Section 10-1.43 of these Special Provisions.

Valves shall be wrapped such that only the stem and operating nut are exposed and the wrap shall be attached so that valve operation will not disturb the wrapping or break the seal.

Apply two layers or wraps around flexible pipe couplings. Overlap the adjoining pipe or fitting a minimum of 12 inches and secure in place with tape. Apply tape around the entire circumference of the overlapped section on the adjoining pipe or fitting.

Repair cuts, tears, punctures, or other damage to the polyethylene per AWWA C105. The polyethylene sheet wrap shall be color blue and shall be low-density 8-mil film thickness. The polyethylene film supplied shall be marked per AWWA C105-05, Section 4.3.

Tape shall be Calpico Vinyl Tape, Polyken 900, Scotchwrap 50, or approved equal. Tape shall be 2-inch wide. Apply tape in accordance with AWWA C105.

Full compensation for "Polyethylene sheet wrap" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

#### **10-1.43 WAX TAPE:**

Wax tape shall be used for coating exposed metal surfaces of ductile iron or steel piping, fittings, mechanical joints, insulating flanges, valves, bolts, nuts, and other irregular surfaces. Wax tape material and application shall be per AWWA C217 and have the following properties:

- a. Thickness = 50 to 70 mils
- b. Tape width = 6 inches
- c. Dielectric strength = 100 volts/mil
- d. Wax tape shall be Trenton No. 1 Wax Tape, Denso "Densyl Tape", or approved equal.

Primer shall be applied at a rate of one gallon per 100 square feet. Primer shall be Trenton Wax Tape Primer, Denso Paste Primer, or approved equal. Plastic wrapper shall have a clear color, thickness of 1.5 mils, and tape width of 6 inches. Plastic wrapper shall be Trenton Poly-Ply, Denso Tape PVC Self-Adhesive, or approved equal.

On vertical sections of ductile iron piping, such as at underground-to-above ground transitions (ie. fire hydrants), coat ductile iron pipe with wax tape starting from the bottom and proceeding upward so that downward flowing water and backfill do not catch in seam.

Wrap completed wax tape coating system with polyethylene wrap and secure around the adjacent pipe circumference with adhesive tape per Section 10-1.42 of these Special Provisions.

Full compensation for "Wax tape" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

#### **10-1.44 PAINTING:**

Painting shall conform to the provisions in Section 59, "Painting," of the Standard Specifications and these Special Provisions. This section includes materials and application of painting for the following surfaces:

- Exposed metal – Ductile Iron exposed to atmospheric weathering
- Valves, Couplings, Tapping Sleeves, Expansion Joints

All coating products shall be received and stored in accordance with the coating manufacturer's recommendations. All iron surfaces of piping and equipment shall be protected with suitable protective coatings applied in the shop.

Repair Coatings. Abraded and scarred areas and connections on painted surfaces exposed to view shall be repaired with the same kind of paint and with a minimum dry film thickness equal to that

previously applied to the steel. Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with the coatings on shop coated or previously coated surfaces.

Polyethylene sheet wrap shall be used to encase and cover all metal surfaces including buried ductile iron pipe, bends, tees, adapters, fittings, couplings, tapping sleeves and all valves per Section 10-1.42 of these Special Provisions.

**Exposed metal – Ductile Iron exposed to atmospheric weathering**

Surface Preparation: Abrasive Blast approximating SSPC-SP6 Commercial Blast Clean and in accordance with NAPF 550-03, Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings.

A. Primer: Epoxy primer applied at spreading rate and thickness recommended by manufacturer. Tnemec Series V69 Epoxoline, Carbomastic 15 Aluminum, or approved equal.

B. Intermediate Coat: Epoxy intermediate coat applied at spreading rate and thickness recommended by manufacturer. Tnemec Series V69 Epoxoline, Carbomastic 15 Aluminum, or approved equal.

C. Topcoat: Urethane applied at spreading rate and thickness recommended by manufacturer. Tnemec Series 1075 Endura-Shield, Carboline Carbothane 134VOC, or approved equal. Color shall be dark, muted green.

**Valves, Couplings, Tapping Sleeves, Expansion Joints**

All interior and exterior ferrous metal surfaces, except finished surfaces, bearing surfaces, and stainless steel components, of valves, couplings, tapping sleeves, expansion joints and accessories shall be shop painted for corrosion protection. Apply the specified prime and intermediate and finish coat at the place of manufacturer.

Valve, piping, or coupling manufacturer's standard coating for exposed metal to atmospheric weathering environment or submerged in potable water will be acceptable, provided it is functionally equivalent to the following coating systems: Ameron "Amerlock 400 High-Solids Epoxy Coating", Carboline "Carboguard 891", 3M Scotchkote, or Tnemec "Series N140 Pota-Pox Plus". Coat valves the same as the adjacent piping.

Valve, flanges, bolts, nuts, and coupling manufacturer's standard coating for buried metal will be acceptable, provided it is functionally equivalent to the following coating systems: High-build coal tar epoxy; Ameron "Amercoat 78HB Coal Tar Epoxy", Carboline "Bitumastic 300 M", Tnemec "46H-413 Hi-Build Tneme-Tar", or Sherwin-Williams "Hi-Mil Sher-Tar Epoxy".

**Payment**

Full compensation for "Painting" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.45 TRANSITION COUPLINGS:**

The Contractor shall use transition couplings to connect different pipes having different outside diameters or for connecting dissimilar pipe materials. The Contractor shall determine the exact material type and outside diameter of the pipes to be connected, and shall provide the transition coupling at the work location before the existing system is interrupted. Couplings shall have an internal full circumference ring pipe stop at the midpoint of the coupling.

Provide shop applied lining and coating per Section 10-1.44 "Painting" of these Special Provisions. Coat buried bolts, nuts, and threads with corrosion resistant grease, then wrap the couplings with polyethylene wrap in accordance with Section 10-1.42 of these Special Provisions.

Transition couplings shall be in conformance to County Standard Drawing W-10. Products shall be Romac XR501, Smith Blair 413, Dresser 62, or approved equal.

Payment for furnishing and installing transition coupling shall be considered as included in the contract price paid for various contract items of work involved and no separate payment will be made therefor.

**10-1.46 INSULATING UNIONS, FLANGES, COUPLINGS OR BUSHINGS:**

When dissimilar metals are used in conjunction with each other, suitable insulation shall be provided between adjacent surfaces so as to eliminate direct contact and any resultant electrolysis. Connections of dissimilar piping materials shall consist of a dielectric type isolation gasket, 1/8" thick, full faced type with outside diameter equal to the flange outside diameter, a full-length sleeve for each bolt, and two (2) insulating washers with two (2) steel washers for each bolt. Insulating gaskets or fittings shall be provided to prevent contact of copper, brass, or bronze pipe, tubing, fittings or appurtenances with stainless steel pipe, tubing, fittings, valves, or appurtenances. Coating for insulated unions, flanges, couplings, or bushings shall be coated with wax tape coating in accordance with Section 10-1.43 of these Special Provisions.

Submit manufacturer's data sheet for insulation unions, flanges, coupling, or bushings showing recommended installation procedures.

Full compensation for "Insulating Unions, Flanges, Couplings or Bushings" shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.47 GATE VALVES:**

Submit complete assembly drawings, together with detailed specifications and data, covering materials used and accessories forming a part of the valves furnished.

Gate valves shall comply with AWWA Specification C 509 and these Special Provisions.

Valves shall have a non-rising stem, resilient wedge, resilient seated, left hand opening (counterclockwise) and epoxy coated and lined. Minimum epoxy thickness shall be 8 mils. All valves shall have O ring stem seals. Body bolts shall be 316 stainless steel. End connections are flanged or mechanical joint as shown on the plans. Provide shop applied lining and coating per Section 10-1.44 "Painting", of these Special Provisions.

Before valves or fittings are laid, all lumps, blisters and excess coating shall be removed from the bell. The inside of the bell shall then be wire-brushed and both the inside of the bell and the spigot end of the pipe wiped clean and dry. Field machining of pipe ends will be required if necessary to fit the PVC pipe to the hubs of the gate valves or fittings. If a joint is defective, it shall be cut out and replaced entirely with new material.

After installation, lubricate any bolts and nuts for corrosion protection with corrosion resistant grease per the manufacturer's recommendations and in accordance with Section 10-1.41 "Corrosion Resistant Grease". Wrap any gate valves, tees, fittings, and coupling adapters with polyethylene sheet wrap or wax tape prior to placing concrete anchors, supports, or thrust blocks. The polyethylene sheet wrap or wax tape shall conform to the County Special Provisions, Sections 10-1.42 "Polyethylene Sheet Wrap" and 10-1.43 "Wax Tape".

All valve boxes shall be supported by circular concrete collar. Valve boxes shall be kept plumb over the wrench nut of the gate valve and shall not rest on the gate valve. The box shall be flush with the surface of the finished pavement or at such other elevation designated by the Engineer. Backfill and compaction around the valve boxes shall conform to Section 10-1.32d "Bedding and Backfill" of these Special Provisions.

Gate valve box assemblies shall be installed per Standard Drawing No. W-3 and these Special Provisions. Concrete shall conform to Section 10-1.53 "Minor Concrete" of these Special Provisions. Gate valve boxes shall be Brooks Products No. 3RT or approved equal with the word "WATER" or the letter "W" cast in the cover and shall be a loose fit in the box. The valve boxes shall be supplied with 8-inch PVC pipe sleeves. The PVC pipe shall conform to Section 10-1.38 "Polyvinyl Chloride (PVC)

Pipe” of these Special Provisions. Reconstruct AC pavement per Section 10-1.55 “HMA Concrete Pavement” of these Special Provisions.

The gate valves shall be Mueller Series 2360-Cast Iron, Kennedy Valve Series 8571, Clow Series 2639-Full Body Ductile Iron or approved equal.

The contract unit price paid per each “8” **GATE VALVE**” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in installing gate valves and valve box assemblies, complete in place, including but not limited to furnishing and installing lubricant for bolts and nuts, polyethylene sheet wrap, concrete collars, thrust restraint devices, sawcutting, excavation, trenching, removal of water, bedding and backfill, slurry cement backfill, disinfection and bacteriological testing, compaction, pavement and/or surface restoration, landscaping, and all appurtenant work and materials as shown on the plans, as specified in these Special Provisions, and as directed by the Engineer.

The approximate locations for the work paid for each “8” GATE VALVE” are as follows:

- 1) Station 13+50 –8” Gate Valve (Flanged x Mechanical Joint)
- 2) Station 19+25 – 8” Gate Valve (Flanged x Mechanical Joint)
- 3) Station 23+00 – 8” Gate Valve (Flanged x Mechanical Joint)
- 4) Station 12+56 –8” Gate Valves (Flanged x Restrained Joint) for Connection to Existing “Point C”

Gate valves to be removed as part of items to be paid for separately shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

#### **10-1.48 BLOW-OFF ASSEMBLY:**

The plans were designed to reflect a continuous positive grade with no low or high points, and it was assumed that construction of the waterline would not need for a blow-off or air and vacuum relief assemblies. See Section 10-1.04 “Order of Work” regarding Contractor’s responsibility to ensure positive grade for the new waterline.

In the event that changes are required to the design profile, such as to avoid conflict with underground facilities, and the revised profile is required to have a low point constructed in the water main, then a 1 ½” blow-off assembly will be required to be constructed at the low point, if so directed by the Engineer. The blow-off assembly shall be constructed per County Standard Drawing W-5, and as directed by the Engineer.

The contract price paid for each “**BLOW-OFF ASSEMBLY**” shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing the blow-off assembly complete in place including sawcutting, excavation, trenching, removal of water, bedding and backfill, slurry cement backfill, compaction, tracer wire, detection tape, pavement and/or surface restoration, landscaping, vegetation and/or irrigation restoration, pressure testing, disinfection, bacteriological testing, and all appurtenant work and materials as shown on County Standard Drawing W-5, and as directed by the Engineer, and no additional compensation will be allowed therefor.

#### **10-1.49 AIR AND VACUUM RELIEF ASSEMBLY**

The plans were designed to reflect a continuous positive grade with no low or high points, and it was assumed that construction of the waterline would not need for a blow-off or air and vacuum relief assemblies. See Section 10-1.04 “Order of Work” regarding Contractor’s responsibility to ensure positive grade for the new waterline.

In the event that changes are required to the design profile, such as to avoid conflict with underground facilities, and the revised profile is required to have a high point constructed in the water main, then an air and vacuum relief assembly will be required to be constructed at the high point, if so directed by the Engineer. The air and vacuum relief assembly shall be constructed per County Standard Drawing W-6, and as directed by the Engineer.

The contract price paid for each **"AIR AND VACUUM RELIEF ASSEMBLY"** shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing the air and vacuum relief assembly complete in place including sawcutting, excavation, trenching, removal of water, bedding and backfill, tracer wire, detection tape, compaction, pavement and/or surface restoration, landscaping, vegetation and/or irrigation restoration, pressure testing, disinfection, bacteriological testing, and all appurtenant work and materials as shown on County Standard Drawing W-6, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.50 SERVICE LATERAL:**

Submit complete assembly drawings, together with detailed specifications and data, covering materials used for the service lateral connection furnished. Reconstruct AC pavement per Section 10-1.55 "HMA Concrete Pavement" of these Special Provisions. **See Section 10-1.04 "Order of Work" of these Special Provisions regarding restrictions on interruptions to water service.** Reconnect service laterals per Detail D and Detail N of the plans, except as modified as follows:

**Station 11+12**

The water meter box for the jail is located far away from the new PVC watermain. The existing service lateral is connected to the existing fire hydrant lateral with a tee connection. Disconnecting the fire hydrant lateral at this station will also disconnect water service for the jail.

No work is required for reconnecting this service lateral other than the related work for reconnecting the hydrant lateral at this station (see Section 10-1.28h "Reconnect Fire Hydrant or Riser" of these Special Provisions), in addition coordinating water shut-off hours per Section 10-1.04 "Order of Work" of these Special Provisions, and no additional compensation will be allowed therefor.

**Station 20+44**

The water service for the detective building at address 1545 Kansas Avenue requires a new water meter box assembly. The new water meter box shall be located in the existing wood bark landscaped area behind the existing concrete sidewalk. Replace plant and rock landscaped area shall in areas of excavation, and any damage to the existing concrete curb, gutter, sidewalk or AC pavement shall be replaced in-kind per Section 10-1.22 "Preservation of Property".

**Station 20+58**

The water service at this location is for the EOC building. There is an existing meter box. Install new angle meter stop and connect to the existing meter.

**Station 20+82**

The water service at this location is for general services firing range. Sawcut existing concrete curb, gutter and sidewalk to remove the existing water meter box. Install new water meter box in same location as the existing water meter box. Salvage the existing meter and relocate it inside the new water meter box. Connect the new service lateral to the existing lateral with a union coupling. Remove existing gate valve. Reconstruct the AC pavement per Section 10-1.55 "HMA Concrete Pavement" and reconstruct concrete curb, gutter and sidewalk per Section 10-1.28c "Reconstruct Concrete Curb, Gutter, and Sidewalk" of these Special Provisions.

**Station 22+84**

The water service at this location is for trailer vehicle parking area. There is an existing water meter box. Protect in place existing meter stop. Plumb new PE pipe into the existing meter stop.

**Station 23+57**

The water service at this location is for general services communication building located at address 1495 Kansas Ave. The existing water meter box is far away from the new PVC watermain. Sawcut existing service lateral and connect the new service lateral to the existing lateral with a union coupling.

**Station 26+98**

The water service at this location is for address 1475 Kansas Avenue. There is an existing meter box. Install new angle meter stop.

**Station 28+93**

The existing water service lateral is connected to the existing fire hydrant lateral to be relocated. Disconnecting this fire hydrant will discontinue water service for the building at this station. Install new connection to the existing watermain in Kansas Avenue as shown on the plans. Confirm the location of the existing water meter box adjacent to the existing above ground 2" backflow preventer. Install a new angle meter stop.

The contract unit price paid per each "**SERVICE LATERAL (2")**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in construction of the service lateral, complete in place, including the modifications to Detail D on Sheet 4 of the plans as listed in this section, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

The contract unit price paid per each "**SERVICE LATERAL (2") WITH METER BOX ASSEMBLY**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in construction of the service lateral with meter box assembly, complete in place, including modifications to Detail N on Sheet 4 of the plans as listed in this section, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and as directed by the Engineer, and no additional compensation will be allowed therefor.

**10-1.51 THRUST RESISTANT DEVICES:**

Thrust restraint devices shall be furnished and installed at all bends of 11 1/4 degrees or more, at each reducer, behind each tee, at each cross which is valved in such a manner that it can act as a tee, at fire hydrant bury elbows and behind each plug or cap. Where mechanical joint restraints are used, harness restraint devices shall be furnished and installed to restrain push-on joints adjacent to restrained fittings according to the manufacturer's installation recommendations. Thrust restraint devices are not required at flanged joints unless the joint acts in a manner which requires restraint and a restraint is required on the plans. Mechanical joint restraints shall not be used on asbestos cement or clay pipe. Thrust restraint devices may be either concrete thrust blocks or approved mechanical pipe joint restraints, unless otherwise specifically indicated on the project plans. Mechanical joint restraints shall be installed in accordance with AWWA C600-99 and the manufacturer's recommendations. The Contractor shall be responsible to plan, provide and install all temporary thrust restraint as required for progress of the work, including pressure testing, as directed by the Engineer.

Payment for thrust restraint devices, including fittings and hardware, shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.52 CONCRETE THRUST BLOCKS:**

Placement of concrete shall not be permitted without submitting to the Engineer 24 hour notice. Thrust blocks shall be placed at all bends of 11 1/4 degrees or more, behind each tee or at each cross which is valved in such a manner that it can act as a tee, at the back of fire hydrants and behind each plug or blind flange cap. Anchor blocks shall be installed on all bends of 11-1/4 degrees or more for vertical (downward) bend. The thrust block shall extend from the fitting to undisturbed soil, and shall be kept clear of the joints, and shall be of such bearing area using a soil horizontal bearing strength value of 1,500 pounds per square foot. In lieu of the above, movement may be prevented by the use of approved pipe restraints if approved by the Engineer.

Portland cement concrete for thrust blocks shall be produced from commercial quality aggregates and cement and shall conform to Section 10-1.53 "Minor Concrete" of these Special Provisions. Hand mixing of this concrete will be permitted.

Before any thrust block is poured against a cap, plug, or mechanically joined fitting, the fitting shall be wrapped in polyethylene sheet wrap or wax tape. No concrete shall be poured against the bare pipe.

Provide curing of thrust blocks and anchor blocks by prompt backfill after initial curing period as directed by the Engineer. Prior to filling the pipeline with water, concrete thrust blocks shall cure a minimum of three days unless an approved temporary restraint system is installed.

Protect existing thrust blocks in place or shore to resist the thrust by a means approved by the Engineer and reconstruct. If the thrust blocks are exposed or rendered to be ineffective in the opinion of the Engineer, reconstruct them to bear against firm unexcavated or backfill material. Notify the Engineer within 24 hours when this situation is identified.

Test compaction of the backfill material before pouring any concrete thrust block.

Payment for furnishing and installing thrust blocks in conformance with these Special Provisions, complete in place including, aggregate, admixtures, water, and an approved temporary restraint system (if required), shall be considered as included in the prices paid for the various contract items of the water system and no separate payment will be made therefor.

**10-1.53 MINOR CONCRETE:** Portland cement concrete for minor structures, concrete collars for gate valves, catch basins, drainage inlets, and thrust blocks shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications and these Special Provisions.

Minor concrete for structures shall contain not less than 550 pounds of cementitious material per cubic yard. Restoration of existing curb, gutter, sidewalk and driveways shall be drilled and dowelled with #4 rebar, 12" long, 12" O.C., as directed by the Engineer.

Concrete for thrust blocks shall contain not less than 470 pounds of cementitious material per cubic yard. The native material shall be compacted to a minimum relative compaction of 95%.

Payment for concrete placed shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

Slurry backfill shall be used when cover over the top of the pipe is less than 3 feet, and at locations as shown on the plans, as directed by the Engineer. Slurry backfill shall contain not less than 188 pounds (2-sack) of material per cubic yard.

The contract price paid per cubic yard for "**SLURRY BACKFILL**" shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in backfilling shallow trenches with slurry, complete in place, in accordance with SLO County Std Drawing U-4b and 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.

**10-1.54 AGGREGATE BASE:**

Aggregate base shall be Class 2 and shall conform to the provisions in Section 26, "Aggregate Subbases," of the Standard Specifications and these Special Provisions.

A minimum of 6" of Class 2 aggregate base or matching existing thickness, whichever is greater, shall be placed under all asphalt concrete pavement.

Payment for aggregate base shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.55 HOT MIX ASPHALT CONCRETE PAVEMENT:**

Hot Mix Asphalt (HMA) concrete pavement shall have a structural road repair section conforming to San Luis Obispo County Standard Drawing R-4 and R-4a.

HMA shall be Type A using the Method process and shall conform to the provisions in Section 39, "Hot Mix Asphalt," of the Standard Specifications and these Special Provisions.

The grade of asphalt binder to be mixed with aggregate for HMA Type A shall be Performance Grade PG 64-10 and shall conform to the provisions in Section 92, "Asphalts," of the State Standard Specifications

The aggregate for HMA Type A shall comply with the 1/2-inch maximum grading.

Smoothness: The first paragraph 39-1.12A is changed to read: "Determine HMA smoothness with a straightedge." Section 30-1.12C "Profilograph", of the Standard Specifications shall not apply. The fourth paragraph of Section 39-1.12D, "Smoothness Correction", is hereby modified to read: "After grinding, measure the ground HMA pavement surface with a 12-foot straightedge until the pavement is within specified tolerances. If straight edged pavement cannot be ground to within specified tolerances, remove and replace the pavement."

Compaction Testing: Relative density of HMA of 0.15 foot or more, and in widths 5 feet or more will be determined by nuclear gage in backscatter mode in accordance with California Test 375.

Section 39-1.04F, "Cores," of the Standard Specification is hereby deleted.

The fourth and fifth paragraphs of Section 39-2.03A, "Testing" of the Standard Specifications, are hereby modified to read:

"The Engineer determines the percent of maximum theoretical density of the HMA in 500 ton lots, using a calibrated nuclear gauge, with a minimum of ten tests per lot. The Engineer will provide the Contractor the final results of the nuclear gauge tests based on the maximum theoretical density of that day's production within 24 hours. If the maximum theoretical density results for any day's production are not available by the end of shift, the Engineer will provide the Contractor preliminary results based on the maximum theoretical density of a previous day's material.

If the relative compaction of any lot, based on the calibrated nuclear gauge, is less than 89%, or greater than 99%, the Contractor shall take two cores from each 500 ton lot at random locations designated by the Engineer, in accordance with the procedures specified above. The Engineer determines the percent of maximum theoretical density for each core by determining the core's density and dividing by the maximum theoretical density. The average percent of maximum theoretical density of the two cores will be considered final for determining removal and replacement requirements."

A tack coat of emulsified asphalt shall be applied to all exposed sawcut surfaces. The area shall be filled with fresh hot asphaltic concrete mix in lifts of the same depths as the adjacent area, then compacted by rolling to the specified surface density and smoothness.

Payment for Hot Mix Asphalt for trench repair and/or pavement restoration shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

**10-1.56 EROSION CONTROL (TYPE D):** Type D erosion control shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these Special Provisions.

The work shall consist of hydro-seeding erosion control material consisting of a mixture of stabilizing emulsion, fiber, seed, commercial fertilizer and water to all embankment slopes, excavation slopes, and areas disturbed from trenching activities, as directed by the Engineer.

Seed shall consist of the following:

<u>botanical name</u> <u>(Common Name)</u>	<u>Percentage</u> <u>(minimum)</u> <u>Purity</u>	<u>Percentage</u> <u>(minimum)</u> <u>Germination</u>	<u>Pounds</u> <u>Per Acre</u>
<i>Bromus carinatus</i> <i>cucamonga</i> (Cucamonga Brome)	95	80	20
<i>Vulpia microstachys</i> (Small Fescue)	90	60	8
<i>Trifolium gracilentum</i> (Pinpoint Clover)	98	60	8

The erosion control materials shall be mixed and applied in the following approximate proportions:

<u>Material</u>	<u>Per Acre</u> <u>(slope measurement)</u>
Fiber	1,500 pounds
Seed	36 pounds
Commercial Fertilizer	400 pounds
Water	as needed for application
Stabilizing emulsion	as recommended by the manufacturer

The contract price paid per square yard for "EROSION CONTROL (TYPE D)" shall include full compensation for furnishing all labor, seed, fertilizer, water, other materials, tools, equipment and incidentals, and for doing all the work involved in "EROSION CONTROL (TYPE D)" complete in place as shown on the approved WPCP, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer, and no additional compensation will be allowed therefor.

#### **10-1.57 PROGRESS RESTORATION:**

All restoration and clean up work must follow closely to the completed trenching operation including laying, compacting, backfilling, and paving, except when temporary pavement patching and steel plate bridging is utilized per Section 10-1.21 "Maintaining Traffic" of these Special Provisions regarding.

Payment for Progress of Restoration shall be considered as included in the contract items of work involved and no separate payment will be made therefor.

#### **10-1.58 TESTING PIPELINES:**

The pressure 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 pressures are shown in Table 1 and 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. Any joint at which the accumulated leakage exceeds the allowable rate specified in Table 1 shall be rejected. 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.

**TABLE 1**  
**Allowable Leakage per 1000 Feet or 50 Joints**  
**U.S. Gallons per hour**

Nominal Pipe Size (Inches)	Average Test Pressure (psi)
	215
4	0.40
6	0.59
8	0.79
12	1.19

Overall Leakage: No pipe installation will be accepted until or unless the leakage for the section of line tested is less than the rate of leakage specified in Table 1. In calculating the leakage the Engineer will allow for the number of joints added to the pipeline, owing to the use of pipe lengths smaller than 20 feet, for which the data in Table 1 applies. If the test leakage in any section is greater than that permitted, the Contractor shall locate and repair the defective joints at his/her own expense until the leakage is within the permitted allowance.

Pressure testing against valves shall not be allowed.

Payment for pressure testing including furnishing all labor, materials, tools, equipment, incidentals and all the 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 Special Provisions, and as directed by the Engineer shall be considered as included in the contract price paid for the various items of work which require pressure testing, and no separate payment will be made therefor.

**10-1.59 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 County Standard Drawing W-9 and per AWWA C651.

**10-1.59a. Disinfection:**

Disinfection shall be in accordance with the San Luis Obispo County Department of Public Works Procedural Memorandum 0-3 (Revised July 15, 2002), included in these Special Provisions. 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 ANSI/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.

**10-1.59b. 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**

<b>Constituent</b>	<b>Maximum or Range</b>
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
Color	Maximum increase of 15 color units
Dissolved Oxygen	Not to be depressed below 5.0 mg/L
<b>Where upstream water turbidity is...</b>	<b>The receiving water shall not be increased more than...</b>
less than 25 NTUs	5 NTUs
25 - 50 NTU	20%
50 – 100 NTU	10 NTUs
greater than 100 NTU	10%

**10-1.59c. Bacteriological Analysis:**

Bacteriological samples will be collected and analyzed by County staff following the SLO County Procedural Memorandum 0-3. 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.

**Bacteriological acceptance limits**

<b>Constituent</b>	<b>Acceptance Limit</b>
Total coliform/E. coli	<1 MPN/100mL
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.

**10-1.59d. 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**

<b>Constituent</b>	<b>Acceptance Limit</b>	<b>Maximum Contaminant Limit</b>
Odor	<3 TON	3 TON
Turbidity	<1 NTU	5 NTU
Color	<15 CU	15 NTU

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

**10-1.59e. Samples.** Samples shall be collected by the Contractor on working days (Monday through Friday) and shall arrive at the Lab no later than 3:00pm (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 within 48 hours.

**10-1.59f. Notification Procedure:** Notification of analytical results shall be in accordance with the San Luis Obispo County Department of Public Works Procedural Memorandum 0-3, Notification procedure.

**10-1.59g. 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.

**10-1.59h. 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.

**10-1.59i. 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 released the pipeline for service.

A record must be maintained of any discharge 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.

**10-1.59j. Payment**

Payment 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.

## SECTION 11. AMENDMENTS TO STANDARD SPECIFICATIONS

AMENDMENTS ISSUE DATE: 11-30-10

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### SECTION 5 CONTROL OF WORK (Issued 06-10-10)

**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.

**Replace Section 5-1.116 with:**

#### **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.

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## **SECTION 9 MEASUREMENT AND PAYMENT**

**(Issued 03-11-10)**

### **9-1.03 FORCE ACCOUNT PAYMENT**

#### **9-1.03A General**

For work paid by force account, the Engineer compares the Department's records to your daily force account work report. When you and the Engineer agree on the contents of the daily force account work reports, the Engineer accepts the report and the Department pays for the work. If the records differ, the Department pays for the work based only on the information shown on the Department's records.

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, as reimbursement for additional administrative costs.

The markups specified in labor, materials, and equipment include compensation for all delay costs, overhead costs, and profit.

If an item's payment is adjusted for work-character changes, the Department excludes your cost of determining the adjustment.

Payment for owner-operated labor and equipment is made at the market-priced invoice submitted.

#### **9-1.03B Labor**

Labor payment is full compensation for the cost of labor used in the direct performance of the work plus a 35 percent markup. Force account labor payment consists of:

1. Employer payment to the worker for:
  - 1.1. Basic hourly wage
  - 1.2. Health and welfare
  - 1.3. Pension
  - 1.4. Vacation
  - 1.5. Training
  - 1.6. Other State and federal recognized fringe benefit payments
2. Labor surcharge percentage in Labor Surcharge and Equipment Rental Rates current during the work paid at force account for:
  - 2.1. Workers' compensation insurance
  - 2.2. Social security
  - 2.3. Medicare
  - 2.4. Federal unemployment insurance
  - 2.5. State unemployment insurance
  - 2.6. State training taxes
3. Subsistence and travel allowances paid to the workers
4. Employer payment to supervisors, if authorized

The 35 percent markup consists of payment for all overhead costs related to labor but not designated as costs of labor used in the direct performance of the work including:

1. Home office overhead
2. Field office overhead
3. Bond costs
4. Profit
5. Labor liability insurance
6. Other fixed or administrative costs that are not costs of labor used in the direct performance of the work

### **9-1.03C Materials**

Material payment is full compensation for materials you furnish and use in the work. The Engineer determines the cost based on the material purchase price, including delivery charges, except:

1. A 15 percent markup is added.
2. Supplier discounts are subtracted whether you took them or not.
3. If the Engineer believes the material purchase prices are excessive, the Department pays the lowest current wholesale price for a similar material quantity.
4. If you procured the materials from a source you wholly or partially own, the determined cost is based on the lower of the:
  - 4.1. Price paid by the purchaser for similar materials from that source on Contract items
  - 4.2. Current wholesale price for those materials
5. If you do not submit a material cost record within 30 days of billing, the determined cost is based on the lowest wholesale price:
  - 5.1. During that period
  - 5.2. In the quantities used

### **9-1.03D Equipment Rental**

#### **9-1.03D(1) General**

Equipment rental payment is full compensation for:

1. Rental equipment costs, including moving rental equipment to and from the site of work performed by change order using its own power.
2. Transport equipment costs for rental equipment that cannot be transported economically using its own power. No payment is made during transport for the transported equipment.
3. 15 percent markup.

If you want to return the equipment to a location other than its original location, the payment to move the equipment must not exceed the cost of returning the equipment to its original location. If you use the equipment for work other than work paid by force account, the transportation cost is included in the other work.

Before moving or loading the equipment, obtain authorization for the equipment rental's original location.

The Engineer determines rental costs:

1. Using rates in Labor Surcharge and Equipment Rental Rates:
  - 1.1. By classifying equipment using manufacturer's ratings and manufacturer-approved changes.
  - 1.2. Current during the work paid by force account.
  - 1.3. Regardless of equipment ownership; but the Department uses the rental document rates or minimum rental cost terms if:
    - 1.3.1. Rented from equipment business you do not own.
    - 1.3.2. The Labor Surcharge and Equipment Rental Rates hourly rate is \$10.00 per hour or less.

2. Using rates established by the Engineer for equipment not listed in Labor Surcharge and Equipment Rental Rates. You may submit cost information that helps the Engineer establish the rental rate; but the Department uses the rental document rates or minimum rental cost terms if:
  - 2.1. Rented from equipment business you do not own.
  - 2.2. The Engineer establishes a rate of \$10.00 per hour or less.
3. Using rates for transport equipment not exceeding the hourly rates charged by established haulers.

Equipment rental rates include the cost of:

1. Fuel
2. Oil
3. Lubrication
4. Supplies
5. Small tools that are not consumed by use
6. Necessary attachments
7. Repairs and maintenance
8. Depreciation
9. Storage
10. Insurance
11. Incidentals

The Department pays for small tools consumed by use. The Engineer determines payment for small tools consumed by use based on Contractor-submitted invoices.

#### **9-1.03D(2) Equipment On the Job Site**

For equipment on the job site at the time required to perform work paid by force account, the time paid is the time:

1. To move the equipment to the location of work paid by force account plus an equal amount of time to move the equipment to another location on the job site when the work paid by force account is completed
2. To load and unload equipment
3. Equipment is operated to perform work paid by force account and:
  - 3.1. Hourly rates are paid in 1/2-hour increments
  - 3.2. Daily rates are paid in 1/2-day increments

When rented equipment on the job site is used to perform work at force account not required by the original contract work, the Engineer may authorize rates in excess of those in Labor Surcharge and Equipment Rental Rates if:

1. You submit a request to use rented equipment
2. Equipment is not available from your owned equipment fleet or from your subcontractors
3. Rented equipment is from an independent rental company
4. Proposed equipment rental rate is reasonable
5. Engineer authorizes the equipment source and the rental rate before you use the equipment

The Department pays for fuel consumed during operation of rented equipment not included in the invoiced rental rate.

#### **9-1.03D(3) Equipment Not On the Job Site Required for Original Contract Work**

For equipment not on the job site at the time required to perform work paid by force account and required for original Contract work, the time paid is the time the equipment is operated to perform work paid by force account and the time to move the equipment to a location on the job site when the work paid by force account is completed.

The minimum total time paid is:

1. 1 day if daily rates are paid
2. 8 hours if hourly rates are paid

If daily rates are recorded, equipment:

1. Idled is paid as 1/2 day
2. Operated 4 hours or less is paid as 1/2 day
3. Operated 4 hours or more is paid as 1 day

If the minimum total time exceeds 8 hours and if hourly rates are listed, the Department rounds up hours operated to the nearest 1/2-hour increment and pays based on the following table. The table does not apply when equipment is not operated due to breakdowns; in which case rental hours are the hours the equipment was operated.

**Equipment Rental Hours**

Hours operated	Hours paid
0.0	4.00
0.5	4.25
1.0	4.50
1.5	4.75
2.0	5.00
2.5	5.25
3.0	5.50
3.5	5.75
4.0	6.00
4.5	6.25
5.0	6.50
5.5	6.75
6.0	7.00
6.5	7.25
7.0	7.5
7.5	7.75
>8.0	hours used

**9-1.03D(4) Equipment Not On the Job Site Not Required for Original Contract Work**

For equipment not on the job site at the time required to perform work paid by force account and not required for original Contract work, the time paid is the time:

1. To move the equipment to the location of work paid by force account plus an equal amount of time to return the equipment to its source when the work paid by force account is completed
2. To load and unload equipment
3. Equipment is operated to perform work paid by force account

For this equipment, the Engineer may authorize rates in excess of those in Labor Surcharge and Equipment Rental Rates subject to the following:

1. Equipment is not available from your normal sources or from one of your subcontractors
2. Proposed equipment rental rate is reasonable
3. Engineer authorizes the equipment source and the rental rate before you use the equipment

**9-1.03D(5) Non-Owner-Operated Dump Truck Rental**

Submit the rental rate for non-owner-operated dump truck rental. The Engineer determines the payment rate. Payment for non-owner-operated dump truck rental is for the cost of renting a dump truck, including its driver. For the purpose of markup payment only, the non-owner-operated dump truck is rental equipment and the owner is a subcontractor.

**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.

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**SECTION 14 (BLANK)**  
**(Issued 06-05-09)**

**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 11-21-08)**

### **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 19-3.062 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 20 EROSION CONTROL AND HIGHWAY PLANTING  
(Issued 08-17-07)**

**Replace Section 20-2.03 with:**

**20-2.03 SOIL AMENDMENT**

Soil amendment shall comply with the requirements in the California Food and Agricultural Code. Soil amendment producers shall comply with the following:

- 1. Be fully permitted to produce compost as specified under the California Integrated Waste Management Board, Local Enforcement Agencies and any other State and Local Agencies that regulate Solid Waste Facilities. If exempt from State permitting requirements, the composting facility must certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.
- 2. Be a participant in United States Composting Council's Seal of Testing Assurance program.

Soil amendment shall be composted and may be derived from any single, or mixture of any of the following feedstock materials:

- 1. Green material consisting of chipped, shredded, or ground vegetation; or clean processed recycled wood products
- 2. Biosolids

3. Manure
4. Mixed food waste

Soil amendment feedstock materials shall be composted to reduce weed seeds, pathogens and deleterious materials as specified under Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7, Section 17868.3.

Soil amendment shall not be derived from mixed municipal solid waste and must be reasonably free of visible contaminants. Soil amendment must not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Soil amendment must not possess objectionable odors.

Metal concentrations in soil amendment must not exceed the maximum metal concentrations listed in Title 14, California Code of Regulations, Division 7, Chapter 3.1, Section 17868.2.

Soil amendment must comply with the following:

Physical/Chemical Requirements		
Property	Test Method	Requirement
pH	*TMECC 04.11-A, Elastometric pH 1:5 Slurry Method, pH Units	6.0–8.0
Soluble Salts	TMECC 04.10-A, Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A, Total Solids & Moisture at 70+/- 5 deg C, % Wet Weight Basis	30–60
Organic Matter Content	TMECC 05.07-A, Loss-On-Ignition Organic Matter Method (LOI), % Dry Weight Basis	30–65
Maturity	TMECC 05.05-A, Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B, Carbon Dioxide Evolution Rate mg CO <sub>2</sub> -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	95% Passing 5/8 inch 70% Passing 3/8 inch
Pathogen	TMECC 07.01-B, Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B, Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Plastic, Glass and Metal, % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles), % > 4mm fraction	None Detected

\*TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Prior to application, the Contractor shall provide the Engineer with a copy of the soil amendment producer's Compost Technical Data Sheet and a copy of the compost producers STA certification. The Compost Technical Data Sheet shall include laboratory analytical test results, directions for product use, and a list of product ingredients.

Prior to application, the Contractor shall provide the Engineer with a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

**In Section 20-2.10 delete the 8th, 9th, and 10th paragraphs.**

**In Section 20-3.04A delete the last paragraph.**

**Replace Section 20-4.055 with:**

**20-4.055 PRUNING**

Pruning of plants shall be consistent with American National Standards Institute (ANSI), "Tree, Shrub and Other Woody Plant Maintenance Standard Practices," ANSI 300 (Part 1)-2001 and "Best Management Practices Tree Pruning," 2002 (ISBN 1-881956318), published by the International Society of Arboriculture, P.O. Boc 3129, Champaign, IL 61826.

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**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 39 ASPHALT CONCRETE**

**(Issued 06-05-09)**

**Replace Section 39 with:**

**SECTION 39 HOT MIX ASPHALT**

**39-1 GENERAL**

**39-1.01 DESCRIPTION**

Section 39 includes specifications for producing and placing hot mix asphalt (HMA) by mixing aggregate

and asphalt binder at a mixing plant and spreading and compacting the HMA mixture. The special provisions specify one or more type of HMA, including:

1. Type A
2. Type B
3. Open graded friction course (OGFC). OGFC includes hot mix asphalt (open graded), rubberized hot mix asphalt (open graded) (RHMA-O) and rubberized hot mix asphalt (open graded high binder) (RHMA-O-HB)
4. Rubberized hot mix asphalt (gap graded) (RHMA-G)

The special provisions specify the HMA construction process, including:

1. Standard
2. Method
3. Quality Control / Quality Assurance (QC / QA)

### **39-1.02 MATERIALS**

#### **39-1.02A Geosynthetic Pavement Interlayer**

Geosynthetic pavement interlayer must comply with the specifications for pavement fabric or paving mat in Section 88-1.07, "Pavement Interlayer."

#### **39-1.02B Tack Coat**

Tack coat must comply with the specifications for asphaltic emulsion in Section 94, "Asphaltic Emulsion," or asphalt binder in Section 92, "Asphalts." Choose the type and grade.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume in compliance with the specifications for weighing, measuring, and metering devices under Section 9-1.01, "Measurement of Quantities," or you may use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit in writing:

1. The weight ratio of water to bituminous material in the original asphaltic emulsion
2. The weight of asphaltic emulsion before diluting
3. The weight of added water
4. The final dilution weight ratio of water to asphaltic emulsion

#### **39-1.02C Asphalt Binder**

Asphalt binder in HMA must comply with Section 92, "Asphalts," or Section 39-1.02D, "Asphalt Rubber Binder." The special provisions specify the grade.

Asphalt binder for geosynthetic pavement interlayer must comply with Section 92, "Asphalts." Choose from Grades PG 64-10, PG 64-16, or PG 70-10.

#### **39-1.02D Asphalt Rubber Binder**

##### **General**

Use asphalt rubber binder in RHMA-G, RHMA-O, and RHMA-O-HB. Asphalt rubber binder must be a combination of:

1. Asphalt binder
2. Asphalt modifier
3. Crumb rubber modifier (CRM)

The combined asphalt binder and asphalt modifier must be  $80.0 \pm 2.0$  percent by weight of the asphalt rubber binder.

##### **Asphalt Modifier**

Asphalt modifier must be a resinous, high flash point, and aromatic hydrocarbon, and comply with:

### Asphalt Modifier for Asphalt Rubber Binder

Quality Characteristic	ASTM	Specification
Viscosity, m <sup>2</sup> /s (x 10 <sup>-6</sup> ) at 100 °C	D 445	X ± 3 <sup>a</sup>
Flash Point, CL.O.C., °C	D 92	207 minimum
Molecular Analysis		
Asphaltenes, percent by mass	D 2007	0.1 maximum
Aromatics, percent by mass	D 2007	55 minimum

Note:

<sup>a</sup> The symbol "X" is the proposed asphalt modifier viscosity. "X" must be between 19 and 36. A change in "X" requires a new asphalt rubber binder design.

Asphalt modifier must be from 2.0 percent to 6.0 percent by weight of the asphalt binder in the asphalt rubber binder.

### Crumb Rubber Modifier

CRM consists of a ground or granulated combination of scrap tire CRM and high natural CRM. CRM must be 75.0 ± 2.0 percent scrap tire CRM and 25.0 ± 2.0 percent high natural CRM by total weight of CRM. Scrap tire CRM must be from any combination of automobile tires, truck tires, or tire buffings. Sample and test scrap tire CRM and high natural CRM separately. CRM must comply with:

### Crumb Rubber Modifier for Asphalt Rubber Binder

Quality Characteristic	Test Method	Specification
Scrap tire CRM gradation (% passing No. 8 sieve)	LP-10	100
High natural CRM gradation (% passing No. 10 sieve)	LP-10	100
Wire in CRM (% max.)	LP-10	0.01
Fabric in CRM (% max.)	LP-10	0.05
CRM particle length (inch max.) <sup>a</sup>	--	3/16
CRM specific gravity <sup>a</sup>	CT 208	1.1 – 1.2
Natural rubber content in high natural CRM (%) <sup>a</sup>	ASTM D 297	40.0 – 48.0

Note:

<sup>a</sup> Test at mix design and for Certificate of Compliance.

Only use CRM ground and granulated at ambient temperature. If steel and fiber are cryogenically separated, it must occur before grinding and granulating. Only use cryogenically produced CRM particles that can be ground or granulated and not pass through the grinder or granulator.

CRM must be dry, free-flowing particles that do not stick together. CRM must not cause foaming when combined with the asphalt binder and asphalt modifier. You may add calcium carbonate or talc up to 3 percent by weight of CRM.

### Asphalt Rubber Binder Design and Profile

Submit in writing an asphalt rubber binder design and profile that complies with the asphalt rubber binder specifications. In the design, designate the asphalt, asphalt modifier, and CRM and their proportions. The profile must include the same component sources for the asphalt rubber binder used.

Design the asphalt rubber binder from testing you perform for each quality characteristic and for the reaction temperatures expected during production. The 24-hour (1,440-minute) interaction period determines the design profile. At a minimum, mix asphalt rubber binder components, take samples, and perform and record the following tests:

### Asphalt Rubber Binder Reaction Design Profile

Test	Minutes of Reaction <sup>a</sup>							Limits
	45	60	90	120	240	360	1440	
				0	0	0	0	

Cone penetration @ 77 °F, 0.10-mm (ASTM D 217)	X <sup>b</sup>				X		X	25 - 70
Resilience @ 77 °F, percent rebound (ASTM D 5329)	X				X		X	18 min.
Field softening point, °F (ASTM D 36)	X				X		X	125 - 165
Viscosity, centipoises (LP-11)	X	X	X	X	X	X	X	1,500 - 4,000

Notes:

<sup>a</sup> Six hours (360 minutes) after CRM addition, reduce the oven temperature to 275 °F for a period of 16 hours. After the 16-hour (1320 minutes) cool-down after CRM addition, reheat the binder to the reaction temperature expected during production for sampling and testing at 24 hours (1440 minutes).

<sup>b</sup> "X" denotes required testing

### Asphalt Rubber Binder

After interacting for a minimum of 45 minutes, asphalt rubber binder must comply with:

#### Asphalt Rubber Binder

Quality Characteristic	Test for Quality Control or Acceptance	Test Method	Specification	
			Minimum	Maximum
Cone penetration @ 77 °F, 0.10-mm	Acceptance	ASTM D 217	25	70
Resilience @ 77 °F, percent rebound	Acceptance	ASTM D 5329	18	--
Field softening point, °F	Acceptance	ASTM D 36	125	165
Viscosity @ 375 °F, centipoises	Quality Control	LP-11	1,500	4,000

### 39-1.02E Aggregate

Aggregate must be clean and free from deleterious substances. Aggregate:

1. Retained on the No. 4 sieve is coarse
2. Passing the No. 4 sieve is fine
3. Added and passing the No. 30 sieve is supplemental fine, including:
  - 3.1. Hydrated lime
  - 3.2. Portland cement
  - 3.3. Fines from dust collectors

The special provisions specify the aggregate gradation for each HMA type.

The specified aggregate gradation is before the addition of asphalt binder and includes supplemental fines. The Engineer tests for aggregate grading under California Test 202, modified by California Test 105 if there is a difference in specific gravity of 0.2 or more between the coarse and fine parts of different aggregate blends.

Choose a sieve size target value (TV) within each target value limit presented in the aggregate gradation tables.

**Aggregate Gradation  
(Percentage Passing)  
HMA Types A and B**

3/4–inch HMA Types A and B

Sieve Sizes	Target Value Limits	Allowable Tolerance
1"	100	—
3/4"	90 - 100	TV ±5
1/2"	70 - 90	TV ±6
No. 4	45 - 55	TV ±7
No. 8	32 - 40	TV ±5
No. 30	12 - 21	TV ±4
No. 200	2 - 7	TV ±2

1/2–inch HMA Types A and B

Sieve Sizes	Target Value Limits	Allowable Tolerance
3/4"	100	—
1/2"	95 - 99	TV ±6
3/8"	75 - 95	TV ±6
No. 4	55 - 66	TV ±7
No. 8	38 - 49	TV ±5
No. 30	15 - 27	TV ±4
No. 200	2 - 8	TV ±2

3/8–inch HMA Types A and B

Sieve Sizes	Target Value Limits	Allowable Tolerance
1/2"	100	—
3/8"	95 - 100	TV ±6
No. 4	58 - 72	TV ±7
No. 8	34 - 48	TV ±6
No. 30	18 - 32	TV ±5
No. 200	2 - 9	TV ±2

No. 4 HMA Types A and B

Sieve Sizes	Target Value Limits	Allowable Tolerance
3/8"	100	—
No. 4	95 - 100	TV ±7
No. 8	72 - 77	TV ±7
No. 30	37 - 43	TV ±7
No. 200	2 - 12	TV ±4

## Rubberized Hot Mix Asphalt - Gap Graded (RHMA-G)

### 3/4-inch RHMA-G

Sieve Sizes	Target Value Limits	Allowable Tolerance
1"	100	—
3/4"	95 - 100	TV ±5
1/2"	83 - 87	TV ±6
3/8"	65 - 70	TV ±6
No. 4	28 - 42	TV ±7
No. 8	14 - 22	TV ±5
No. 200	0 - 6	TV ±2

### 1/2-inch RHMA-G

Sieve Sizes	Target Value Limits	Allowable Tolerance
3/4"	100	—
1/2"	90 - 100	TV ±6
3/8"	83 - 87	TV ±6
No. 4	28 - 42	TV ±7
No. 8	14 - 22	TV ±5
No. 200	0 - 6	TV ±2

## Open Graded Friction Course (OGFC)

### 1-inch OGFC

Sieve Sizes	Target Value Limits	Allowable Tolerance
1 1/2"	100	—
1"	99 - 100	TV ±5
3/4"	85 - 96	TV ±5
1/2"	55 - 71	TV ±6
No. 4	10 - 25	TV ±7
No. 8	6 - 16	TV ±5
No. 200	1 - 6	TV ±2

### 1/2-inch OGFC

Sieve Sizes	Target Value Limits	Allowable Tolerance
3/4"	100	—
1/2"	95 - 100	TV ±6
3/8"	78 - 89	TV ±6
No. 4	28 - 37	TV ±7
No. 8	7 - 18	TV ±5
No. 30	0 - 10	TV ±4
No. 200	0 - 3	TV ±2

### 3/8-inch OGFC

Sieve Sizes	Target Value Limits	Allowable Tolerance
1/2"	100	—
3/8"	90 - 100	TV ±6
No. 4	29 - 36	TV ±7
No. 8	7 - 18	TV ±6
No. 30	0 - 10	TV ±5
No. 200	0 - 3	TV ±2

Before the addition of asphalt binder and lime treatment, aggregate must comply with:

## Aggregate Quality

Quality Characteristic	Test Method	HMA Type			
		A	B	RHMA-G	OGFC
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face	CT 205	90 75  70	25 -- 20	-- 90 70	90 75 90
Los Angeles Rattler (% max.) Loss at 100 Rev. Loss at 500 Rev.	CT 211	12 45	-- 50	12 40	12 40
Sand equivalent (min.) <sup>a</sup>	CT 217	47	42	47	--
Fine aggregate angularity (% min.) <sup>b</sup>	AASHTO T 304 Method A	45	45	45	--
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791	10	10	10	10

Notes:

<sup>a</sup> Reported value must be the average of 3 tests from a single sample.

<sup>b</sup> The Engineer waives this specification if HMA contains less than 10 percent of nonmanufactured sand by weight of total aggregate. Manufactured sand is fine aggregate produced by crushing rock or gravel.

### 39-1.02F Reclaimed Asphalt Pavement

You may produce HMA using reclaimed asphalt pavement (RAP). HMA produced using RAP must comply with the specifications for HMA except aggregate quality specifications do not apply to RAP. You may substitute RAP aggregate for a part of the virgin aggregate in HMA in a quantity not exceeding 15.0 percent of the aggregate blend. Do not use RAP in OGFC and RHMA-G.

Assign the substitution rate of RAP aggregate for virgin aggregate with the job mix formula (JMF) submittal. The JMF must include the percent of RAP used. If you change your assigned RAP aggregate substitution rate by more than 5 percent (within the 15.0 percent limit), submit a new JMF.

Process RAP from asphalt concrete. You may process and stockpile RAP throughout the project's life. Prevent material contamination and segregation. Store RAP in stockpiles on smooth surfaces free of debris and organic material. Processed RAP stockpiles must consist only of homogeneous RAP.

### 39-1.03 HOT MIX ASPHALT MIX DESIGN REQUIREMENTS

#### 39-1.03A General

A mix design consists of performing California Test 367 and laboratory procedures on combinations of aggregate gradations and asphalt binder contents to determine the optimum binder content (OBC) and HMA mixture qualities. If RAP is used, use Laboratory Procedure LP-9. The result of the mix design becomes the proposed JMF.

Use Form CEM-3512 to document aggregate quality and mix design data. Use Form CEM-3511 to present the JMF.

Laboratories testing aggregate qualities and preparing the mix design and JMF must be qualified under the Department's Independent Assurance Program. Take samples under California Test 125.

The Engineer reviews the aggregate qualities, mix design, and JMF and verifies and accepts the JMF.

You may change the JMF during production. Do not use the changed JMF until the Engineer accepts it. Except when adjusting the JMF in compliance with Section 39-1.03E, "Job Mix Formula Verification," perform a new mix design and submit in writing a new JMF submittal for changing any of the following:

1. Target asphalt binder percentage
2. Asphalt binder supplier
3. Asphalt rubber binder supplier
4. Component materials used in asphalt rubber binder or percentage of any component materials
5. Combined aggregate gradation
6. Aggregate sources
7. Substitution rate for RAP aggregate of more than 5 percent

8. Any material in the JMF

For OGFC, submit in writing a complete JMF submittal except asphalt binder content. The Engineer determines the asphalt binder content under California Test 368 within 20 days of your complete JMF submittal and provides you a Form CEM-3513.

**39-1.03B Hot Mix Asphalt Mix Design**

Perform a mix design that produces HMA in compliance with:

**Hot Mix Asphalt Mix Design Requirements**

Quality Characteristic	Test Method	HMA Type		
		A	B	RHMA-G
Air voids content (%)	CT 367 <sup>a</sup>	4.0	4.0	Special Provisions
Voids in mineral aggregate (% min.)	LP-2	17.0	17.0	--
No. 4 grading		15.0	15.0	--
3/8" grading		14.0	14.0	18.0 – 23.0 <sup>b</sup>
1/2" grading		13.0	13.0	18.0 – 23.0 <sup>b</sup>
3/4" grading				
Voids filled with asphalt (%)	LP-3	76.0 – 80.0	76.0 – 80.0	Note d
No. 4 grading		73.0 – 76.0	73.0 – 76.0	
3/8" grading		65.0 – 75.0	65.0 – 75.0	
1/2" grading		65.0 – 75.0	65.0 – 75.0	
3/4" grading				
Dust proportion	LP-4	0.9 – 2.0	0.9 – 2.0	Note d
No. 4 and 3/8" gradings		0.6 – 1.3	0.6 – 1.3	
1/2" and 3/4" gradings				
Stabilometer value (min.) <sup>c</sup>	CT 366	30	30	--
No. 4 and 3/8" gradings		37	35	23
1/2" and 3/4" gradings				

Notes:

<sup>a</sup> Calculate the air voids content of each specimen using California Test 309 and Lab Procedure LP-1. Modify California Test 367, Paragraph C5, to use the exact air voids content specified in the selection of OBC.

<sup>b</sup> Voids in mineral aggregate for RHMA-G must be within this range.

<sup>c</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the compactor, cool to 140 °± 5 °F by allowing the briquettes to cool at room temperature for 0.5-hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

<sup>d</sup> Report this value in the JMF submittal.

For stability and air voids content, prepare 3 briquettes at the OBC and test for compliance. Report the average of 3 tests. Prepare new briquettes and test if the range of stability for the 3 briquettes is more than 8 points. The average air void content may vary from the specified air void content by ±0.5 percent. You may use the briquettes used for stability testing to determine bulk specific gravity under CT 308. If you use the same briquettes and tests using bulk specific gravity fail, you may prepare 3 new briquettes and determine a new bulk specific gravity.

**39-1.03C Job Mix Formula Submittal**

Each JMF submittal must consist of:

1. Proposed JMF on Form CEM-3511
2. Mix design documentation on Form CEM-3512 dated within 12 months of submittal
3. JMF verification on Form CEM-3513, if applicable
4. JMF renewal on Form CEM-3514, if applicable
5. Materials Safety Data Sheets (MSDS) for:
  - 5.1. Asphalt binder
  - 5.2. Base asphalt binder used in asphalt rubber binder
  - 5.3. CRM and asphalt modifier used in asphalt rubber binder

- 5.4. Blended asphalt rubber binder mixture
- 5.5. Supplemental fine aggregate except fines from dust collectors
- 5.6. Antistrip additives

If the Engineer requests in writing, sample the following materials in the presence of the Engineer and place in labeled containers weighing no more than 50 pounds each:

1. Coarse, fine, and supplemental fine aggregate from stockpiles, cold feed belts, or hot bins. Samples must include at least 120 pounds for each coarse aggregate, 80 pounds for each fine aggregate, and 10 pounds for each type of supplemental fines. The Department combines these aggregate samples to comply with the JMF target values submitted on Form CEM-3511.
2. RAP from stockpiles or RAP system. Samples must be at least 60 pounds.
3. Asphalt binder from the binder supplier. Samples must be in two 1-quart cylindrical shaped cans with open top and friction lids.
4. Asphalt rubber binder with the components blended in the proportions to be used. Samples must be in four 1-quart cylindrical shaped cans with open top and friction lids.

Notify the Engineer in writing at least 2 business days before sampling materials. For aggregate and RAP, split the samples into at least 4 parts. Submit 3 parts to the Engineer and use 1 part for your testing.

#### **39-1.03D Job Mix Formula Review**

The Engineer reviews each mix design and proposed JMF within 5 business days from the complete JMF submittal. The review consists of reviewing the mix design procedures and comparing the proposed JMF with the specifications.

The Engineer may verify aggregate qualities during this review period.

#### **39-1.03E Job Mix Formula Verification**

If you cannot submit a Department-verified JMF on Form CEM-3513 dated within 12 months before HMA production, the Engineer verifies the JMF.

Based on your testing and production experience, you may submit on Form CEM-3511 an adjusted JMF before the Engineer's verification testing. JMF adjustments may include a change in the:

1. Asphalt binder content target value up to  $\pm 0.6$  percent from the optimum binder content value submitted on Form CEM-3512 except do not adjust the target value for asphalt rubber binder for RHMA-G below 7.0 percent
2. Aggregate gradation target values within the target value limits specified in the aggregate gradation tables

For HMA Type A, Type B, and RHMA-G, the Engineer verifies the JMF from samples taken from HMA produced by the plant to be used. Notify the Engineer in writing at least 2 business days before sampling materials.

In the Engineer's presence and from the same production run, take samples of:

1. Aggregate
2. Asphalt binder
3. RAP
4. HMA

Sample aggregate from cold feed belts or hot bins. Sample RAP from the RAP system. Sample HMA under California Test 125 except if you request in writing and the Engineer approves, you may sample from any of the following locations:

1. The plant
2. A truck
3. A windrow
4. The paver hopper
5. The mat behind the paver

You may sample from a different project including a non-Department project if you make arrangements for the Engineer to be present during sampling.

For aggregate, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 split parts to the Engineer and use 1 part for your testing.

The Engineer verifies each proposed JMF within 20 days of receiving verification samples. If you request in writing, the Engineer verifies RHMA-G quality requirements within 3 business days of sampling. Verification is testing for compliance with the specifications for:

1. Aggregate quality
2. Aggregate gradation (JMF TV  $\pm$  tolerance)
3. Asphalt binder content (JMF TV  $\pm$  tolerance)
4. HMA quality specified in the table Hot Mix Asphalt Mix Design Requirements except:
  - 4.1. Air voids content (design value  $\pm$  2.0 percent)
  - 4.2. Voids filled with asphalt (report only if an adjustment for asphalt binder content target value is less than or equal to  $\pm$  0.3 percent from OBC)
  - 4.3. Dust proportion (report only if an adjustment for asphalt binder content target value is less than or equal to  $\pm$  0.3 percent from OBC)

The Engineer prepares 3 briquettes from a single split sample. To verify the JMF for stability and air voids content, the Engineer tests the 3 briquettes and reports the average of 3 tests. The Engineer prepares new briquettes if the range of stability for the 3 briquettes is more than 8 points.

The Engineer may use the briquettes used for stability testing to determine bulk specific gravity under CT 308. If the Engineer uses the same briquettes and the tests using bulk specific gravity fail, the Engineer prepares 3 new briquettes and determines a new bulk specific gravity.

If the Engineer verifies the JMF, the Engineer provides you a Form CEM-3513.

If the Engineer's tests on plant-produced samples do not verify the JMF, the Engineer notifies you in writing and you must submit a new JMF submittal or submit an adjusted JMF based on your testing. JMF adjustments may include a change in the:

1. Asphalt binder content target value up to  $\pm$ 0.6 percent from the optimum binder content value submitted on Form CEM-3512 except do not adjust the target value for asphalt rubber binder for RHMA-G below 7.0 percent
2. Aggregate gradation target values within the target value limits specified in the aggregate gradation tables

You may adjust the JMF only once due to a failed verification test. An adjusted JMF requires a new Form CEM-3511 and verification of a plant-produced sample.

The Engineer re-verifies the JMF if HMA production has stopped for longer than 30 days and the verified JMF is older than 12 months.

For each HMA type and aggregate size specified, the Engineer verifies at the State's expense up to 2 proposed JMF including a JMF adjusted after verification failure. The Engineer deducts \$3,000 from payments for each verification exceeding this limit. This deduction does not apply to verifications initiated by the Engineer or if a JMF expires while HMA production is stopped longer than 30 days.

### **39-1.03F Job Mix Formula Renewal**

You may request a JMF renewal by submitting the following:

1. Proposed JMF on Form CEM-3511
2. A previously verified JMF documented on Form CEM-3513 dated within 12 months
3. Mix design documentation on Form CEM-3512 used for the previously verified JMF

If the Engineer requests in writing, sample the following materials in the presence of the Engineer and place in labeled containers weighing no more than 50 pounds each:

1. Coarse, fine, and supplemental fine aggregate from stockpiles, cold feed belts, or hot bins. Samples must include at least 120 pounds for each coarse aggregate, 80 pounds for each fine aggregate, and 10 pounds for each type of supplemental fines. The Department combines these aggregate samples to comply with the JMF target values submitted on Form CEM-3511.
2. RAP from stockpiles or RAP system. Samples must be at least 60 pounds.

3. Asphalt binder from the binder supplier. Samples must be in two 1-quart cylindrical shaped cans with open top and friction lids.
4. Asphalt rubber binder with the components blended in the proportions to be used. Samples must be in four 1-quart cylindrical shaped cans with open top and friction lids.

Notify the Engineer in writing at least 2 business days before sampling materials. For aggregate and RAP, split samples into at least 4 parts. Submit 3 parts to the Engineer and use 1 part for your testing.

The Engineer reviews each complete JMF renewal submittal within 5 business days.

The Engineer may verify aggregate qualities during this review period.

Notify the Engineer in writing at least 2 business days before sampling materials. For aggregate, RAP, and HMA, split the samples into at least 4 parts. Submit 3 parts to the Engineer and use 1 part for your testing.

The Engineer verifies the JMF renewal submittal under Section 39-1.03E, "Job Mix Formula Verification," except:

1. The Engineer retains samples until you provide test results for your part on Form CEM-3514.
2. The Engineer tests samples of materials obtained from the HMA production unit after you submit test results that comply with the specifications for the quality characteristics under Section 39-1.03E, "Job Mix Formula Verification."
3. The Engineer verifies each proposed JMF within 30 days of receiving verification samples.
4. You may not adjust the JMF due to a failed verification.
5. For each HMA type and aggregate gradation specified, the Engineer verifies at the State's expense 1 proposed JMF.

If the Engineer verifies the JMF renewal, the Engineer provides you a Form CEM-3513.

### **39-1.03G Job Mix Formula Acceptance**

You may start HMA production if:

1. The Engineer's review of the JMF shows compliance with the specifications.
2. The Department has verified the JMF within 12 months before HMA production.
3. The Engineer accepts the verified JMF.

## **39-1.04 CONTRACTOR QUALITY CONTROL**

### **39-1.04A General**

Establish, maintain, and change a quality control system to ensure materials and work comply with the specifications. Submit quality control test results to the Engineer within 3 days of a request except when QC / QA is specified.

You must identify the HMA sampling location in your Quality Control Plan. During production, take samples under California Test 125 except if you request in writing and the Engineer approves, you may sample HMA from:

1. The plant
2. The truck
3. A windrow
4. The paver hopper
5. The mat behind the paver

### **39-1.04B Prepaving Conference**

Meet with the Engineer at a prepaving conference at a mutually agreed time and place. Discuss methods of performing the production and paving work.

### **39-1.04C Asphalt Rubber Binder**

Take asphalt rubber binder samples from the feed line connecting the asphalt rubber binder tank to the HMA plant. Sample and test asphalt rubber binder under Laboratory Procedure LP-11.

Test asphalt rubber binder for compliance with the viscosity specifications in Section 39-1.02, "Materials." During asphalt rubber binder production and HMA production using asphalt rubber binder, measure viscosity every hour with not

less than 1 reading for each asphalt rubber binder batch. Log measurements with corresponding time and asphalt rubber binder temperature. Submit the log daily in writing.

Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance." With the Certificate of Compliance, submit test results in writing for CRM and asphalt modifier with each truckload delivered to the HMA plant. A Certificate of Compliance for asphalt modifier must not represent more than 5,000 pounds. Use an AASHTO-certified laboratory for testing.

Sample and test gradation and wire and fabric content of CRM once per 10,000 pounds of scrap tire CRM and once per 3,400 pounds of high natural CRM. Sample and test scrap tire CRM and high natural CRM separately.

Submit certified weight slips in writing for the CRM and asphalt modifier furnished.

#### **39-1.04D Aggregate**

Determine the aggregate moisture content and RAP moisture content in continuous mixing plants at least twice a day during production and adjust the plant controller. Determine the RAP moisture content in batch mixing plants at least twice a day during production and adjust the plant controller.

#### **39-1.04E Reclaimed Asphalt Pavement**

Perform RAP quality control testing each day.

Sample RAP once daily and determine the RAP aggregate gradation under Laboratory Procedure LP-9 and submit the results to the Engineer in writing with the combined aggregate gradation.

#### **39-1.04F Density Cores**

To determine density for Standard and QC / QA projects, take 4-inch or 6-inch diameter density cores at least once every 5 business days. Take 1 density core for every 250 tons of HMA from random locations the Engineer designates. Take density cores in the Engineer's presence and backfill and compact holes with material authorized by the Engineer. Before submitting a density core to the Engineer, mark it with the density core's location and place it in a protective container.

If a density core is damaged, replace it with a density core taken within 1 foot longitudinally from the original density core. Relocate any density core located within 1 foot of a rumble strip to 1 foot transversely away from the rumble strip.

#### **39-1.04G Briquettes**

Prepare 3 briquettes for each stability and air voids content determination. Report the average of 3 tests. Prepare new briquettes and test if the range of stability for the 3 briquettes is more than 12 points.

You may use the briquettes used for stability testing to determine bulk specific gravity under CT 308. If you use these briquettes and tests using bulk specific gravity fail, you may prepare 3 new briquettes and determine a new bulk specific gravity.

### **39-1.05 ENGINEER'S ACCEPTANCE**

The Engineer's acceptance of HMA is specified in the sections for each HMA construction process.

The Engineer samples materials for testing under California Test 125 and the applicable test method except samples may be taken from:

1. The plant from:
  - 1.1. A truck
  - 1.2. An automatic sampling device
2. The mat behind the paver

Sampling must be independent of Contractor quality control, statistically-based, and random. If you request, the Engineer splits samples and provides you with a part.

The Engineer accepts HMA based on:

1. Accepted JMF

2. Accepted QCP for Standard and QC / QA
3. Compliance with the HMA Acceptance tables
4. Acceptance of a lot for QC / QA
5. Visual inspection

The Engineer prepares 3 briquettes for each stability and air voids content determination. The Engineer reports the average of 3 tests. The Engineer prepares new briquettes and test if the range of stability for the 3 briquettes is more than 8 points.

The Engineer may use the briquettes used for stability testing to determine bulk specific gravity under CT 308. If the Engineer uses the same briquettes and the tests using bulk specific gravity fail, the Engineer prepares 3 new briquettes and determines a new bulk specific gravity.

### **39-1.06 DISPUTE RESOLUTION**

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer in

writing within 5 days of receiving a test result if you dispute the test result.

If you or the Engineer dispute each other's test results, submit written quality control test results and copies of paperwork including worksheets used to determine the disputed test results to the Engineer. An Independent Third Party (ITP) performs referee testing. Before the ITP participates in a dispute resolution, the ITP must be accredited under the Department's Independent Assurance Program. The ITP must be independent of the project. By mutual agreement, the ITP is chosen from:

1. A Department laboratory
2. A Department laboratory in a district or region not in the district or region the project is located
3. The Transportation Laboratory
4. A laboratory not currently employed by you or your HMA producer

If split quality control or acceptance samples are not available, the ITP uses any available material representing the disputed HMA for evaluation.

### **39-1.07 PRODUCTION START-UP EVALUATION**

The Engineer evaluates HMA production and placement at production start-up.

Within the first 750 tons produced on the first day of HMA production, in the Engineer's presence and from the same production run, take samples of:

1. Aggregate
2. Asphalt binder
3. RAP
4. HMA

Sample aggregate from cold feed belts or hot bins. Take RAP samples from the RAP system. Sample HMA under California Test 125 except if you request in writing and the Engineer approves, you may sample HMA from:

1. The plant
2. The truck
3. A windrow
4. The paver hopper
5. The mat behind the paver

For aggregate, RAP, and HMA, split the samples into at least 4 parts and label their containers. Submit 3 split parts to the Engineer and keep 1 part.

For Standard and QC / QA projects, you and the Engineer must test the split samples and report test results in writing within 3 business days of sampling.

If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results.

For Standard and QC / QA projects, take 4-inch or 6-inch diameter density cores within the first 750 tons on the first day of HMA production. For each density core, the Engineer reports the bulk specific gravity

determined under California Test 308, Method A in addition to the percent of maximum theoretical density. You may test for in-place density at the density core locations and include them in your production tests for percent of maximum theoretical density.

### **39-1.08 PRODUCTION**

#### **39-1.08A General**

Produce HMA in a batch mixing plant or a continuous mixing plant. Proportion aggregate by hot or cold feed control.

HMA plants must be Department-qualified. Before production, the HMA plant must have a current qualification under the Department's Materials Plant Quality Program.

During production, you may adjust:

1. Hot or cold feed proportion controls for virgin aggregate and RAP
2. The set point for asphalt binder content

#### **39-1.08B Mixing**

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

Asphalt binder must be between 275 °F and 375 °F when mixed with aggregate.

Asphalt rubber binder must be between 375 °F and 425 °F when mixed with aggregate.

When mixed with asphalt binder, aggregate must not be more than 325 °F except aggregate for OGFC with unmodified asphalt binder must be not more than 275 °F. Aggregate temperature specifications do not apply when you use RAP.

HMA with or without RAP must not be more than 325 °F.

#### **39-1.08C Asphalt Rubber Binder**

Deliver scrap tire CRM and high natural CRM in separate bags.

Either proportion and mix asphalt binder, asphalt modifier, and CRM simultaneously or pre-mix the asphalt binder and asphalt modifier before adding CRM. If you pre-mix asphalt binder and asphalt modifier, mix them for at least 20 minutes. When you add CRM, the asphalt binder and asphalt modifier must be between 375 °F and 440 °F.

Do not use asphalt rubber binder during the first 45 minutes of the reaction period. During this period, the asphalt rubber binder mixture must be between 350 °F and the lower of 425 °F or 25 °F below the asphalt binder's flash point indicated in the MSDS.

If any asphalt rubber binder is not used within 4 hours after the reaction period, discontinue heating. If the asphalt rubber binder drops below 375 °F, reheat before use. If you add more scrap tire CRM to the reheated asphalt rubber binder, the binder must undergo a 45-minute reaction period. The added scrap tire CRM must not exceed 10 percent of the total asphalt rubber binder weight. Reheated and reacted asphalt rubber binder must comply with the viscosity specifications for asphalt rubber binder in Section 39-1.02, "Materials." Do not reheat asphalt rubber binder more than twice.

### **39-1.09 SUBGRADE, TACK COAT, AND GEOSYNTHETIC PAVEMENT INTERLAYER**

#### **39-1.09A General**

Prepare subgrade or apply tack coat to surfaces receiving HMA. If specified, place geosynthetic pavement interlayer over a coat of asphalt binder.

#### **39-1.09B Subgrade**

Subgrade to receive HMA must comply with the compaction and elevation tolerance specifications in the sections for the material involved. Subgrade must be free of loose and extraneous material. If HMA is paved on existing base or pavement, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

#### **39-1.09C Tack Coat**

Apply tack coat:

1. To existing pavement including planed surfaces
2. Between HMA layers
3. To vertical surfaces of:

- 3.1. Curbs
- 3.2. Gutters
- 3.3. Construction joints

Before placing HMA, apply tack coat in 1 application at the minimum residual rate specified for the condition of the underlying surface:

**Tack Coat Application Rates for HMA Type A, Type B, and RHMA-G**

HMA over:	Minimum Residual Rates (gallons per square yard)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h Asphaltic Emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 Asphaltic Emulsion	Asphalt Binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h Asphaltic Emulsion
New HMA (between layers)	0.02	0.03	0.02
Existing AC and PCC pavement	0.03	0.04	0.03
Planned pavement	0.05	0.06	0.04

**Tack Coat Application Rates for OGFC**

OGFC over:	Minimum Residual Rates (gallons per square yard)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h Asphaltic Emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 Asphaltic Emulsion	Asphalt Binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h Asphaltic Emulsion
New HMA	0.03	0.04	0.03
Existing AC and PCC pavement	0.05	0.06	0.04
Planned pavement	0.06	0.07	0.05

If you dilute asphaltic emulsion, mix until homogeneous before application.

Apply to vertical surfaces with a residual tack coat rate that will thoroughly coat the vertical face without running off.

If you request in writing and the Engineer authorizes, you may:

- 1. Change tack coat rates
- 2. Omit tack coat between layers of new HMA during the same work shift if:
  - 2.1. No dust, dirt, or extraneous material is present
  - 2.2. The surface is at least 140 °F

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not track tack coat onto pavement surfaces beyond the job site.

Asphalt binder tack coat must be between 285 °F and 350 °F when applied.

**39-1.09D Geosynthetic Pavement Interlayer**

Place geosynthetic pavement interlayer in compliance with the manufacturer's recommendations.

Before placing the geosynthetic pavement interlayer and asphalt binder:

- 1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement. The State pays for this repair work under Section 4-1.03D, "Extra Work."
- 2. Clean the pavement of loose and extraneous material.

Immediately before placing the interlayer, apply 0.25 gallon ± 0.03 gallon of asphalt binder per square

yard of interlayer or until the fabric is saturated. Apply asphalt binder the width of the geosynthetic pavement interlayer plus 3 inches on each side. At interlayer overlaps, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2 inch thick. If the overlapping wrinkle is more than 1/2 inch thick, cut the wrinkle out and overlap the interlayer no more than 2 inches. The minimum HMA thickness over the interlayer must be 0.12 foot thick including conform tapers. Do not place the interlayer on a wet or frozen surface.

Overlap the interlayer borders between 2 inches and 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic except for crossings under traffic control and only after you place a small HMA quantity
2. Sharp turns from construction equipment
3. Damaging elements

Pave HMA on the interlayer during the same work shift.

### **39-1.10 SPREADING AND COMPACTING EQUIPMENT**

Paving equipment for spreading must be:

1. Self-propelled
2. Mechanical
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane
4. Equipped with a full-width compacting device
5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope

Install and maintain grade and slope references.

The screed must produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades and cross sections.
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction.

### **39-1.11 TRANSPORTING, SPREADING, AND COMPACTING**

Do not pave HMA on a wet pavement or frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed
2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for deposit, pick-up, loading, and paving are continuous
4. HMA temperature in the windrow does not fall below 260 °F

You may pave HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce a uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or

compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps

Longitudinal joints in the top layer must match specified lane edges. Alternate longitudinal joint offsets in lower layers at least 0.5 foot from each side of the specified lane edges. You may request in writing other longitudinal joint placement patterns.

Until the adjoining through lane's top layer has been paved, do not pave the top layer of:

1. Shoulders
2. Tapers
3. Transitions
4. Road connections
5. Driveways
6. Curve widenings
7. Chain control lanes
8. Turnouts
9. Turn pockets

If the number of lanes change, pave each through lane's top layer before paving a tapering lane's top layer. Simultaneous to paving a through lane's top layer, you may pave an adjoining area's top layer including shoulders. Do not operate spreading equipment on any area's top layer until completing final compaction.

If HMA (leveling) is specified, fill and level irregularities and ruts with HMA before spreading HMA over base, existing surfaces, or bridge decks. You may use mechanical equipment other than a paver for these areas. The equipment must produce a uniform smoothness and texture. HMA used to change an existing surface's cross slope or profile is not HMA (leveling).

If placing HMA against the edge of existing pavement, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material without damaging the surface remaining in place. If placing HMA against the edge of a longitudinal or transverse construction joint and the joint is damaged or not placed to a neat line, sawcut or grind the pavement straight and vertical along the joint and remove extraneous material without damaging the surface remaining in place. Repair or remove and replace damaged pavement at your expense.

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving. Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 °F for HMA with unmodified binder
2. Below 140 °F for HMA with modified binder
3. Below 200 °F for RHMA-G

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not use a pneumatic tired roller to compact RHMA-G.

For Standard and QC/QA, if a 3/4-inch aggregate grading is specified, you may use a 1/2-inch aggregate grading if the specified paved thickness is from 0.15 foot to 0.20 foot thick.

Spread and compact HMA under Section 39-3.03, "Spreading and Compacting Equipment," and Section 39-3.04, "Transporting, Spreading, and Compacting," for any of the following:

1. Specified paved thickness is less than 0.15 foot.
2. Specified paved thickness is less than 0.20 foot and a 3/4-inch aggregate grading is specified and used.
3. You spread and compact at:
  - 3.1. Asphalt concrete surfacing replacement areas
  - 3.2. Leveling courses
  - 3.3. Areas the Engineer determines conventional compaction and compaction measurement methods are impeded

Do not allow traffic on new HMA pavement until its mid-depth temperature is below 160 °F.

If you request in writing and the Engineer authorizes, you may cool HMA Type A and Type B with water when rolling activities are complete. Apply water under Section 17, "Watering."

Spread sand at a rate between 1 pound and 2 pounds per square yard on new RHMA-G, RHMA-O, and RHMA-O-HB pavement when finish rolling is complete. Sand must be free of clay or organic matter. Sand must comply with Section 90-3.03, "Fine Aggregate Grading." Keep traffic off the pavement until spreading sand is complete.

### **39-1.12 SMOOTHNESS**

#### **39-1.12A General**

Determine HMA smoothness with a profilograph and a straightedge.

Smoothness specifications do not apply to OGFC placed on existing pavement not constructed under the same project.

If portland cement concrete is placed on HMA:

1. Cold plane the HMA finished surface to within specified tolerances if it is higher than the grade specified by the Engineer.
2. Remove and replace HMA if the finished surface is lower than 0.05 foot below the grade specified by the Engineer.

#### **39-1.12B Straightedge**

The HMA pavement top layer must not vary from the lower edge of a 12-foot long straightedge:

1. More than 0.01 foot when the straight edge is laid parallel with the centerline
2. More than 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
3. More than 0.02 foot when the straightedge is laid within 24 feet of a pavement conform

#### **39-1.12C Profilograph**

Under California Test 526, determine the zero (null) blanking band Profile Index ( $PI_0$ ) and must-grinds on the top layer of HMA Type A, Type B, and RHMA-G pavement. Take 2 profiles within each traffic lane, 3 feet from and parallel with the edge of each lane.

A must-grind is a deviation of 0.3 inch or more in a length of 25 feet. You must correct must-grinds.

For OGFC, only determine must-grinds when placed over HMA constructed under the same project. The top layer of the underlying HMA must comply with the smoothness specifications before placing OGFC. Profile pavement in the Engineer's presence. Choose the time of profiling.

On tangents and horizontal curves with a centerline radius of curvature 2,000 feet or more, the  $PI_0$  must be at most 3 inches per 0.1-mile section.

On horizontal curves with a centerline radius of curvature between 1,000 feet and 2,000 feet including pavement within the superelevation transitions, the  $PI_0$  must be at most 6 inches per 0.1-mile section.

Before the Engineer accepts HMA pavement for smoothness, submit written final profilograms.

Submit 1 electronic copy of profile information in Microsoft Excel and 1 electronic copy of longitudinal pavement profiles in ".erd" format or other ProVAL compatible format to the Engineer and to:

Smoothness@dot.ca.gov

The following HMA pavement areas do not require a  $PI_0$ . You must measure these areas with a 12-foot straightedge and determine must-grinds with a profilograph:

1. New HMA with a total thickness less than or equal to 0.25 foot
2. HMA sections of city or county streets and roads, turn lanes and collector lanes that are less than 1,500 feet in length

The following HMA pavement areas do not require a  $PI_0$ . You must measure these areas with a 12-foot straightedge:

1. Horizontal curves with a centerline radius of curvature less than 1,000 feet including pavement within the superelevation transitions of those curves

2. Within 12 feet of a transverse joint separating the pavement from:
  - 2.1. Existing pavement not constructed under the same project
  - 2.2. A bridge deck or approach slab
3. Exit ramp termini, truck weigh stations, and weigh-in-motion areas
4. If steep grades and superelevation rates greater than 6 percent are present on:
  - 4.1. Ramps
  - 4.2. Connectors
5. Turn lanes
6. Areas within 15 feet of manholes or drainage transitions
7. Acceleration and deceleration lanes for at-grade intersections
8. Shoulders and miscellaneous areas
9. HMA pavement within 3 feet from and parallel to the construction joints formed between curbs, gutters, or existing pavement

#### **39-1.12D Smoothness Correction**

If the top layer of HMA Type A, Type B, or RHMA-G pavement does not comply with the smoothness specifications, grind the pavement to within tolerances, remove and replace it, or place a layer of HMA. The Engineer must authorize your choice of correction before the work begins.

Remove and replace the areas of OGFC not in compliance with the must-grind and straightedge specifications, except you may grind OGFC for correcting smoothness:

1. At a transverse joint separating the pavement from pavement not constructed under the same project
2. Within 12 feet of a transverse joint separating the pavement from a bridge deck or approach slab

Corrected HMA pavement areas must be uniform rectangles with edges:

1. Parallel to the nearest HMA pavement edge or lane line
2. Perpendicular to the pavement centerline

Measure the corrected HMA pavement surface with a profilograph and a 12-foot straightedge and correct the pavement to within specified tolerances. If a must-grind area or straightedged pavement cannot be corrected to within specified tolerances, remove and replace the pavement.

On ground areas not overlaid with OGFC, apply fog seal coat under Section 37-1, "Seal Coats."

#### **39-1.13 MISCELLANEOUS AREAS AND DIKES**

Miscellaneous areas are outside the traveled way and include:

1. Median areas not including inside shoulders
2. Island areas
3. Sidewalks
4. Gutters
5. Gutter flares
6. Ditches
7. Overside drains
8. Aprons at the ends of drainage structures

Spread miscellaneous areas in 1 layer and compact to the specified lines and grades.

For miscellaneous areas and dikes:

1. Do not submit a JMF.
2. Choose the 3/8-inch or 1/2-inch HMA Type A and Type B aggregate gradations.
3. Minimum asphalt binder content must be 6.8 percent for 3/8-inch aggregate and 6.0 percent for 1/2-inch aggregate. If you request in writing and the Engineer authorizes, you may reduce the minimum asphalt binder content.
4. Choose asphalt binder Grade PG 70-10 or the same grade specified for HMA.

## **39-2 STANDARD**

### **39-2.01 DESCRIPTION**

If HMA is specified as Standard, construct it under Section 39-1, "General," this Section 39-2, "Standard," and Section 39-5, "Measurement and Payment."

### **39-2.02 CONTRACTOR QUALITY CONTROL**

#### **39-2.02A Quality Control Plan**

Establish, implement, and maintain a Quality Control Plan (QCP) for HMA. The QCP must describe the organization and procedures you will use to:

1. Control the quality characteristics
2. Determine when corrective actions are needed (action limits)
3. Implement corrective actions

When you submit the proposed JMF, submit the written QCP. You and the Engineer must discuss the QCP during the prepaving conference.

The QCP must address the elements affecting HMA quality including:

1. Aggregate
2. Asphalt binder
3. Additives
4. Production
5. Paving

The Engineer reviews each QCP within 5 business days from the submittal. Hold HMA production until the Engineer accepts the QCP in writing. The Engineer's QCP acceptance does not mean your compliance with the QCP will result in acceptable HMA. Section 39-1.05, "Engineer's Acceptance," specifies HMA acceptance.

#### **39-2.02B Quality Control Testing**

Perform sampling and testing at the specified frequency for the following quality characteristics:

### Minimum Quality Control – Standard

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	HMA Type			
			A	B	RHMA-G	OGFC
Aggregate gradation <sup>a</sup>	CT 202	1 per 750 tons and any remaining part	JMF Tolerance <sup>b</sup> ±			
Sand equivalent (min.) <sup>c</sup>	CT 217		47	42	47	--
Asphalt binder content (%)	CT 379 or 382		JMF ± 0.45	JMF ± 0.45	JMF ± 0.50	JMF ± 0.50
HMA moisture content (% max.)	CT 226 or CT 370	1 per 2,500 tons but not less than 1 per paving day	1.0	1.0	1.0	1.0
Percent of maximum theoretical density (%) <sup>d, e</sup>	Quality control plan	2 per business day (min.)	91 - 97	91 - 97	91 - 97	--
Stabilometer value (min.) <sup>c, f</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	CT 366	One per 4,000 tons or 2 per 5 business days, which-ever is more	30	30	--	--
			37	35	23	--
Air voids content (%) <sup>c, g</sup>	CT 367		4 ± 2	4 ± 2	Specification ± 2	--
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants <sup>h</sup>	CT 226 or CT 370	2 per day during production	--	--	--	--
Percent of crushed particles coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face	CT 205	As necessary and designated in the QCP. At least once per project	90	25	--	90
			75	--	90	75
			70	20	70	90
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	CT 211		12 45	-- 50	12 40	12 40
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791		Report only	Report only	Report only	Report only
Fine aggregate angularity (% min.)	AASHTO T 304, Method A		45	45	45	--
Voids filled with asphalt (%) <sup>i</sup> No. 4 grading 3/8" grading	LP-3		76.0 – 80.0 73.0 – 76.0	76.0 – 80.0 73.0 – 76.0	Report only	--

1/2" grading 3/4" grading			65.0 – 75.0 65.0 – 75.0	65.0 – 75.0 65.0 – 75.0		
Voids in mineral aggregate (% min.) <sup>i</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	LP-2		17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0 – 23.0 <sup>j</sup> 18.0 – 23.0 <sup>j</sup>	--
Dust proportion <sup>i</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	LP-4		0.9 – 2.0 0.6 – 1.3	0.9 – 2.0 0.6 – 1.3	Report only	--
Smoothness	Section 39-1.12	--	12-foot straightedge, must-grind, and PI <sub>0</sub>	12-foot straightedge, must-grind, and PI <sub>0</sub>	12-foot straightedge, must-grind, and PI <sub>0</sub>	12-foot straightedge and must-grind
Asphalt rubber binder viscosity @ 350 °F, centipoises	Section 39-1.02D	Section 39-1.04C	--	--	1,500 – 4,000	1,500 – 4,000
Asphalt modifier	Section 39-1.02D	Section 39-1.04C	--	--	Section 39-1.02D	Section 39-1.02D
Crumb rubber modifier	Section 39-1.02D	Section 39-1.04C	--	--	Section 39-1.02D	Section 39-1.02D

Notes:

<sup>a</sup> Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

<sup>b</sup> The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

<sup>c</sup> Report the average of 3 tests from a single split sample.

<sup>d</sup> Required for HMA Type A, Type B, and RHMA-G if the specified paved thickness is at least 0.15 foot.

<sup>e</sup> Determine maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

<sup>f</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the mechanical compactor, cool to 140 °F ± 5 °F by allowing the briquettes to cool at room temperature for 0.5 hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

<sup>g</sup> Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>h</sup> For adjusting the plant controller at the HMA plant.

<sup>i</sup> Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

<sup>j</sup> Voids in mineral aggregate for RHMA-G must be within this range.

For any single quality characteristic except smoothness, if 2 consecutive quality control test results do not comply with the action limits or specifications:

1. Stop production.
2. Notify the Engineer in writing.
3. Take corrective action.
4. Demonstrate compliance with the specifications before resuming production and placement on the State highway.

### 39-2.03 ENGINEER'S ACCEPTANCE

#### 39-2.03A Testing

The Engineer samples for acceptance testing and tests for:

#### HMA Acceptance - Standard

Quality Characteristic	Test Method	HMA Type						
		A	B	RHMA-G	OGFC			
Aggregate gradation <sup>a</sup>	CT 202	JMF Tolerance <sup>c</sup> ±	JMF Tolerance <sup>c</sup> ±	JMF Tolerance <sup>c</sup> ±	JMF Tolerance <sup>c</sup> ±			
Sieve						3/4"	1/2"	3/8"
1/2"						X <sup>b</sup>		
3/8"							X	
No. 4								X
No. 8						X	X	X
No. 200	X	X	X					
Sand equivalent (min.) <sup>d</sup>	CT 217	47	42	47	--			
Asphalt binder content (%)	CT 379 or 382	JMF ± 0.45	JMF ± 0.45	JMF ± 0.50	JMF ± 0.50			
HMA moisture content (% max.)	CT 226 or CT 370	1.0	1.0	1.0	1.0			
Percent of maximum theoretical density (%) <sup>e, f</sup>	CT 375	91 – 97	91 – 97	91 – 97	--			
Stabilometer value (min.) <sup>d, g</sup>	CT 366	30	30	--	--			
No. 4 and 3/8" gradings								
1/2" and 3/4" gradings		37	35	23	--			
Air voids content (%) <sup>d, h</sup>	CT 367	4 ± 2	4 ± 2	Specification ± 2	--			
Percent of crushed particles	CT 205	90	25	--	90			
Coarse aggregate (% min.)								
One fractured face								
Two fractured faces								
Fine aggregate (% min.)	70	20	70	90				
(Passing No. 4 sieve and retained on No. 8 sieve.)								
One fractured face								
Percent of crushed particles	CT 205	90	25	--	90			
Coarse aggregate (% min.)								
One fractured face								
Two fractured faces								
Los Angeles Rattler (% max.)	CT 211	12	--	12	12			
Loss at 100 rev.								
Loss at 500 rev.		45	50	40	40			
Fine aggregate angularity (% min.)	AASHTO T 304, Method A	45	45	45	--			
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791	Report only	Report only	Report only	Report only			
Voids filled with asphalt (%) <sup>i</sup>	LP-3	76.0 – 80.0	76.0 – 80.0	Report only	--			
No. 4 grading								
3/8" grading								
1/2" grading								
3/4" grading								
Voids in mineral aggregate (% min.) <sup>i</sup>	LP-2	17.0	17.0	--	--			
No. 4 grading								
3/8" grading								
1/2" grading								
3/4" grading								
Dust proportion <sup>i</sup>	LP-4	0.9 – 2.0	0.9 – 2.0	Report only	--			
No. 4 and 3/8" gradings								
1/2" and 3/4" gradings		0.6 – 1.3	0.6 – 1.3					
Smoothness	Section 39-1.12	12-foot straightedge, must-grind,	12-foot straightedge, must-grind, and	12-foot straightedge, must-grind, and	12-foot straightedge and must-grind			

		and $PI_0$	$PI_0$	$PI_0$	
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92-1.02(C) and Section 39-1.02D	Section 92-1.02(C) and Section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
Crumb rubber modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

<sup>b</sup> "X" denotes the sieves the Engineer considers for the specified aggregate gradation.

<sup>c</sup> The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

<sup>d</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>e</sup> The Engineer determines percent of maximum theoretical density if the specified paved thickness is at least 0.15 foot under California Test 375 except the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core instead of using the nuclear gauge in Part 4, "Determining In-Place Density By The Nuclear Density Device."
2. California Test 309 to determine maximum theoretical density instead of calculating test maximum density in Part 5, "Determining Test Maximum Density."

<sup>f</sup> The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

<sup>g</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the mechanical compactor, cool to 140 °F  $\pm$  5 °F by allowing the briquettes to cool at room temperature for 0.5 hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

<sup>h</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>i</sup> Report only if the adjustment for asphalt binder content target value is less than or equal to  $\pm$  0.3 percent from OBC.

<sup>j</sup> Voids in mineral aggregate for RHMA-G must be within this range.

No single test result may represent more than the smaller of 750 tons or 1 day's production.

For any single quality characteristic except smoothness, if 2 consecutive acceptance test results do not comply with the specifications:

1. Stop production.
2. Take corrective action.
3. In the Engineer's presence, take samples and split each sample into 4 parts. Test 1 part for compliance with the specifications and submit 3 parts to the Engineer. The Engineer tests 1 part for compliance with the specifications and reserves and stores 2 parts.
4. Demonstrate compliance with the specifications before resuming production and placement on the State highway.

The Engineer tests the density core you take from each 250 tons of HMA production. The Engineer determines the percent of maximum theoretical density for each density core by determining the density core's density and dividing by the maximum theoretical density.

If the specified total paved thickness is at least 0.15 foot and any layer is less than 0.15 foot, the Engineer determines the percent of maximum theoretical density from density cores taken from the final layer measured the full depth of the total paved HMA thickness.

For percent of maximum theoretical density, the Engineer determines a deduction for each test result outside the specifications in compliance with:

**Reduced Payment Factors for Percent of Maximum Theoretical Density**

HMA Type A and B and RHMA-G Percent of Maximum Theoretical Density	Reduced Payment Factor	HMA Type A and B and RHMA-G Percent of Maximum Theoretical Density	Reduced Payment Factor
91.0	0.0000	97.0	0.0000
90.9	0.0125	97.1	0.0125
90.8	0.0250	97.2	0.0250
90.7	0.0375	97.3	0.0375
90.6	0.0500	97.4	0.0500
90.5	0.0625	97.5	0.0625
90.4	0.0750	97.6	0.0750
90.3	0.0875	97.7	0.0875
90.2	0.1000	97.8	0.1000
90.1	0.1125	97.9	0.1125
90.0	0.1250	98.0	0.1250
89.9	0.1375	98.1	0.1375
89.8	0.1500	98.2	0.1500
89.7	0.1625	98.3	0.1625
89.6	0.1750	98.4	0.1750
89.5	0.1875	98.5	0.1875
89.4	0.2000	98.6	0.2000
89.3	0.2125	98.7	0.2125
89.2	0.2250	98.8	0.2250
89.1	0.2375	98.9	0.2375
89.0	0.2500	99.0	0.2500
< 89.0	Remove and Replace	> 99.0	Remove and Replace

**39-2.04 TRANSPORTING, SPREADING, AND COMPACTING**

Determine the number of rollers needed to obtain the specified density and surface finish.

**39-3 METHOD**

**39-3.01 DESCRIPTION**

If HMA is specified as Method, construct it under Section 39-1, "General," this Section 39-3, "Method," and Section 39-5, "Measurement and Payment."

**39-3.02 ENGINEER'S ACCEPTANCE**

**39-3.02A Testing**

The Engineer samples for acceptance testing and tests for:

### HMA Acceptance - Method

Quality Characteristic	Test Method	HMA Type			
		A	B	RHMA-G	OGFC
Aggregate gradation <sup>a</sup>	CT 202	JMF Tolerance <sup>b</sup> ±			
Sand equivalent (min.) <sup>c</sup>	CT 217	47	42	47	--
Asphalt binder content (%)	CT 379 or 382	JMF ± 0.45	JMF ± 0.45	JMF ± 0.50	JMF ± 0.50
HMA moisture content (% max.)	CT 226 or CT 370	1.0	1.0	1.0	1.0
Stabilometer value (min.) <sup>c, d</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	CT 366	30	30	--	--
		37	35	23	--
Percent of crushed particles Coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face	CT 205	90	25	--	90
		75	--	90	75
		70	20	70	90
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	CT 211	12	--	12	12
		45	50	40	40
Air voids content (%) <sup>c, e</sup>	CT 367	4 ± 2	4 ± 2	Specification ± 2	--
Fine aggregate angularity (% min.)	AASHTO T 304, Method A	45	45	45	--
Flat and elongated particles (% max. by weight @ 5:1)	ASTM D 4791	Report only	Report only	Report only	Report only
Voids filled with asphalt (%) <sup>f</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	LP-3	76.0 – 80.0	76.0 – 80.0	Report only	--
		73.0 – 76.0	73.0 – 76.0		
		65.0 – 75.0	65.0 – 75.0		
		65.0 – 75.0	65.0 – 75.0		
Voids in mineral aggregate (% min.) <sup>f</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	LP-2	17.0	17.0	--	--
		15.0	15.0	--	
		14.0	14.0	18.0 – 23.0 <sup>g</sup>	
		13.0	13.0	18.0 – 23.0 <sup>g</sup>	
Dust proportion <sup>f</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	LP-4	0.9 – 2.0	0.9 – 2.0	Report only	--
		0.6 – 1.3	0.6 – 1.3		
Smoothness	Section 39-1.12	12-foot straightedge	12-foot straightedge	12-foot straightedge	12-foot straightedge

		and must-grind	and must-grind	and must-grind	and must-grind
Asphalt binder	Various	Section 92	Section 92	Section 92	Section 92
Asphalt rubber binder	Various	--	--	Section 92-1.02(C) and Section 39-1.02D	Section 92-1.02(C) and Section 39-1.02D
Asphalt modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D
Crumb rubber modifier	Various	--	--	Section 39-1.02D	Section 39-1.02D

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

<sup>b</sup> The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

<sup>c</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>d</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the mechanical compactor, cool to 140 °F ±5 °F by allowing the briquettes to cool at room temperature for 0.5 hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

<sup>e</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>f</sup> Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

<sup>g</sup> Voids in mineral aggregate for RHMA-G must be within this range.

No single test result may represent more than the smaller of 750 tons or 1 day's production.

For any single quality characteristic except smoothness, if 2 consecutive acceptance test results do not comply with the specifications:

1. Stop production.
2. Take corrective action.
3. In the Engineer's presence, take samples and split each sample into 4 parts. Test 1 part for compliance with the specifications and submit 3 parts to the Engineer. The Engineer tests 1 part for compliance with the specifications and reserves and stores 2 parts.
4. Demonstrate compliance with the specifications before resuming production and placement on the State highway.

### 39-3.03 SPREADING AND COMPACTING EQUIPMENT

Each paver spreading HMA Type A and Type B must be followed by 3 rollers:

1. One vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
2. One oscillating type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
3. One steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible.

Compact RHMA-G under the specifications for compacting HMA Type A and Type B except do not use pneumatic-tired rollers.

Compact OGFC with steel-tired, 2-axle tandem rollers. If placing over 300 tons of OGFC per hour, use at least 3 rollers for each paver. If placing less than 300 tons of OGFC per hour, use at least 2 rollers for each paver. Each roller must weigh between 126 pounds to 172 pounds per linear inch of drum width. Turn the vibrator off.

### 39-3.04 TRANSPORTING, SPREADING, AND COMPACTING

Pave HMA in maximum 0.25-foot thick compacted layers.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.

Spread HMA Type A and Type B only if atmospheric and surface temperatures are:

**Minimum Atmospheric and Surface Temperatures**

Compacted Layer Thickness, feet	Atmospheric, ° F				Surface, ° F	
	Unmodified Asphalt Binder		Modified Asphalt Binder <sup>a</sup>		Unmodified Asphalt Binder	Modified Asphalt Binder <sup>a</sup>
	< 0.15	55	50	50	60	55
0.15 – 0.25	45	45	45	50	50	

Note:

<sup>a</sup> Except asphalt rubber binder.

If the asphalt binder for HMA Type A and Type B is:

1. Unmodified asphalt binder, complete:
  - 1.1. First coverage of breakdown compaction before the surface temperature drops below 250 °F
  - 1.2. Breakdown and intermediate compaction before the surface temperature drops below 200 °F
  - 1.3. Finish compaction before the surface temperature drops below 150 °F
2. Modified asphalt binder, complete:
  - 2.1. First coverage of breakdown compaction before the surface temperature drops below 240 °F
  - 2.2. Breakdown and intermediate compaction before the surface temperature drops below 180 °F
  - 2.3. Finish compaction before the surface temperature drops below 140 °F

For RHMA-G:

1. Only spread and compact if the atmospheric temperature is at least 55 °F and the surface temperature is at least 60 °F.
2. Complete the first coverage of breakdown compaction before the surface temperature drops below 280 °F.
3. Complete breakdown and intermediate compaction before the surface temperature drops below 250 °F.
4. Complete finish compaction before the surface temperature drops below 200 °F.
5. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface.

For OGFC with unmodified asphalt binder:

1. Only spread and compact if the atmospheric temperature is at least 55 °F and the surface temperature is at least 60 °F.
2. Complete first coverage using 2 rollers before the surface temperature drops below 240 °F.
3. Complete all compaction before the surface temperature drops below 200 °F.
4. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface.

For OGFC with modified asphalt binder except asphalt rubber binder:

1. Only spread and compact if the atmospheric temperature is at least 50 °F and the surface temperature is at least 50 °F.

2. Complete first coverage using 2 rollers before the surface temperature drops below 240 °F.
3. Complete all compaction before the surface temperature drops below 180 °F.
4. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or to the pavement surface.

For RHMA-O and RHMA-O-HB:

1. Only spread and compact if the atmospheric temperature is at least 55 °F and surface temperature is at least 60 °F.
2. Complete the 1st coverage using 2 rollers before the surface temperature drops below 280 °F.
3. Complete compaction before the surface temperature drops below 250 °F.
4. If the atmospheric temperature is below 70 °F, cover loads in trucks with tarpaulins. The tarpaulins must completely cover the exposed load until the mixture is transferred to the paver's hopper or to the pavement surface.

For RHMA-G and OGFC, tarpaulins are not required if the time from discharge to truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes.

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Start rolling at the lower edge and progress toward the highest part.

Perform breakdown compaction of each layer of HMA Type A, Type B, and RHMA-G with 3 coverages using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the HMA layer thickness is less than 0.08 foot, turn the vibrator off. The Engineer may order fewer coverages if the HMA layer thickness is less than 0.15 foot.

Perform intermediate compaction of each layer of HMA Type A and Type B with 3 coverages using a pneumatic-tired roller at a speed not to exceed 5 mph.

Perform finish compaction of HMA Type A, Type B, and RHMA-G with 1 coverage using a steel-tired roller.

Compact OGFC with 2 coverages using steel-tired rollers.

### **39-4 QUALITY CONTROL / QUALITY ASSURANCE**

#### **39-4.01 DESCRIPTION**

If HMA is specified as Quality Control / Quality Assurance, construct it under Section 39-1, "General," this Section 39-4, "Quality Control / Quality Assurance," and Section 39-5, "Measurement and Payment."

#### **39-4.02 GENERAL**

The QC / QA construction process consists of:

1. Establishing, maintaining, and changing if needed a quality control system providing assurance the HMA complies with the specifications
2. Sampling and testing at specified intervals, or sublots, to demonstrate compliance and to control process
3. The Engineer sampling and testing at specified intervals to verify testing process and HMA quality
4. The Engineer using test results, statistical evaluation of verified quality control tests, and inspection to accept HMA for payment

A lot is a quantity of HMA. The Engineer designates a new lot when:

1. 20 sublots are complete
2. The JMF changes
3. Production stops for more than 30 days

Each lot consists of no more than 20 sublots. A subplot is 750 tons except HMA paved at day's end greater than 250 tons is a subplot. If HMA paved at day's end is less than 250 tons, you may either make this quantity a subplot or include it in the previous subplot's test results for statistical evaluation.

### **39-4.03 CONTRACTOR QUALITY CONTROL**

#### **39-4.03A General**

Use a composite quality factor,  $QF_C$ , and individual quality factors,  $QF_{QCi}$ , to control your process and evaluate your quality control program. For quality characteristics without quality factors, use your quality control plan's action limits to control process.

Control HMA quality including:

1. Materials
2. Proportioning
3. Spreading and compacting
4. Finished roadway surface

Develop, implement, and maintain a quality control program that includes:

1. Inspection
2. Sampling
3. Testing

#### **39-4.03B Quality Control Plan**

With the JMF submittal, submit a written Quality Control Plan (QCP). The QCP must comply with the Department's Quality Control Manual for Hot Mix Asphalt Production and Placement. Discuss the QCP with the Engineer during the prepaving conference.

The Engineer reviews each QCP within 5 business days from the submittal.

Hold HMA production until the Engineer accepts the QCP in writing. The Engineer's QCP acceptance does not mean your compliance with the QCP will result in acceptable HMA. Section 39-1.05, "Engineer's Acceptance," specifies HMA acceptance.

The QCP must include the name and qualifications of a Quality Control Manager. The Quality Control Manager administers the QCP and during paving must be at the job site within 3 hours of receiving notice. The Quality Control Manager must not be any of the following on the project:

1. Foreman
2. Production or paving crewmember
3. Inspector
4. Tester

The QCP must include action limits and details of corrective action you will take if a test result for any quality characteristic falls outside an action limit.

As work progresses, you must submit a written QCP supplement to change quality control procedures, personnel, tester qualification status, or laboratory accreditation status.

#### **39-4.03C Quality Control Inspection, Sampling, And Testing**

Sample, test, inspect, and manage HMA quality control.

Provide a roadway inspector while HMA paving activities are in progress. Provide a plant inspector during HMA production.

Inspectors must comply with the Department's Quality Control Manual for Hot Mix Asphalt Production and Placement.

Provide a testing laboratory and personnel for quality control testing. Provide the Engineer unrestricted access to the quality control activities. Before providing services for the project, the Engineer reviews, accredits, and qualifies the testing laboratory and personnel under the Department's Independent Assurance Program.

The minimum random sampling and testing for quality control is:

**Minimum Quality Control – QC / QA**

Quality Characteristic	Test Method	Min-imum Sampling and Testing Frequency	HMA Type			Location of Sampling	Max. Reporting Time Allowance
			A	B	RHMA-G		
Aggregate gradation <sup>a</sup>	CT 202	1 per 750 tons	JMF $\pm$ Tolerance <sub>b</sub>	JMF $\pm$ Tolerance <sub>b</sub>	JMF $\pm$ Tolerance <sub>b</sub>	CT 125	24 hours
Asphalt binder content (%)	CT 379 or 382		JMF $\pm 0.45$	JMF $\pm 0.45$	JMF $\pm 0.5$	Loose Mix Behind Paver See CT 125	
Percent of maximum theoretical density (%) <sup>c, d</sup>	QC Plan		92 - 96	92 - 96	91 - 96	QC Plan	
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants <sup>e</sup>	CT 226 or CT 370	2 per day during production	--	--	--	Stock-piles or cold feed belts	--
Sand equivalent (min.) <sup>f</sup>	CT 217	1 per 750 tons	47	42	47	CT 125	24 hours
HMA moisture content (% max.)	CT 226 or CT 370	1 per 2,500 tons but not less than 1 per paving day	1.0	1.0	1.0	Loose Mix Behind Paver See CT 125	24 hours
Stabilometer Value (min.) <sup>f, g</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	CT 366	1 per 4,000 tons or 2 per 5 business days, whichever is more	30 37	30 35	-- 23		48 hours
Air voids content (%) <sup>f, h</sup>	CT 367		4 $\pm$ 2	4 $\pm$ 2	Specification $\pm$ 2		

Percent of crushed particles coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face	CT 205	As necessary and design at-ed in QCP. At least once per project.	90	25	--	CT 125	48 hours	
			75	--	90			
			70	20	70			
Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.	CT 211			12	--	12		CT 125
				45	50	40		
Fine aggregate angularity (% min.)	AASHTO T 304, Method A			45	45	45		CT 125
Flat and elongated particle (% max. by weight @ 5:1)	ASTM D 4791			Report only	Report only	Report only		CT 125
Voids filled with asphalt (%) <sup>i</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	LP-3			76.0 -- 80.0 -- 73.0 -- 76.0 -- 65.0 -- 75.0 -- 65.0 -- 75.0	76.0 -- 80.0 -- 73.0 -- 76.0 -- 65.0 -- 75.0 -- 65.0 -- 75.0	Report only		LP-3
Voids in mineral aggregate (% min.) <sup>i</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading	LP-2			17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	-- -- 18.0 – 23.0 <sup>j</sup> 18.0 – 23.0 <sup>j</sup>		LP-2
Dust proportion <sup>l</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings	LP-4			0.9 – 2.0 0.6 – 1.3	0.9 – 2.0 0.6 – 1.3	Report only		LP-4
Smoothness	Section 39-1.12	--	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	--		
Asphalt rubber binder viscosity @ 350 °F, centipoises	Section 39-1.02D	--	--	--	1,500 – 4,000	Section 39-1.02D	24 hours	

Crumb rubber modifier	Section 39-1.02D	--	--	--	Section 39-1.02D	Section 39-1.02D	48 hours
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Notes:

- <sup>a</sup> Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.
- <sup>b</sup> The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."
- <sup>c</sup> Required for HMA Type A, Type B, and RHMA-G if the specified paved thickness is at least 0.15 foot.
- <sup>d</sup> Determine maximum theoretical density (California Test 309) at the frequency specified for test maximum density under California Test 375, Part 5 D.
- <sup>e</sup> For adjusting the plant controller at the HMA plant.
- <sup>f</sup> Report the average of 3 tests from a single split sample.
- <sup>g</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the mechanical compactor, cool to 140 °F ± 5 °F by allowing the briquettes to cool at room temperature for 0.5 hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."
- <sup>h</sup> Determine the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.
- <sup>i</sup> Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.
- <sup>j</sup> Voids in mineral aggregate for RHMA-G must be within this range.

Within the specified reporting time, submit written test results including:

1. Sampling location, quantity, and time
2. Testing results
3. Supporting data and calculations

If test results for any quality characteristic are beyond the action limits in the QCP, take corrective actions. Document the corrective actions taken in the inspection records under Section 39-4.03E, "Records of Inspection and Testing."

Stop production, notify the Engineer in writing, take corrective action, and demonstrate compliance with the specifications before resuming production and placement on the State highway if:

1. A lot's composite quality factor,  $Q_{FC}$ , or an individual quality factor,  $Q_{FCi}$  for  $i = 3, 4, \text{ or } 5$ , is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation"
2. An individual quality factor,  $Q_{FCi}$  for  $i = 1 \text{ or } 2$ , is below 0.75
3. Quality characteristics for which a quality factor,  $Q_{FCi}$ , is not determined has 2 consecutive acceptance or quality control tests not in compliance with the specifications.

### 39-4.03D Charts And Records

Record sampling and testing results for quality control on forms provided in the "Quality Control Manual for Hot Mix Asphalt," or on forms you submit with the QCP. The QCP must also include form posting locations and submittal times.

Submit quality control test results using the Department's statistical evaluation program, HMAPay, available at

[www.dot.ca.gov/hq/construc/hma/index.htm](http://www.dot.ca.gov/hq/construc/hma/index.htm)

### 39-4.03E Records Of Inspection And Testing

During HMA production, submit in writing a daily:

1. HMA Construction Daily Record of Inspection. Also make this record available at the HMA plant and job site each day.
2. HMA Inspection and Testing Summary. Include in the summary:
  - 2.1. Test forms with the testers' signatures and Quality Control Manager's initials.
  - 2.2. Inspection forms with the inspectors' signatures and Quality Control Manager's initials.
  - 2.3. A list and explanation of deviations from the specifications or regular practices.
  - 2.4. A signed statement by the Quality Control Manager that says:

"It is hereby certified that the information contained in this record is accurate, and that information, tests, or calculations documented herein comply with the specifications of the contract and the standards set forth in the testing procedures. Exceptions to this certification are documented as part of this record."

Retain for inspection the records generated as part of quality control including inspection, sampling, and testing for at least 3 years after final acceptance.

### 39-4.03F Statistical Evaluation

#### General

Determine a lot's composite quality factor,  $QF_C$ , and the individual quality factors,  $QF_{QC_i}$ . Perform statistical evaluation calculations to determine these quality factors based on quality control test results for:

1. Aggregate gradation
2. Asphalt binder content
3. Percent of maximum theoretical density

The Engineer grants a waiver and you must use 1.0 as the individual quality factor for percent of maximum theoretical density,  $QF_{QC5}$ , for HMA paved in:

1. Areas where the specified paved thickness is less than 0.15 foot
2. Areas where the specified paved thickness is less than 0.20 foot and a 3/4-inch grading is specified and used
3. Dig outs
4. Leveling courses
5. Areas where, in the opinion of the Engineer, compaction or compaction measurement by conventional methods is impeded

#### Statistical Evaluation Calculations

Use the Variability-Unknown / Standard Deviation Method to determine the percentage of a lot not in compliance with the specifications. The number of significant figures used in the calculations must comply with AASHTO R-11, Absolute Method.

Determine the percentage of work not in compliance with the specification limits for each quality characteristic as follows:

1. Calculate the arithmetic mean ( $\bar{X}$ ) of the test values

$$\bar{X} = \frac{\sum X}{n}$$

where:

$x$  = individual test values  
 $n$  = number of test values

2. Calculate the standard deviation

$$s = \sqrt{\frac{n(\sum x^2) - (\sum x)^2}{n(n-1)}}$$

where:

$\sum(x^2)$  = sum of the squares of individual test values  
 $(\sum x)^2$  = sum of the individual test values squared  
 $n$  = number of test values

3. Calculate the upper quality index ( $Qu$ )

$$Q_U = \frac{USL - \bar{X}}{s}$$

where:

USL = target value plus the production tolerance or upper specification limit  
 s = standard deviation  
 $\bar{X}$  = arithmetic mean

4. Calculate the lower quality index (QL);

$$Q_L = \frac{\bar{X} - LSL}{s}$$

where:

LSL = target value minus production tolerance or lower specification limit  
 s = standard deviation  
 $\bar{X}$  = arithmetic mean

5. From the table, Upper Quality Index  $Q_U$  or Lower Quality Index  $Q_L$ , of this Section 39-4.03F, "Statistical Evaluation", determine  $P_U$ ;

where:

$P_U$  = the estimated percentage of work outside the USL.  
 $P_U = 0$ , when USL is not specified.

6. From the table, Upper Quality Index  $Q_U$  or Lower Quality Index  $Q_L$ , of this Section 39-4.03F, "Statistical Evaluation," determine  $P_L$ ;

where:

$P_L$  = the estimated percentage of work outside the LSL.  
 $P_L = 0$ , when LSL is not specified.

7. Calculate the total estimated percentage of work outside the USL and LSL, percent defective

$$\text{Percent defective} = P_U + P_L$$

$P_U$  and  $P_L$  are determined from:

P <sub>U</sub> or P <sub>L</sub>	Upper Quality Index Q <sub>U</sub> or Lower Quality Index Q <sub>L</sub>												
	Sample Size (n)												
	5	6	7	8	9	10- 11	12- 14	15- 17	18- 22	23- 29	30- 42	43- 66	>66
0	1.72	1.88	1.99	2.07	2.13	2.20	2.28	2.34	2.39	2.44	2.48	2.51	2.56
1	1.64	1.75	1.82	1.88	1.91	1.96	2.01	2.04	2.07	2.09	2.12	2.14	2.16
2	1.58	1.66	1.72	1.75	1.78	1.81	1.84	1.87	1.89	1.91	1.93	1.94	1.95
3	1.52	1.59	1.63	1.66	1.68	1.71	1.73	1.75	1.76	1.78	1.79	1.80	1.81
4	1.47	1.52	1.56	1.58	1.60	1.62	1.64	1.65	1.66	1.67	1.68	1.69	1.70
5	1.42	1.47	1.49	1.51	1.52	1.54	1.55	1.56	1.57	1.58	1.59	1.59	1.60
6	1.38	1.41	1.43	1.45	1.46	1.47	1.48	1.49	1.50	1.50	1.51	1.51	1.52
7	1.33	1.36	1.38	1.39	1.40	1.41	1.41	1.42	1.43	1.43	1.44	1.44	1.44
8	1.29	1.31	1.33	1.33	1.34	1.35	1.35	1.36	1.36	1.37	1.37	1.37	1.38
9	1.25	1.27	1.28	1.28	1.29	1.29	1.30	1.30	1.30	1.31	1.31	1.31	1.31
10	1.21	1.23	1.23	1.24	1.24	1.24	1.25	1.25	1.25	1.25	1.25	1.26	1.26
11	1.18	1.18	1.19	1.19	1.19	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20
12	1.14	1.14	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
13	1.10	1.10	1.10	1.10	1.10	1.10	1.11	1.11	1.11	1.11	1.11	1.11	1.11
14	1.07	1.07	1.07	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06	1.06
15	1.03	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
16	1.00	0.99	0.99	0.99	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
17	0.97	0.96	0.95	0.95	0.95	0.95	0.94	0.94	0.94	0.94	0.94	0.94	0.94
18	0.93	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90
19	0.90	0.89	0.88	0.88	0.88	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
20	0.87	0.86	0.85	0.85	0.84	0.84	0.84	0.83	0.83	0.83	0.83	0.83	0.83
21	0.84	0.82	0.82	0.81	0.81	0.81	0.80	0.80	0.80	0.80	0.80	0.80	0.79
22	0.81	0.79	0.79	0.78	0.78	0.77	0.77	0.77	0.76	0.76	0.76	0.76	0.76
23	0.77	0.76	0.75	0.75	0.74	0.74	0.74	0.73	0.73	0.73	0.73	0.73	0.73
24	0.74	0.73	0.72	0.72	0.71	0.71	0.70	0.70	0.70	0.70	0.70	0.70	0.70
25	0.71	0.70	0.69	0.69	0.68	0.68	0.67	0.67	0.67	0.67	0.67	0.67	0.66
26	0.68	0.67	0.67	0.65	0.65	0.65	0.64	0.64	0.64	0.64	0.64	0.64	0.63
27	0.65	0.64	0.63	0.62	0.62	0.62	0.61	0.61	0.61	0.61	0.61	0.61	0.60
28	0.62	0.61	0.60	0.59	0.59	0.59	0.58	0.58	0.58	0.58	0.58	0.58	0.57
29	0.59	0.58	0.57	0.57	0.56	0.56	0.55	0.55	0.55	0.55	0.55	0.55	0.54
30	0.56	0.55	0.54	0.54	0.53	0.53	0.52	0.52	0.52	0.52	0.52	0.52	0.52
31	0.53	0.52	0.51	0.51	0.50	0.50	0.50	0.49	0.49	0.49	0.49	0.49	0.49
32	0.50	0.49	0.48	0.48	0.48	0.47	0.47	0.47	0.46	0.46	0.46	0.46	0.46
33	0.47	0.48	0.45	0.45	0.45	0.44	0.44	0.44	0.44	0.43	0.43	0.43	0.43
34	0.45	0.43	0.43	0.42	0.42	0.42	0.41	0.41	0.41	0.41	0.41	0.41	0.40
35	0.42	0.40	0.40	0.39	0.39	0.39	0.38	0.38	0.38	0.38	0.38	0.38	0.38
36	0.39	0.38	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
37	0.36	0.35	0.34	0.34	0.34	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.32
38	0.33	0.32	0.32	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.30	0.30
39	0.30	0.30	0.29	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
40	0.28	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
41	0.25	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
42	0.23	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
43	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
44	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
45	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
46	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
47	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
48	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
49	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

1. If the value of Q<sub>U</sub> or Q<sub>L</sub> does not correspond to a value in the table, use the next lower value.
2. If Q<sub>U</sub> or Q<sub>L</sub> are negative values, P<sub>U</sub> or P<sub>L</sub> is equal to 100 minus the table value for P<sub>U</sub> or P<sub>L</sub>.

### Quality Factor Determination

Determine individual quality factors,  $QF_{QC_i}$ , using percent defective =  $P_U + P_L$  and:

#### Quality Factors

Quality Factor	Maximum Allowable Percent Defective ( $P_U + P_L$ )												
	Sample Size (n)												
	5	6	7	8	9	10-11	12-14	15-17	18-22	23-29	30-42	43-66	>66
1.05			0	0	0	0	0	0	0	0	0	0	0
1.04			0	1	3	5	4	4	4	3	3	3	3
1.03		0	2	4	6	8	7	7	6	5	5	4	4
1.02		1	3	6	9	11	10	9	8	7	7	6	6
1.01	0	2	5	8	11	13	12	11	10	9	8	8	7
1.00	22	20	18	17	16	15	14	13	12	11	10	9	8
0.99	24	22	20	19	18	17	16	15	14	13	11	10	9
0.98	26	24	22	21	20	19	18	16	15	14	13	12	10
0.97	28	26	24	23	22	21	19	18	17	16	14	13	12
0.96	30	28	26	25	24	22	21	19	18	17	16	14	13
0.95	32	29	28	26	25	24	22	21	20	18	17	16	14
0.94	33	31	29	28	27	25	24	22	21	20	18	17	15
0.93	35	33	31	29	28	27	25	24	22	21	20	18	16
0.92	37	34	32	31	30	28	27	25	24	22	21	19	18
0.91	38	36	34	32	31	30	28	26	25	24	22	21	19
0.90	39	37	35	34	33	31	29	28	26	25	23	22	20
0.89	41	38	37	35	34	32	31	29	28	26	25	23	21
0.88	42	40	38	36	35	34	32	30	29	27	26	24	22
0.87	43	41	39	38	37	35	33	32	30	29	27	25	23
0.86	45	42	41	39	38	36	34	33	31	30	28	26	24
0.85	46	44	42	40	39	38	36	34	33	31	29	28	25
0.84	47	45	43	42	40	39	37	35	34	32	30	29	27
0.83	49	46	44	43	42	40	38	36	35	33	31	30	28
0.82	50	47	46	44	43	41	39	38	36	34	33	31	29
0.81	51	49	47	45	44	42	41	39	37	36	34	32	30
0.80	52	50	48	46	45	44	42	40	38	37	35	33	31
0.79	54	51	49	48	46	45	43	41	39	38	36	34	32
0.78	55	52	50	49	48	46	44	42	41	39	37	35	33
0.77	56	54	52	50	49	47	45	43	42	40	38	36	34
0.76	57	55	53	51	50	48	46	44	43	41	39	37	35
0.75	58	56	54	52	51	49	47	46	44	42	40	38	36
Reject	60	57	55	53	52	51	48	47	45	43	41	40	37
	61	58	56	55	53	52	50	48	46	44	43	41	38
	62	59	57	56	54	53	51	49	47	45	44	42	39
	63	61	58	57	55	54	52	50	48	47	45	43	40
	64	62	60	58	57	55	53	51	49	48	46	44	41

Reject Values Greater Than Those Shown Above

Notes:

- To obtain a quality factor when the estimated percent outside specification limits from table, "Upper Quality Index  $Q_U$  or Lower Quality Index  $Q_L$ ," does not correspond to a value in the table, use the next larger value.

Compute the composite of single quality factors,  $QF_C$ , for a lot using:

$$QF_C = \sum_{i=1}^5 w_i QF_{QC_i}$$

where:

- $QF_c$  = the composite quality factor for the lot rounded to 2 decimal places.  
 $QF_{Qi}$  = the quality factor for the individual quality characteristic.  
 $w$  = the weighting factor listed in the table HMA Acceptance – QC / QA.  
 $i$  = the quality characteristic index number in the table HMA Acceptance – QC / QA.

### 39-4.04 ENGINEER'S QUALITY ASSURANCE

#### 39-4.04A General

The Engineer assures quality by:

1. Reviewing mix designs and proposed JMF
2. Inspecting procedures
3. Conducting oversight of quality control inspection and records
4. Verification sampling and testing during production and paving

#### 39-4.04B Verification Sampling And Testing

##### General

The Engineer samples:

1. Aggregate to verify gradation
2. HMA to verify asphalt binder content

##### Verification

For aggregate gradation and asphalt binder content, the ratio of verification testing frequency to the minimum quality control testing frequency is 1:5. The Engineer performs at least 3 verification tests per lot.

Using the t-test, the Engineer compares quality control tests results for aggregate gradation and asphalt binder content with corresponding verification test results. The Engineer uses the average and standard deviation of up to 20 sequential sublots for the comparison. The Engineer uses production start-up evaluation tests to represent the first subplot. When there are less than 20 sequential sublots, the Engineer uses the maximum number of sequential sublots available. The 21st subplot becomes the 1st subplot ( $n = 1$ ) in the next lot.

The t-value for a group of test data is computed as follows:

$$t = \frac{|\bar{X}_c - \bar{X}_v|}{S_p \sqrt{\frac{1}{n_c} + \frac{1}{n_v}}} \quad \text{and} \quad S_p^2 = \frac{S_c^2(n_c - 1) + S_v^2(n_v - 1)}{n_c + n_v - 2}$$

where:

- $n_c$  = Number of quality control tests (2 minimum, 20 maximum).  
 $n_v$  = Number of verification tests (minimum of 1 required).  
 $\bar{X}_c$  = Mean of quality control tests.  
 $\bar{X}_v$  = Mean of verification tests.  
 $S_p$  = Pooled standard deviation (When  $n_v = 1$ ,  $S_p = S_c$ ).  
 $S_c$  = Standard deviation of quality control tests.  
 $S_v$  = Standard deviation of verification tests (when  $n_v > 1$ ).

The comparison of quality control test results and the verification test results is at a level of significance of  $\alpha = 0.025$ . The Engineer computes t and compares it to the critical t-value,  $t_{crit}$ , from:

**Critical T-Value**

Degrees of freedom ( $n_c+n_v-2$ )	$t_{crit}$ (for $\alpha = 0.025$ )	Degrees of freedom ( $n_c+n_v-2$ )	$t_{crit}$ (for $\alpha = 0.025$ )
1	24.452	18	2.445
2	6.205	19	2.433
3	4.177	20	2.423
4	3.495	21	2.414
5	3.163	22	2.405
6	2.969	23	2.398
7	2.841	24	2.391
8	2.752	25	2.385
9	2.685	26	2.379
10	2.634	27	2.373
11	2.593	28	2.368
12	2.560	29	2.364
13	2.533	30	2.360
14	2.510	40	2.329
15	2.490	60	2.299
16	2.473	120	2.270
17	2.458	$\infty$	2.241

If the t-value computed is less than or equal to  $t_{crit}$ , quality control test results are verified.

If the t-value computed is greater than  $t_{crit}$  and both  $\bar{X}_v$  and  $\bar{X}_c$  comply with acceptance specifications, the quality control tests are verified. You may continue to produce and place HMA with the following allowable differences:

1.  $|\bar{X}_v - \bar{X}_c| \leq 1.0$  percent for any grading
2.  $|\bar{X}_v - \bar{X}_c| \leq 0.1$  percent for asphalt binder content

If the t-value computed is greater than  $t_{crit}$  and the  $|\bar{X}_v - \bar{X}_c|$  for grading and asphalt binder content are greater than the allowable differences, quality control test results are not verified and:

1. The Engineer notifies you in writing.
2. You and the Engineer must investigate why the difference exist.
3. If the reason for the difference cannot be found and corrected, the Engineer's test results are used for acceptance and pay.

**39-4.05 ENGINEER'S ACCEPTANCE****39-4.05A Testing**

The Engineer samples for acceptance testing and tests for:

**HMA Acceptance – QC / QA**

Index (i)	Quality Characteristic				Weigh t-ing Factor (w)	Test Method	HMA Type		
							A	B	RHMA-G
	Aggregate gradation <sup>a</sup>					CT 202	JMF ± Tolerance <sup>c</sup>		
	Sieve	3/4"	1/2"	3/8"					
1	1/2"	X <sup>b</sup>	--	--	0.05				
1	3/8"	--	X	--	0.05				
1	No. 4	--	--	X	0.05				
2	No. 8	X	X	X	0.10				
3	No. 200	X	X	X	0.15				
4	Asphalt binder content (%)				0.30	CT 379 or 382	JMF ± 0.45	JMF ± 0.45	JMF ± 0.5
5	Percent of maximum theoretical density (%) <sup>d, e</sup>				0.40	CT 375	92 – 96	92 – 96	91 – 96
	Sand equivalent (min.) <sup>f</sup>					CT 217	47	42	47
	Stabilometer value (min.) <sup>f, g</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings					CT 366	30 37	30 35	-- 23
	Air voids content (%) <sup>f, h</sup>					CT 367	4 ± 2	4 ± 2	Specifica- tion ± 2
	Percent of crushed particles coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min) (Passing No. 4 sieve and retained on No. 8 sieve.) One fractured face					CT 205	90 70  70	25 --  20	-- 90  70
	HMA moisture content (% max.)					CT 226 or CT 370	1.0	1.0	1.0
	Los Angeles Rattler (% max.) Loss at 100 rev. Loss at 500 rev.					CT 211	12 45	-- 50	12 45
	Fine aggregate angularity (% min.)					AASHTO T 304, Method A	45	45	45
	Flat and elongated particle (% max. by weight @ 5:1)					ASTM D 4791	Report only	Report only	Report only
	Voids in mineral aggregate (% min.) <sup>i</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading					LP-2	17.0 15.0 14.0 13.0	17.0 15.0 14.0 13.0	(Note j) -- -- 18.0 - 23.0 18.0 - 23.0

	Voids filled with asphalt (%) <sup>1</sup> No. 4 grading 3/8" grading 1/2" grading 3/4" grading		LP-3	76.0 - 76.0 80.0 - 80.0 73.0 - 73.0 76.0 - 76.0 65.0 - 65.0 75.0 - 75.0 65.0 - 65.0 75.0 - 75.0		Report only
	Dust proportion <sup>1</sup> No. 4 and 3/8" gradings 1/2" and 3/4" gradings		LP-4	0.9 - 2.0 0.6 - 1.3	0.9 - 2.0 0.6 - 1.3	Report only
	Smoothness		Section 39-1.12	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>	12-foot straight-edge, must-grind, and Pl <sub>0</sub>
	Asphalt binder		Various	Section 92	Section 92	Section 92
	Asphalt rubber binder		Various	--	--	Section 92-1.02(C) and Section 39-1.02D
	Asphalt modifier		Various	--	--	Section 39-1.02D
	Crumb rubber modifier		Various	--	--	Section 39-1.02D

Notes:

<sup>a</sup> The Engineer determines combined aggregate gradations containing RAP under Laboratory Procedure LP-9.

<sup>b</sup> "X" denotes the sieves the Engineer considers for the specified aggregate gradation.

<sup>c</sup> The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

<sup>d</sup> The Engineer determines percent of maximum theoretical density if the specified paved thickness is at least 0.15 foot under California Test 375 except the Engineer uses:

1. California Test 308, Method A, to determine in-place density of each density core instead of using the nuclear gauge in Part 4, "Determining In-Place Density By The Nuclear Density Device."
2. California Test 309 to determine maximum theoretical density instead of calculating test maximum density in Part 5, "Determining Test Maximum Density."

<sup>e</sup> The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

<sup>f</sup> The Engineer reports the average of 3 tests from a single split sample.

<sup>g</sup> Modify California Test 304, Part 2.B.2.c: "After compaction in the mechanical compactor, cool to 140 °F ± 5 °F by allowing the briquettes to cool at room temperature for 0.5 hour, then place the briquettes in the oven at 140 °F for a minimum of 2 hours and not more than 3 hours."

<sup>h</sup> The Engineer determines the bulk specific gravity of each lab-compacted briquette under California Test 308, Method A, and theoretical maximum specific gravity under California Test 309.

<sup>1</sup> Report only if the adjustment for asphalt binder content target value is less than or equal to ± 0.3 percent from OBC.

<sup>1</sup> Voids in mineral aggregate for RHMA-G must be within this range.

The Engineer determines the percent of maximum theoretical density from the average density of 3 density cores you take from every 750 tons of production or part thereof divided by the maximum theoretical density.

If the specified total paved thickness is at least 0.15 foot and any layer is less than 0.15 foot, the Engineer determines the percent of maximum theoretical density from density cores taken from the final layer measured the full depth of the total paved HMA thickness.

The Engineer stops production and terminates a lot if:

1. The lot's composite quality factor,  $Q_{FC}$ , or an individual quality factor,  $Q_{FCi}$  for  $i = 3, 4, \text{ or } 5$ , is below 0.90 determined under Section 39-4.03F, "Statistical Evaluation"
2. An individual quality factor,  $Q_{FCi}$  for  $i = 1 \text{ or } 2$ , is below 0.75
3. Quality characteristics for which a quality factor,  $Q_{FCi}$ , is not determined has 2 consecutive acceptance or quality control tests not in compliance with the specifications

For any single quality characteristic for which a quality factor,  $Q_{FCi}$ , is not determined, except smoothness, if 2 consecutive acceptance test results do not comply with specifications:

1. Stop production.
2. Take corrective action.
3. In the Engineer's presence, take samples and split each sample into 4 parts. Test 1 part for compliance with the specifications and submit 3 parts to the Engineer. The Engineer tests 1 part for compliance with the specifications and reserves and stores 2 parts.
4. Demonstrate compliance with the specifications before resuming production and placement on the State highway.

#### **39-4.05B Statistical Evaluation, Determination Of Quality Factors And Acceptance**

##### **Statistical Evaluation and Determination of Quality Factors**

To determine the individual quality factor,  $Q_{FCi}$ , for any quality factor  $i = 1$  through 5 or a lot's composite quality factor,  $Q_{FC}$ , for acceptance and payment adjustment, the Engineer uses the evaluation specifications under Section 39-4.03F, "Statistical Evaluation," and:

1. Verified quality control test results for aggregate gradation
2. Verified quality control test results for asphalt binder content
3. The Engineer's test results for percent of maximum theoretical density

##### **Lot Acceptance Based on Quality Factors**

The Engineer accepts a lot based on the quality factors determined for aggregate gradation and asphalt binder content,  $Q_{FCi}$  for  $i = 1$  through 4, using the total number of verified quality control test result values and the total percent defective ( $P_U + P_L$ ).

The Engineer accepts a lot based on the quality factor determined for maximum theoretical density,  $Q_{FC5}$ , using the total number of test result values from density cores and the total percent defective ( $P_U + P_L$ ).

The Engineer calculates the quality factor for the lot,  $Q_{FC}$ , which is a composite of weighted individual quality factors,  $Q_{FCi}$ , determined for each quality characteristic in the HMA Acceptance – QC / QA table in Section 39-4.05A, "Testing."

The Engineer accepts a lot based on quality factors if:

1. The current composite quality factor,  $Q_{FC}$ , is 0.90 or greater
2. Each individual quality factor,  $Q_{FCi}$  for  $i = 3, 4, \text{ and } 5$ , is 0.90 or greater
3. Each individual quality factor,  $Q_{FCi}$  for  $i = 1 \text{ and } 2$ , is 0.75 or greater

No single quality characteristic test may represent more than the smaller of 750 tons or 1 day's production.

##### **Payment Adjustment**

If a lot is accepted, the Engineer adjusts payment with the following formula:

$$PA = \sum_{i=1}^n HMA CP * w_i * [QF_{QC_i} * (HMATT - WHMATT_i) + WHMATT_i] - (HMA CP * HMATT)$$

where:

PA =	Payment adjustment rounded to 2 decimal places.
HMA CP =	HMA contract price.
HMATT =	HMA total tons represented in the lot.
WHMATT <sub>i</sub> =	Total tons of waived quality characteristic HMA.
QF <sub>QC<sub>i</sub></sub> =	Running quality factor for the individual quality characteristic. QF <sub>QC<sub>i</sub></sub> for i = 1 through 4 must be from verified Contractor's QC results. QF <sub>QC<sub>5</sub></sub> must be determined from the Engineer's results on density cores taken for percent of maximum theoretical density determination.
w =	Weighting factor listed in the HMA acceptance table.
i =	Quality characteristic index number in the HMA acceptance table.

If the payment adjustment is a negative value, the Engineer deducts this amount from payment. If the payment adjustment is a positive value, the Engineer adds this amount to payment. The 21st subplot becomes the 1st subplot (n = 1) in the next lot. When the 21st sequential subplot becomes the 1st subplot, the previous 20 sequential sublots become a lot for which the Engineer determines a quality factor. The Engineer uses this quality factor to pay for the HMA in the lot. If the next lot consists of less than 8 sublots, these sublots must be added to the previous lot for quality factor determination using 21 to 27 sublots.

### 39-4.05C Dispute Resolution

For a lot, if you or the Engineer dispute any quality factor, QF<sub>QC<sub>i</sub></sub>, or verification test result, every subplot in that lot must be retested.

Referee tests must be performed under the specifications for acceptance testing.

Any quality factor, QF<sub>QC<sub>i</sub></sub>, must be determined using the referee tests.

For any quality factor, QF<sub>QC<sub>i</sub></sub>, for i = 1 through 5, dispute resolution:

1. If the difference between the quality factors for QF<sub>QC<sub>i</sub></sub> using the referee test result and the disputed test result is less than or equal to 0.01, the original test result is correct.
2. If the difference between the quality factor for QF<sub>QC<sub>i</sub></sub> using the referee test result and the disputed test result is more than 0.01, the quality factor determined from the referee tests supersedes the previously determined quality factor.

## 39-5 MEASUREMENT AND PAYMENT

### 39-5.01 MEASUREMENT

The contract item for HMA is measured by weight. The weight of each HMA mixture designated in the Engineer's Estimate must be the combined mixture weight.

If tack coat, asphalt binder, and asphaltic emulsion are paid with separate contract items, their contract items are measured under Section 92, "Asphalts," or Section 94, "Asphaltic Emulsions," as the case may be.

If recorded batch weights are printed automatically, the contract item for HMA is measured by using the printed batch weights, provided:

1. Total aggregate and supplemental fine aggregate weight per batch is printed. If supplemental fine aggregate is weighed cumulatively with the aggregate, the total aggregate batch weight must include the supplemental fine aggregate weight.
2. Total asphalt binder weight per batch is printed.
3. Each truckload's zero tolerance weight is printed before weighing the first batch and after weighing the last batch.
4. Time, date, mix number, load number and truck identification is correlated with a load slip.
5. A copy of the recorded batch weights is certified by a licensed weighmaster and submitted to the Engineer.

The contract item for placing HMA dike is measured by the linear foot along the completed length. The contract item for placing HMA in miscellaneous areas is measured as the in-place compacted area in square yards. In addition to the quantities measured on a linear foot or square yard basis, the HMA for dike and miscellaneous areas are measured by weight.

The contract item for geosynthetic pavement interlayer is measured by the square yard for the actual pavement area covered.

### **39-5.02 PAYMENT**

The contract prices paid per ton for hot mix asphalt as designated in the Engineer's Estimate include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in constructing hot mix asphalt, complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer. If HMA is specified to comply with Section 39-4, "Quality Control / Quality Assurance," the Engineer adjusts payment under that section. Full compensation for the Quality Control Plan and prepaving conference is included in the contract prices paid per ton for hot mix asphalt as designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Full compensation for performing and submitting mix designs and for Contractor sampling, testing, inspection, testing facilities, and preparation and submittal of results is included in the contract prices paid per ton for HMA as designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

Full compensation for reclaimed asphalt pavement is included in the contract prices paid per ton for HMA as designated in the Engineer's Estimate and no additional compensation will be allowed therefor.

The contract price paid per ton for hot mix asphalt (leveling) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in hot mix asphalt (leveling), complete in place, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The State pays for HMA dike at the contract price per linear foot for place HMA dike and by the ton for HMA. The contract prices paid per linear foot for place hot mix asphalt dike as designated in the Engineer's Estimate include full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in placing HMA dike, complete in place, including excavation, backfill, and preparation of the area to receive the dike, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The State pays for HMA specified to be a miscellaneous area at the contract price per square yard for place hot mix asphalt (miscellaneous area) and per ton for hot mix asphalt. The contract price paid per square yard for place hot mix asphalt (miscellaneous area) includes full compensation for furnishing all labor, tools, equipment, and incidentals, and for doing all the work involved in placing HMA (miscellaneous area) complete in place, including excavation, backfill, and preparation of the area to receive HMA (miscellaneous area), as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

If the Quality Control / Quality Assurance construction process is specified, HMA placed in dikes and miscellaneous areas is paid for at the contract price per ton for hot mix asphalt under Section 39-4, "Quality Control / Quality Assurance." Section 39-4.05B, "Statistical Evaluation, Determination of Quality Factors and Acceptance," does not apply to HMA placed in dikes and miscellaneous areas.

If there are no contract items for place hot mix asphalt dike and place hot mix asphalt (miscellaneous area) and the work is specified, full compensation for constructing HMA dikes and HMA (miscellaneous areas) including excavation, backfill, and preparation of the area to receive HMA dike or HMA (miscellaneous area) is included in the contract price paid per ton for the hot mix asphalt designated in the Engineer's Estimate and no separate payment will be made therefor.

The contract price paid per square yard for geosynthetic pavement interlayer includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing geosynthetic pavement interlayer, complete in place, 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 ton for paving asphalt (binder, geosynthetic pavement interlayer) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying paving asphalt (binder, geosynthetic pavement interlayer), complete in place, including spreading sand to cover exposed binder material, as shown on the plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

Full compensation for small quantities of HMA placed on geosynthetic pavement interlayer to prevent displacement during construction is included in the contract price paid per ton for the HMA being paved over the interlayer and no separate payment will be made therefor.

The contract price paid per ton for tack coat includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying tack coat, complete in place, as shown on the

plans, as specified in these specifications and the special provisions, and as directed by the Engineer.

The Engineer does not adjust payment for increases or decreases in the quantities for tack coat, regardless of the reason for the increase or decrease. Section 4-1.03B, "Increased or Decreased Quantities," does not apply to the items for tack coat.

Full compensation for performing smoothness testing, submitting written and electronic copies of tests, and performing corrective work including applying fog seal coat is included in the contract price paid per ton for the HMA designated in the Engineer's Estimate and no separate payment will be made therefor.

Full compensation for spreading sand on RHMA-G, RHMA-O, and RHMA-O-HB surfaces and for sweeping and removing excess sand is included in the contract price paid per ton for rubberized hot mix asphalt as designated in the Engineer's Estimate and no separate payment will be made therefor.

If the Engineer fails to comply with a specification within a specified time, and if, in the opinion of the Engineer, work completion is delayed because of the failure, the Engineer adjusts payment and contract time under Section 8-1.09, "Right of Way Delays."

If the dispute resolution ITP determines the Engineer's test results are correct, the Engineer deducts the ITP's testing costs from payments. If the ITP determines your test results are correct, the State pays the ITP's testing costs.

If, in the Engineer's opinion, work completion is delayed because of incorrect Engineer test results, the Engineer adjusts payment and contract time under Section 8-1.09, "Right of Way Delays."

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## **SECTION 51 CONCRETE STRUCTURES**

**(Issued 07-30-10)**

**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 51-1.06C 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 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
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**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:

<b>HMWM Resin</b>		
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 52-1.08C(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 59 PAINTING  
(Issued 06-05-09)**

**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 59-2.01 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 Qualification Procedure No. 3, "Standard Procedure For Evaluating Qualifications of Shop Painting Applicators" (SSPC QP 3, Enclosed Shop Facility). The AISC's Sophisticated Paint Endorsement (SPE) quality program, Certification P-1 Enclosed, will be considered equivalent to SSPC QP 3, Enclosed Shop Facility.

**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.

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**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.

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**SECTION 73 CONCRETE CURBS AND SIDEWALKS  
(Issued 06-05-09)**

**In Section 73-1.01 in the 2nd paragraph, replace item 2 with:**

2. Minor concrete shall contain not less than 463 pounds of cementitious material per cubic yard except that when extruded or slip-formed curbs are constructed using 3/8-inch maximum size aggregate, minor concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

**In Section 73-1.06 replace the 15th paragraph with:**

Where hot mix asphalt or portland cement concrete pavements are to be placed around or adjacent to manholes, pipe inlets or other miscellaneous structures in sidewalk, gutter depression, island paving, curb ramps or driveway areas, the structures shall not be constructed to final grade until after the pavements have been constructed for a reasonable distance on each side of the structures.

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**SECTION 80 FENCES  
(Issued 01-05-07)**

**In Section 80-3.01F replace the 4th paragraph with:**

Portland cement concrete for metal post and brace footings and for deadmen shall be 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.

**In Section 80-4.01C replace the 4th paragraph with:**

Portland cement concrete for metal post and for deadmen 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.

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**SECTION 85 PAVEMENT MARKERS  
(Issued 07-31-07)**

**In Section 85-1.06 replace the 6th paragraph with:**

Pavement markers shall not be placed on new hot mix asphalt surfacing or seal coat until the surfacing or seal coat has been opened to public traffic for a period of not less than 7 days when hot melt bituminous adhesive is used, and not less than 14 days when epoxy adhesive is used.

**In Section 85-1.06 in the 14th paragraph, replace the 2nd sentence with:**

Cleaning shall be done by blast cleaning on all surfaces regardless of age or type, except that blast cleaning of clean, new hot mix asphalt and clean, new seal coat surfaces will not be required when hot melt bituminous adhesive is used.

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**SECTION 90 PORTLAND CEMENT CONCRETE  
(Issued 11-30-10)**

**Replace Section 90 with:**

**SECTION 90 PORTLAND CEMENT CONCRETE**

**90-1 GENERAL**

**90-1.01 DESCRIPTION**

Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

The Contractor shall determine the mix proportions for concrete in conformance with these specifications. Minor concrete shall contain not less than 505 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content (Pounds/CY)
Concrete designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min., 800 max.
Roof sections of exposed top box culverts	675 min., 800 max.
Other portions of structures	590 min., 800 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min.
Roof sections of exposed top box culverts	675 min.
Prestressed members	675 min.
Seal courses	675 min.
Other portions of structures	590 min.
Concrete for precast members	590 min., 925 max.

Except for minor structures, the minimum required compressive strength for concrete in structures or portions of structures shall be the strength specified, or 3600 pounds per square inch at 28 days, whichever is greater.

Except for when a modulus of rupture is specified, the minimum required compressive strength for concrete shall be the strength specified, or 2,500 pounds per square inch, whichever is greater. Concrete shall be proportioned such that the concrete will attain the minimum required compressive strength.

If the specified 28-day compressive strength is 3,600 pounds per square inch or greater, the concrete is designated by compressive strength. For concrete with a 28-day compressive strength greater than 3,600 pounds per square inch, 42 days will be allowed to obtain the specified strength.

For concrete not designated by compressive strength, the Engineer may test the concrete for compressive strength. The concrete will be accepted if the compressive strength at 28 days attains 85 percent or more of the minimum required compressive strength.

Concrete shall be proportioned to conform to the following shrinkage limitations when tested in conformance with the requirements of AASHTO Designation: T 160, modified as follows:

Condition	Maximum Shrinkage of Laboratory Cast Specimens at 28 days Drying (average of 3, %)
Paving and approach slab concrete	0.050
Bridge deck concrete	0.045

Note: Shrinkage requirement is waived for concrete that is used for precast elements.

Shrinkage tests shall be either:

- A. Performed by a laboratory accredited to perform AASHTO Designation: T 160, or
- B. Performed by a laboratory that maintains a current rating of 3 or better for the Cement and Concrete Reference Laboratory (CCRL) concrete proficiency sample program.

Laboratory cast specimens shall have a 4" x 4" cross section. Specimens shall be removed from the molds  $23 \pm 1$  hours after mixing the concrete and placed in lime water at  $73 \pm 3$  °F to 7 days age. A comparator reading shall be taken at 7 days age and recorded as the initial reading. Specimens then shall be stored in a humidity controlled room maintained at  $73 \pm 3$  °F and  $50 \pm 4$  percent relative humidity for the remainder of the test. Subsequent readings shall be taken at 7, 14, 21, and 28 days drying. Test data verifying conformance to the shrinkage limitations shall be submitted with the mix design. Shrinkage testing data accepted by the Engineer no more than 3 years prior to the first working day of this contract will be acceptable for this entire contract, provided the data was for concrete with similar proportions and the same materials and material sources to be used on this contract. Concrete shall be considered to have similar proportions if, when compared to concrete to be used on this project, no more than 2 mix design elements are varied. Varied mix design elements shall fall within the tolerances in the following table:

Mix Design Element	Tolerance ( $\pm$ )
Water to cementitious material ratio	0.03
Total water content	5 %
Coarse aggregate (weight per cubic yard)	10 %
Fine aggregate (weight per cubic yard)	10 %
Supplementary cementitious material content	5 %
Admixture (as originally dosed)	25 %

Note: Admixtures must be of the same brand.

Before using concrete or in advance of revising the mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, supplementary cementitious material (SCM) shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

If any concrete has a cementitious material, portland cement, or SCM content that is less than the minimum required, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State \$0.25 for each pound of cementitious material, portland cement, or SCM that is less than the minimum required. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions will be made based on the results of California Test 518.

The requirements of the preceding paragraph shall not apply to minor concrete.

## 90-2 MATERIALS

### 90-2.01 CEMENTITIOUS MATERIALS

Unless otherwise specified, cementitious material shall be either a combination of Type II or Type V portland cement and SCM, or a blended cement. No cementitious material shall be used in the work unless it is on the Department's Pre-Qualified Products List at the time of mix design submittal.

Information regarding cementitious material qualification and placement on the Department's approved list can be obtained at the Transportation Laboratory.

Cementitious materials used in cast-in-place concrete for exposed surfaces of like elements of a structure shall be from the same sources and of the same proportions.

Cementitious materials shall be protected from moisture until used. Sacked cementitious materials shall be piled to permit access for tallying, inspecting, and identifying each shipment.

Facilities shall be provided to ensure that the various cementitious materials meeting this Section 90-2.01 are kept separate from each other and from other cementitious materials. A storage silo containing a cementitious material shall be emptied before using that silo for a different cementitious material. Blended cements with a percentage of SCM differing by more than 2 percentage points are considered different cementitious materials. Sampling cementitious materials shall be in conformance with California Test 125.

The Contractor shall furnish a Certificate of Compliance for cementitious materials in conformance with the provisions in Section 6-1.07, "Certificates of Compliance." The Certificate of Compliance shall indicate the source by name and location (including country, state, and city). If cementitious material is delivered directly to the job site, the Certificate of Compliance shall be signed by the cementitious material supplier. If the cementitious material is used in ready-mixed concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product. If blended cement is used, the Certificate of Compliance shall include a statement signed by the blended cement supplier that indicates the actual percentage, by weight, of SCM in the blend. Weight of SCM shall be by weighing device conforming to Section 9-1.01, "Measurement of Quantities," or as determined by chemical analysis.

**90-2.01A Cement**

Portland cement shall conform to the requirements in ASTM Designation: C 150 except the C<sub>3</sub>S content of Type II cement shall not exceed 65 percent.

Blended cement shall conform to the requirements for Portland Blast-Furnace Slag Cement, Type IS (MS) or Portland-Pozzolan Cement, Type IP (MS) in AASHTO Designation: M 240, except that the maximum limits on the pozzolan content shall not apply. Blended cement shall be comprised of Type II or Type V cement and SCM produced either by intergrinding portland cement clinker and SCM, by blending portland cement and either finely ground granulated blast furnace slag or finely divided pozzolan, or a combination of intergrinding and blending.

In addition, Type II portland cement and Type V portland cement shall conform to the following requirements:

- A. The cement shall not contain more than 0.60-percent by mass of alkalis, calculated as the percentage of Na<sub>2</sub>O plus 0.658 times the percentage of K<sub>2</sub>O, when determined by methods as required in AASHTO Designation: T 105; and
- B. The autoclave expansion shall not exceed 0.50-percent

Type III portland cement shall be used only as specified or with the approval of the Engineer. Type III portland cement shall conform to the additional requirements listed above for Type II portland cement. The Contractor may use Type III portland cement in the manufacturing of precast concrete.

**90-2.01B Supplementary Cementitious Materials**

Each supplementary cementitious material shall conform to one of the following:

- A. Fly ash conforming to the requirements in AASHTO Designation: M 295, Class F, and these specifications. The available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 311 or the total alkali, as sodium oxide equivalent, shall not exceed 5.0 percent when determined in conformance with the requirements in AASHTO Designation: T 105.
- B. Ultra fine fly ash (UFFA) conforming to the requirements in AASHTO Designation: M 295, Class F, and the following chemical and physical requirements:

Chemical Requirements	Percent
Sulfur Trioxide (SO <sub>3</sub> )	1.5 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na <sub>2</sub> O) equivalent	1.5 max.

Physical Requirements	Percent
Particle size distribution	
Less than 3.5 microns	50
Less than 9.0 microns	90
Strength Activity Index with portland cement	
7 days	95 (minimum % of control)
28 days	110 (minimum % of control)
Expansion at 16 days when testing job materials in conformance with ASTM C 1567*	0.10 max.

\* In the test mix, Type II or Type V portland cement shall be replaced with at least 12% UFFA by weight.

- C. Raw or calcined natural pozzolans conforming to the requirements in AASHTO Designation: M 295, Class N. and the following requirements and these specifications. The available alkali, as sodium oxide equivalent, shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 311 or the total alkali, as sodium oxide equivalent, shall not exceed 5.0 percent when determined in conformance with the requirements in AASHTO Designation: T 105.
- D. Metakaolin conforming to the requirements in AASHTO Designation: M 295, Class N, and the following chemical and physical requirements:

Chemical Requirements	Percent
Silicon Dioxide (SiO <sub>2</sub> ) + Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> )	92.0 min.
Calcium Oxide (CaO)	1.0 max
Sulfur Trioxide (SO <sub>3</sub> )	1.0 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na <sub>2</sub> O) equivalent	1.0 max.

Physical Requirements	Percent
Particle size distribution	95
Less than 45 microns	
Strength Activity Index with portland cement	
7 days	100 (minimum % of control)
28 days	100 (minimum % of control)

- E. Ground Granulated Blast Furnace Slag (GGBFS) conforming to the requirements in AASHTO Designation: M 302, Grade 100 or Grade 120.
- F. Silica Fume conforming to the requirements of AASHTO Designation: M 307, with reduction in mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

Commingling of fly ash from different sources at uncontrolled ratios is permissible only if the following criteria are satisfied:

- A. Sources of fly ash to be commingled shall each produce fly ash that conforms to the requirements in AASHTO Designation: M 295, Class F.
- B. Testing of the commingled product is the responsibility of the fly ash supplier.
- C. Each fly ash's running average of relative density shall not differ from any other by more than 0.25 pound per cubic inch at the time of commingling.
- D. Each fly ash's running average of loss on ignition shall not differ from any other by more than one percent at the time of commingling.
- E. The final product of commingled fly ash shall conform to the requirements in AASHTO Designation: M 295, Class F.

### 90-2.01C Required Use Of Supplementary Cementitious Materials

#### General

The amount of portland cement and SCM used in portland cement concrete shall conform to the minimum cementitious material content provisions in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and these specifications.

The SCM content in portland cement concrete shall conform to one of the following:

- A. Any combination of portland cement and at least one SCM, satisfying Equations (1) and (2):

Equation (1)

$$\frac{(25 \times UF) + (12 \times FA) + (10 \times FB) + (6 \times SL)}{MC} \geq X$$

Where:

- UF = Silica fume, metakaolin, or UFFA, including the amount in blended cement, pounds per cubic yard.  
FA = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N with a CaO content up to 10 percent, including the amount in blended cement, pounds per cubic yard.  
FB = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N with a CaO content up to 15 percent, including the amount in blended cement, pounds per cubic yard.  
SL = GGBFS, including the amount in blended cement, pounds per cubic yard.  
MC = Minimum amount of cementitious material specified, pounds per cubic yard.  
X = 1.8 for innocuous aggregate, 3.0 for all other aggregate.

Equation (2)

$$MC - MSCM - PC \geq 0$$

Where:

- MC = Minimum amount of cementitious material specified, pounds per cubic yard.  
MSCM = The minimum sum of SCMs that satisfies Equation (1) above, pounds per cubic yard.  
PC = The amount of portland cement, including the amount in blended cement, pounds per cubic yard.

- B. 15 percent of Class F fly ash with at least 48 ounces of LiNO<sub>3</sub> solution added per 100 pounds of portland cement. CaO content of the fly ash shall not exceed 15 percent.

### **Precast Concrete**

The SCM content in precast portland cement concrete shall conform to one of the following:

- A. Any combination of portland cement and SCM, satisfying the following equation:

Equation (3)

$$\frac{(25 \times UF) + (12 \times FA) + (10 \times FB) + (6 \times SL)}{TC} \geq X$$

Where:

- UF = Silica fume, metakaolin, or UFFA, including the amount in blended cement, pounds per cubic yard.  
FA = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N with a CaO content up to 10 percent, including the amount in blended cement, pounds per cubic yard.  
FB = Fly ash or natural pozzolan conforming to the requirements in AASHTO Designation: M 295, Class F or N with a CaO content up to 15 percent, including the amount in blended cement, pounds per cubic yard.  
SL = GGBFS, including the amount in blended cement, pounds per cubic yard.

- TC = Total amount of cementitious material used in the mix, pounds per cubic yard.
- X = 0.0 if precast members are constructed with portland cement concrete using aggregate that is "innocuous" in conformance with the provisions in Section 90-2.02, "Aggregates."
- X = 3.0 for all other aggregate.

- B. 15 percent of Class F fly ash with at least 48 ounces of LiNO<sub>3</sub> solution added per 100 pounds of portland cement. CaO content of the fly ash shall not exceed 15 percent.
- C. Any combination of supplementary cementitious material and portland cement may be used if the expansion of cementitious material and aggregate does not exceed 0.10 percent when tested in conformance with the requirements in ASTM C 1567. Test data shall be submitted with each mix design. Test data accepted by the Engineer no more than 3 years prior to the first working day of this contract will be acceptable for this entire contract, provided the data was for the same concrete mix and the same materials and material sources to be used on this contract.

## 90-2.02 AGGREGATES

To be considered innocuous, aggregate must be on the Department's approved list, "Innocuous Aggregates for use in Concrete." Information regarding aggregate qualification and placement on the Department's approved list can be obtained at the Transportation Laboratory.

Both coarse and fine aggregate must be on the approved list for the aggregate used in concrete to be considered innocuous.

Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

The Contractor shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates, in conformance with California Test 125.

Aggregates shall be of such character that it will be possible to produce workable concrete within the limits of water content provided in Section 90-6.06, "Amount of Water and Penetration."

Aggregates shall have not more than 10 percent loss when tested for soundness in conformance with the requirements in California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index, D<sub>f</sub>, of the fine aggregate is 60 or greater when tested for durability in conformance with California Test 229.

If the results of any one or more of the Cleanness Value, Sand Equivalent, or aggregate grading tests do not meet the requirements specified for "Operating Range" but all meet the "Contract Compliance" requirements, the placement of concrete shall be suspended at the completion of the current pour until tests or other information indicate that the next material to be used in the work will comply with the requirements specified for "Operating Range."

If the results of either or both the Cleanness Value and coarse aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete that is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$3.50 per cubic yard for paving concrete and \$5.50 per cubic yard for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

If the results of either or both the Sand Equivalent and fine aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete which is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State \$3.50 per cubic yard for paving concrete and \$5.50 per cubic yard for all other concrete for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

The 2 preceding paragraphs apply individually to the "Contract Compliance" requirements for coarse aggregate and fine aggregate. When both coarse aggregate and fine aggregate do not conform to the "Contract Compliance" requirements, both paragraphs shall apply. The payments specified in those paragraphs are in addition to any payments made in conformance with the provisions in Section 90-1.01, "Description."

No single Cleanness Value, Sand Equivalent, or aggregate grading test shall represent more than 300 cubic yards of concrete or one day's pour, whichever is smaller.

When the source of an aggregate is changed, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using the aggregates.

**90-2.02A Coarse Aggregate**

Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, reclaimed aggregate, crushed air-cooled iron blast furnace slag or combinations thereof. Crushed air-cooled blast furnace slag shall not be used in reinforced or prestressed concrete.

Reclaimed aggregate is aggregate that has been recovered from plastic concrete by washing away the cementitious material. Reclaimed aggregate shall conform to all aggregate requirements.

Coarse aggregate shall conform to the following quality requirements:

Tests	California Test	Requirements
Loss in Los Angeles Rattler (after 500 revolutions)	211	45% max.
Cleanness Value		
Operating Range	227	75 min.
Contract Compliance	227	71 min.

In lieu of the above Cleanness Value requirements, a Cleanness Value "Operating Range" limit of 71, minimum, and a Cleanness Value "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the coarse aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

- A. Coarse aggregate sampled at the completion of processing at the aggregate production plant had a Cleanness Value of not less than 82 when tested in conformance with the requirements in California Test 227; and
- B. Prequalification tests performed in conformance with the requirements in California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

**90-2.02B Fine Aggregate**

Fine aggregate shall consist of natural sand, manufactured sand produced from larger aggregate or a combination thereof. Manufactured sand shall be well graded.

Fine aggregate shall conform to the following quality requirements:

Test	California Test	Requirements
Organic Impurities	213	Satisfactory <sup>a</sup>
Sand Equivalent:		
Operating Range	217	75, min.
Contract Compliance	217	71, min.

<sup>a</sup> Fine aggregate developing a color darker than the reference standard color may be accepted if 95% relative mortar strength is achieved when tested in conformance with ASTM C87.

In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71, minimum, and a Sand Equivalent "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

- A. Fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and
- B. Prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

**90-2.03 WATER**

In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO<sub>4</sub>,

when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO<sub>4</sub>, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266 or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent, when tested in conformance with the requirements in ASTM Designation: C 109, when compared to the results obtained with distilled water or deionized water, tested in conformance with the requirements in ASTM Designation: C 109.

In nonreinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1,500 parts per million of sulfates as SO<sub>4</sub>, when tested in conformance with California Test 417.

In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis (Na<sub>2</sub>O + 0.658 K<sub>2</sub>O) as determined on the filtrate. The specific gravity of the water shall not exceed 1.03 and shall not vary more than ±0.010 during a day's operations.

#### **90-2.04 Admixture Materials**

Admixture materials shall be stored and dispersed in liquid form and conform to the following requirements:

- A. Chemical Admixtures—ASTM Designation: C 494.
- B. Air-entraining Admixtures—ASTM Designation: C 260.
- C. Lithium Nitrate shall be in an aqueous solution conforming to the following:
  - 1. Lithium Nitrate (LiNO<sub>3</sub>) must be 30 percent +/- 0.5 percent by weight
  - 2. Sulfate (SO<sub>4</sub>) must be less than 1000 ppm
  - 3. Chloride (Cl) must be less than 1000 ppm
  - 4. Alkalis (Na<sub>2</sub>O + 0.658 K<sub>2</sub>O) must be less than 1000 ppm

### **90-3 AGGREGATE GRADINGS**

#### **90-3.01 GENERAL**

Before beginning concrete work, the Contractor shall submit in writing to the Engineer the gradation of the primary aggregate nominal sizes that the Contractor proposes to furnish. If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, the proposed gradation shall consist of the gradation for each individual size, and the proposed proportions of each individual size, combined mathematically to indicate one proposed gradation. The proposed gradation shall meet the grading requirements shown in the table in this section, and shall show the percentage passing each of the sieve sizes used in determining the end result.

The Engineer may waive, in writing, the gradation requirements in this Section 90-3.01 and in Sections 90-3.02, "Coarse Aggregate Grading," 90-3.03, "Fine Aggregate Grading," and 90-3.04, "Combined Aggregate Gradings," if, in the Engineer's opinion, furnishing the gradation is not necessary for the type or amount of concrete work to be constructed.

Gradations proposed by the Contractor shall be within the following percentage passing limits:

Primary Aggregate Nominal Size	Sieve Size	Limits of Proposed Gradation
1-1/2" x 3/4"	1"	19 - 41
1" x No. 4	3/4"	52 - 85
1" x No. 4	3/8"	15 - 38
1/2" x No. 4	3/8"	40 - 78
3/8" x No. 8	3/8"	50 - 85
Fine Aggregate	No. 16	55 - 75
Fine Aggregate	No. 30	34 - 46
Fine Aggregate	No. 50	16 - 29

Should the Contractor change the source of supply, the Contractor shall submit in writing to the Engineer the new gradations before their intended use.

### 90-3.02 COARSE AGGREGATE GRADING

The grading requirements for coarse aggregates are shown in the following table for each size of coarse aggregate:

Sieve Sizes	Percentage Passing Primary Aggregate Nominal Sizes							
	1-1/2" x 3/4"		1" x No. 4		1/2" x No. 4		3/8" x No. 8	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance	Operating Range	Contract Compliance
2"	100	100	—	—	—	—	—	—
1-1/2"	88 - 100	85 - 100	100	100	—	—	—	—
1"	X ±18	X ±25	88 - 100	86 - 100	—	—	—	—
3/4"	0 - 17	0 - 20	X ±15	X ±22	100	100	—	—
1/2"	—	—	—	—	82 - 100	80 - 100	100	100
3/8"	0 - 7	0 - 9	X ±15	X ±22	X ±15	X ±22	X ±15	X ±20
No. 4	—	—	0 - 16	0 - 18	0 - 15	0 - 18	0 - 25	0 - 28
No. 8	—	—	0 - 6	0 - 7	0 - 6	0 - 7	0 - 6	0 - 7

In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."

Coarse aggregate for the 1-1/2 inch, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," shall be furnished in 2 or more primary aggregate nominal sizes. Each primary aggregate nominal size may be separated into 2 sizes and stored separately, provided that the combined material conforms to the grading requirements for that particular primary aggregate nominal size.

When the one inch, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," is to be used, the coarse aggregate may be separated into 2 sizes and stored separately, provided that the combined material shall conform to the grading requirements for the 1" x No. 4 primary aggregate nominal size.

### 90-3.03 FINE AGGREGATE GRADING

Fine aggregate shall be graded within the following limits:

Sieve Sizes	Percentage Passing	
	Operating Range	Contract Compliance
3/8"	100	100
No. 4	95 - 100	93 - 100
No. 8	65 - 95	61 - 99
No. 16	X ±10	X ±13
No. 30	X ±9	X ±12
No. 50	X ±6	X ±9
No. 100	2 - 12	1 - 15
No. 200	0 - 8	0 - 10

In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."

In addition to the above required grading analysis, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the No. 16 sieve and the total percentage passing the No. 30 sieve shall be between 10 and 40, and the difference between the percentage passing the No. 30 and No. 50 sieves shall be between 10 and 40.

Fine aggregate may be separated into 2 or more sizes and stored separately, provided that the combined material conforms to the grading requirements specified in this Section 90-3.03.

#### 90-3.04 COMBINED AGGREGATE GRADINGS

Combined aggregate grading limits shall be used only for the design of concrete mixes. Concrete mixes shall be designed so that aggregates are combined in proportions that shall produce a mixture within the grading limits for combined aggregates as specified herein.

The combined aggregate grading, except when otherwise specified in these specifications or the special provisions, shall be either the 1-1/2 inch, maximum grading, or the 1 inch, maximum grading, at the option of the Contractor.

Grading Limits of Combined Aggregates

Sieve Sizes	Percentage Passing			
	1-1/2" Max.	1" Max.	1/2" Max.	3/8" Max.
2"	100	—	—	—
1-1/2"	90 - 100	100	—	—
1"	50 - 86	90 - 100	—	—
3/4"	45 - 75	55 - 100	100	—
1/2"	—	—	90 - 100	100
3/8"	38 - 55	45 - 75	55 - 86	50 - 100
No. 4	30 - 45	35 - 60	45 - 63	45 - 63
No. 8	23 - 38	27 - 45	35 - 49	35 - 49
No. 16	17 - 33	20 - 35	25 - 37	25 - 37
No. 30	10 - 22	12 - 25	15 - 25	15 - 25
No. 50	4 - 10	5 - 15	5 - 15	5 - 15
No. 100	1 - 6	1 - 8	1 - 8	1 - 8
No. 200	0 - 3	0 - 4	0 - 4	0 - 4

Changes from one grading to another shall not be made during the progress of the work unless permitted by the Engineer.

### 90-4 ADMIXTURES

#### 90-4.01 GENERAL

Admixtures used in portland cement concrete shall conform to and be used in conformance with the provisions in this Section 90-4 and the special provisions. Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option as provided herein.

Chemical admixtures and air-entraining admixtures containing chlorides as Cl in excess of one percent by weight of admixture, as determined by California Test 415, shall not be used.

Admixtures shall be uniform in properties throughout their use in the work. Should it be found that an admixture as furnished is not uniform in properties, its use shall be discontinued.

If more than one admixture is used, the admixtures shall be compatible with each other so that the desirable effects of all admixtures used will be realized.

Chemical admixtures shall be used in conformance with the manufacturer's written recommendations.

The manufacturer's written recommendations shall include a statement that the admixtures are compatible with the types and amounts of SCMs used.

#### 90-4.02 MATERIALS

Admixture materials shall conform to the provisions in Section 90-2.04, "Admixture Materials."

#### **90-4.03 ADMIXTURE APPROVAL**

No admixture brand shall be used in the work unless it is on the Department's current list of approved brands for the type of admixture involved. Information regarding admixture qualification and placement on the Department's list can be obtained at the Transportation Laboratory.

If the Contractor proposes to use an admixture of a brand and type on the current list of approved admixture brands, the Contractor shall furnish a Certificate of Compliance from the manufacturer, as provided in Section 6-1.07, "Certificates of Compliance," certifying that the admixture furnished is the same as that previously approved. If a previously approved admixture is not accompanied by a Certificate of Compliance, the admixture shall not be used in the work until the Engineer has had sufficient time to make the appropriate tests and has approved the admixture for use. The Engineer may take samples for testing at any time, whether or not the admixture has been accompanied by a Certificate of Compliance.

#### **90-4.04 REQUIRED USE OF CHEMICAL ADMIXTURES**

If the use of a chemical admixture is specified, the admixture shall be used at the dosage specified, except that if no dosage is specified, the admixture shall be used at the dosage normally recommended by the manufacturer of the admixture.

#### **90-4.05 OPTIONAL USE OF CHEMICAL ADMIXTURES**

The Contractor may use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

- A. If a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by weight, except that the resultant cementitious material content shall be not less than 505 pounds per cubic yard; and
- B. When a reduction in cementitious material content is made, the dosage of admixture used shall be no less than the dosage used in determining approval of the admixture.

The Contractor may use Type S admixtures conforming to the requirements in ASTM Designation: C 494.

Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete. Inclusion in the mix design submitted for approval will not be required provided that the admixture is added to counteract changing conditions that contribute to delayed setting of the portland cement concrete, and the use or change in dosage of the admixture is approved in writing by the Engineer.

#### **90-4.06 REQUIRED USE OF AIR-ENTRAINING ADMIXTURES**

When air-entrainment is specified or ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce a concrete having the specified air content as determined by California Test 504.

#### **90-4.07 OPTIONAL USE OF AIR-ENTRAINING ADMIXTURES**

When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent, and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate.

#### **90-4.08 BLANK**

#### **90-4.09 BLANK**

#### **90-4.10 PROPORTIONING AND DISPENSING LIQUID ADMIXTURES**

Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers for liquid admixtures shall have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Each dispenser shall include a graduated measuring unit into which liquid

admixtures are measured to within  $\pm 5$  percent of the prescribed quantity for each batch. Dispensers shall be located and maintained so that the graduations can be accurately read from the point at which proportioning operations are controlled to permit a visual check of batching accuracy prior to discharge. Each measuring unit shall be clearly marked for the type and quantity of admixture.

Each liquid admixture dispensing system shall be equipped with a sampling device consisting of a valve located in a safe and readily accessible position such that a sample of the admixture may be withdrawn slowly by the Engineer.

If more than one liquid admixture is used in the concrete mix, each liquid admixture shall have a separate measuring unit and shall be dispensed by injecting equipment located in such a manner that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other. When air-entraining admixtures are used in conjunction with other liquid admixtures, the air-entraining admixture shall be the first to be incorporated into the mix, unless it is demonstrated that a different sequence improves performance.

When automatic proportioning devices are required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.

Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch, except that air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.

Liquid admixtures requiring dosages greater than one-half gallon per cubic yard shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."

#### **90-4.11 BLANK**

### **90-5 PROPORTIONING**

#### **90-5.01 STORAGE OF AGGREGATES**

Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and the various sizes shall not become intermixed before proportioning.

Aggregates shall be stored or stockpiled and handled in a manner that prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:

- A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
- B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.

In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

#### **90-5.02 PROPORTIONING DEVICES**

Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in

Section 90-5.03A, "Proportioning for Pavement." Automatic devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and SCM for one batch of concrete is a single operation of a switch or starter.

Proportioning devices shall be tested as frequently as the Engineer may deem necessary to ensure their accuracy.

Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

Equipment for cumulative weighing of aggregate shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch weight of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be  $\pm 0.5$  percent of the individual batch weight designated for each size of aggregate. Equipment for cumulative weighing of cement and SCM shall have a zero tolerance of  $\pm 0.5$  percent of the designated total batch weight of the cement and SCM. Equipment for weighing cement or SCM separately shall have a zero tolerance of  $\pm 0.5$  percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of  $\pm 0.5$  percent of its designated weight or volume.

The weight indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

- A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch weight of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch weights; and
- B. Cement shall be 99 to 102 percent of its designated batch weight. When weighed individually, SCM shall be 99 to 102 percent of its designated batch weight. When SCM and cement are permitted to be weighed cumulatively, cement shall be weighed first to 99 to 102 percent of its designated batch weight, and the total for cement and SCM shall be 99 to 102 percent of the sum of their designated batch weights. When a blended cement is used, the percentages of cement and SCM used for calculating batch weights shall be based on the percentage of SCM indicated in the Certificate of Compliance from the blended cement supplier; and
- C. Water shall be within 1.5 percent of its designated weight or volume.

Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, SCM, or cement plus SCM and aggregates shall not exceed that of commercially available scales having single graduations indicating a weight not exceeding the maximum permissible weight variation above, except that no scale shall be required having a capacity of less than 1,000 pounds, with one pound graduations.

### **90-5.03 PROPORTIONING**

Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cementitious material and water as provided in these specifications.

Aggregates shall be proportioned by weight.

At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight. Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

Bulk Type IP (MS) or Type IS (MS) cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

Bulk cement and SCM may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and SCM are weighed cumulatively, the cement shall be weighed first.

If cement and SCM are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the SCM shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material-weighing device. The cement and the SCM shall be discharged into the mixer simultaneously with the aggregate.

The scales and weigh hoppers for bulk weighing cement, SCM, or cement plus SCM shall be separate and distinct from the aggregate weighing equipment.

For batches of one cubic yard or more, the batching equipment shall conform to one of the following combinations:

- A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
- B. Single box and scale indicator for all aggregates.
- C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed on scales designated by the Engineer.

#### **90-5.03A Proportioning For Pavement**

Aggregates and bulk SCM for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to these specifications.

The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.

The batching of cement, SCM, or cement plus SCM and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and SCM hoppers or the cement plus SCM hopper are charged with weights that are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

If interlocks are required for cement and SCM charging mechanisms and cement and SCM are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of SCM until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

If concrete is completely mixed in stationary paving mixers, the SCMs shall be weighed in a separate weigh hopper and the SCM and cement shall be introduced simultaneously into the mixer proportionately with the aggregate. If the Contractor provides certification that the stationary mixer is capable of mixing the cement, SCM, aggregates, and water uniformly before discharge, weighing the SCM cumulatively with the cement is permitted. Certification shall contain the following:

- A. Test results for 2 compressive strength test cylinders of concrete taken within the first one-third and 2 compressive strength test cylinders of concrete taken within the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength";
- B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first one-third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last one-third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
- C. The mixer rotation speed and time of mixing before discharge that are required to produce a mix that meets the requirements above.

The discharge gate on the cement and SCM hoppers or the cement plus SCM hopper shall be designed to permit regulating the flow of cement, SCM, or cement plus SCM into the aggregate as directed by the Engineer.

If separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

If the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required mass is discharged into the weigh box, after which the gate shall automatically close and

lock.

The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

## 90-6 MIXING AND TRANSPORTING

### 90-6.01 GENERAL

Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding 1/3 cubic yard may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."

Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used. Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cementitious material.

Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.

When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 1/2 inch. When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 170 pounds per cubic yard of concrete.

Average Slump	Maximum Permissible Difference
Less than 4"	1"
4" to 6"	1-1/2"
Greater than 6" to 9"	2"

The Contractor shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

### 90-6.02 MACHINE MIXING

Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.

The temperature of mixed concrete, immediately before placing, shall be not less than 50 °F or more than 90 °F. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed 150 °F. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first one-fourth of the specified mixing time. When concrete is delivered in a truck mixer, a portion of the mixing water may be withheld and may be added at the point of delivery as specified under Section 90-6.03, "Transporting Mixed Concrete."

Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.

Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

The size of batch shall not exceed the manufacturer's guaranteed capacity.

When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at job site batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.

Concrete shall be mixed and delivered to the job site by means of one of the following combinations of operations:

- A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in nonagitating hauling equipment (central-mixed concrete).
- B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).
- C. Mixed completely in a truck mixer (transit-mixed concrete).
- D. Mixed completely in a paving mixer.

Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.

Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.

When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed will be allowed for partial mixing in a central plant.

### **90-6.03 TRANSPORTING MIXED CONCRETE**

Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."

Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform mass during hauling.

Bodies of nonagitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.

Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 75 °F.

No water in excess of that in the approved mix design shall be incorporated into the concrete. If approved by the Engineer, water withheld during batching may be added to the concrete at the delivery point in one operation before the discharge of more than 1/4 cubic yard. Equipment for supplying the water shall conform to Section 90-6.06, "Amount of Water and Penetration." When water is added at the point of delivery, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharged is commenced.

The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

If a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or if the temperature of the concrete is 85 °F or above, the time allowed may be less than 1.5 hours. If an admixture is used to retard the set time, the temperature of the concrete shall not exceed 85 °F, the time limit shall be 2 hours, and the revolution limitation shall be 300.

If nonagitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85 °F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete delivered at the job site shall be accompanied by a weighmaster certificate showing the mix identification number, nonrepeating load number, date and time at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a CD

or DVD. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.

The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch weights or measurements for a load of concrete provided that both certificates are imprinted with the same nonrepeating load number that is unique to the contract and delivered to the jobsite with the load.

Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

#### 90-6.04 TIME OR AMOUNT OF MIXING

Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.

The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.

The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.

The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

When a high range water-reducing admixture is added to the concrete at the job site, the total number of revolutions shall not exceed 300.

#### 90-6.05 HAND-MIXING

Hand-mixed concrete shall be made in batches of not more than 1/3 cubic yard and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cementitious materials and the whole mass turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole mass again turned no fewer than 3 times, not including placing in the carriers or forms.

#### 90-6.06 AMOUNT OF WATER AND PENETRATION

The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the nominal values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. If Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 9 inches after the chemical admixtures are added.

Type of Work	Nominal		Maximum	
	Penetration (inches)	Slump (inches)	Penetration (inches)	Slump (inches)
Concrete Pavement	0 - 1	—	1-1/2	—
Non-reinforced concrete facilities	0 - 1-1/2	—	2	—
Reinforced concrete structures				
Sections over 12 inches thick	0 - 1-1/2	—	2-1/2	—
Sections 12 inches thick or less	0 - 2	—	3	—
Concrete placed under water	—	6 - 8	—	9
Cast-in-place concrete piles	2-1/2 - 3-1/2	5 - 7	4	8

The amount of free water used in concrete shall not exceed 310 pounds per cubic yard, plus 20 pounds

for each required 100 pounds of cementitious material in excess of 550 pounds per cubic yard. The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.

If there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. Full compensation for additional cementitious material and water added under these conditions shall be considered as included in the contract price paid for the concrete work involved and no additional compensation will be allowed therefor.

The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made rapidly in one operation without dribbling. All equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

## **90-7 CURING CONCRETE**

### **90-7.01 METHODS OF CURING**

Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

#### **90-7.01A Water Method**

The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.

Cotton mats, rugs, carpets, or earth or sand blankets may be used as a curing medium to retain the moisture during the curing period.

If a curing medium consisting of cotton mats, rugs, carpets, polyethylene sheeting, polyethylene sheeting on burlap, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing media.

At the option of the Contractor, a curing medium consisting of white opaque polyethylene sheeting extruded onto burlap may be used to cure concrete structures. The polyethylene sheeting shall have a minimum thickness of 4-mil, and shall be extruded onto 10-ounce burlap.

At the option of the Contractor, a curing medium consisting of polyethylene sheeting may be used to cure concrete columns. The polyethylene sheeting shall have a minimum thickness of 10-mil achieved in a single layer of material.

If the Contractor chooses to use polyethylene sheeting or polyethylene sheeting on burlap as a curing medium, these media and any joints therein shall be secured as necessary to provide moisture retention and shall be within 3 inches of the concrete at all points along the surface being cured. When these media are used, the temperature of the concrete shall be monitored during curing. If the temperature of the concrete cannot be maintained below 140° F, use of these curing media shall be disallowed.

When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified above, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

#### **90-7.01B Curing Compound Method**

Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.

Curing compounds to be used shall be as follows:

1. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.

2. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
3. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
4. Nonpigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
5. Nonpigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.
6. Nonpigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.

The infrared scan for the dried vehicle from curing compound (1) shall match the infrared scan on file at the Transportation Laboratory.

The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.28 pounds per square yard in 24 hours.

The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.

If the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.

Curing compound shall be applied at a nominal rate of one gallon per 150 square feet, unless otherwise specified.

At any point, the application rate shall be within  $\pm 50$  square feet per gallon of the nominal rate specified, and the average application rate shall be within  $\pm 25$  square feet per gallon of the nominal rate specified when tested in conformance with the requirements in California Test 535. Runs, sags, thin areas, skips, or holidays in the applied curing compound shall be evidence that the application is not satisfactory.

Curing compounds shall be applied using power operated spray equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Hand spraying of small and irregular areas that are not reasonably accessible to mechanical spraying equipment, in the opinion of the Engineer, may be permitted.

The curing compound shall be applied to the concrete following the surface finishing operation, immediately before the moisture sheen disappears from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any drying or cracking of the surface, application of water with an atomizing nozzle as specified in Section 90-7.01A, "Water Method," shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting freestanding water. Should the film of compound be damaged from any cause before the expiration of 7 days after the concrete is placed in the case of structures and 72 hours in the case of pavement, the damaged portion shall be repaired immediately with additional compound.

At the time of use, compounds containing pigments shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. A paddle shall be used to loosen all settled pigment from the bottom of the container, and a power driven agitator shall be used to disperse the pigment uniformly throughout the vehicle.

Agitation shall not introduce air or other foreign substance into the curing compound.

The manufacturer shall include in the curing compound the necessary additives for control of sagging, pigment settling, leveling, de-emulsification, or other requisite qualities of a satisfactory working material. Pigmented curing compounds shall be manufactured so that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular or curdled. Settlement of pigment shall be a thoroughly wetted, soft, mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

Curing compounds shall remain sprayable at temperatures above 40 °F and shall not be diluted or altered after manufacture.

The curing compound shall be packaged in clean 274-gallon totes, 55-gallon barrels or 5-gallon pails shall be supplied from a suitable storage tank located at the jobsite. The containers shall comply with "Title 49, Code of Federal Regulations, Hazardous Materials Regulations." The 274-gallon totes and the 55-gallon barrels shall have removable lids and airtight fasteners. The 5-gallon pails shall be round and have standard full open head and bail. Lids with bungholes will not be permitted. Settling or separation of solids in containers, except tanks, must be completely redispersed with low speed mixing prior to use, in conformance with these specifications and the manufacturer's recommendations. Mixing shall be

accomplished either manually by use of a paddle or by use of a mixing blade driven by a drill motor, at low speed. Mixing blades shall be the type used for mixing paint. On-site storage tanks shall be kept clean and free of contaminants. Each tank shall have a permanent system designed to completely redisperse settled material without introducing air or other foreign substances.

Steel containers and lids shall be lined with a coating that will prevent destructive action by the compound or chemical agents in the air space above the compound. The coating shall not come off the container or lid as skins. Containers shall be filled in a manner that will prevent skinning. Plastic containers shall not react with the compound.

Each container shall be labeled with the manufacturer's name, kind of curing compound, batch number, volume, date of manufacture, and volatile organic compound (VOC) content. The label shall also warn that the curing compound containing pigment shall be well stirred before use. Precautions concerning the handling and the application of curing compound shall be shown on the label of the curing compound containers in conformance with the Construction Safety Orders and General Industry Safety Orders of the State.

Containers of curing compound shall be labeled to indicate that the contents fully comply with the rules and regulations concerning air pollution control in the State.

When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

Curing compound will be sampled by the Engineer at the source of supply, at the job site, or at both locations.

Curing compound shall be formulated so as to maintain the specified properties for a minimum of one year. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.

Tests will be conducted in conformance with the latest ASTM test methods and methods in use by the Transportation Laboratory.

#### **90-7.01C Waterproof Membrane Method**

The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the curing membrane, shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.

Sheeting material for curing concrete shall conform to the requirements in AASHTO Designation: M 171 for white reflective materials.

The sheeting material shall be fabricated into sheets of such width as to provide a complete cover for the entire concrete surface. Joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 0.33 foot.

The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.

Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.

Sections of membrane that have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

#### **90-7.01D Forms-In-Place Method**

Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 20 inches in least dimension the forms shall remain in place for a minimum period of 5 days.

Joints in the forms and the joints between the end of forms and concrete shall be kept moisture tight during the curing period. Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods subject to the approval of the Engineer.

#### **90-7.02 BLANK**

#### **90-7.03 CURING STRUCTURES**

Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in Section 90-7.01, "Methods of Curing."

The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only ordinary surface finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (1).

The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (1).

Concrete surfaces of minor structures, as defined in Section 51-1.02, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.

When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer required. Application of water for this purpose will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

#### **90-7.04 CURING PRECAST CONCRETE MEMBERS**

Precast concrete members shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:

- A. After placement of the concrete, members shall be held for a minimum 4-hour presteaming period. If the ambient air temperature is below 50 °F, steam shall be applied during the presteaming period to hold the air surrounding the member at a temperature between 50 °F and 90 °F.
- B. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
- C. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
- D. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 40 °F per hour. The curing temperature throughout the enclosure shall not exceed 150 °F and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
- E. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 200 feet of continuous bed length will be required for checking temperature.
- F. Members in pretension beds shall be detensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 60 °F until the stress is transferred to the concrete.
- G. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

#### **90-7.05 CURING PRECAST PRESTRESSED CONCRETE PILES**

Newly placed concrete for precast prestressed concrete piles shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," except that piles in a corrosive environment shall be cured as follows:

- A. Piles shall be either steam cured or water cured. If water curing is used, the piles shall be kept continuously wet by the application of water in conformance with the provisions in Section 90-7.01A, "Water Method."
- B. If steam curing is used, the steam curing provisions in Section 90-7.04, "Curing Precast Concrete Members," shall apply except that the piles shall be kept continuously wet for their entire length for a period of not less than 3 days, including the holding and steam curing periods.

### **90-7.06 CURING SLOPE PROTECTION**

Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."

Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing," with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

### **90-7.07 CURING MISCELLANEOUS CONCRETE WORK**

Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in Section 90-7.01B, "Curing Compound Method."

Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."

Shotcrete shall be cured for at least 72 hours by spraying with water, by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

Mortar and grout shall be cured by keeping the surface damp for 3 days.

After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

## **90-8 PROTECTING CONCRETE**

### **90-8.01 GENERAL**

In addition to the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," the Contractor shall protect concrete as provided in this Section 90-8. If required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

The Contractor shall protect concrete from damage from any cause, which shall include, but not be limited to: rain, heat, cold, wind, Contractor's actions, and actions of others.

Concrete shall not be placed on frozen or ice-coated ground or subgrade nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.

Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.

Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at the Contractor's expense.

### **90-8.02 PROTECTING CONCRETE STRUCTURES**

Structure concrete and shotcrete used as structure concrete shall be maintained at a temperature of not less than 45 °F for 72 hours after placing and at not less than 40 °F for an additional 4 days.

## **90-9 COMPRESSIVE STRENGTH**

### **90-9.01 GENERAL**

Concrete compressive strength requirements consist of a minimum strength that shall be attained before various loads or stresses are applied to the concrete and, for concrete designated by compressive strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or the special provisions or are shown on the plans.

The compressive strength of concrete will be determined from test cylinders that have been fabricated from concrete sampled in conformance with the requirements of California Test 539. Test cylinders will be molded and initially field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with the requirements of California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

When concrete is designated by compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$10 for each in-place cubic yard of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State \$15 for each in-place cubic yard of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test that indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

If the test result indicates that the compressive strength at the maximum age specified or allowed is below the specified strength, but is 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

No single compressive strength test shall represent more than 320 cubic yards.

If a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. If the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

When concrete has a specified 28-day compressive strength greater than 3,600 pounds per square inch, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

Certified test data, in order to be acceptable, shall indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 580 pounds per square inch greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

The certified test data and trial batch test reports shall include the following information:

- A. Date of mixing.
- B. Mixing equipment and procedures used.
- C. The size of batch in cubic yards and the weight, type, and source of all ingredients used.
- D. Penetration or slump (if the concrete will be placed under water or placed in cast-in-place concrete piles) of the concrete.
- E. The air content of the concrete if an air-entraining admixture is used.
- F. The age at time of testing and strength of all concrete cylinders tested.

Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type of concrete required at that location.

After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes that, in the judgment of the Engineer, could result in a strength of concrete below that specified.

The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

## 90-10 MINOR CONCRETE

### 90-10.01 GENERAL

Concrete for minor structures, slope paving, curbs, sidewalks and other concrete work, when designated as minor concrete on the plans, in the specifications, or in the contract item, shall conform to the provisions specified herein.

The Engineer, at the Engineer's discretion, will inspect and test the facilities, materials and methods for producing the concrete to ensure that minor concrete of the quality suitable for use in the work is obtained.

Before using minor concrete or in advance of revising the mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design. When required by the following table, the Contractor shall include compressive strength test results verifying the minimum specified compressive strength:

SCM	Test Submittal Required
Fly Ash used alone	When portland cement content < 350 lbs/cy
GGBFS used alone	When portland cement content < 250 lbs/cy
Natural Pozzolan used alone	When portland cement content < 350 lbs/cy
More than 1 SCM	Always

Tests shall be performed by an ACI certified technician.

### 90-10.02 MATERIALS

Minor concrete shall conform to the following requirements:

#### 90-10.02A Cementitious Material

Cementitious material shall conform to the provisions in Section 90-1.01, "Description," and 90-2, "Materials."

#### 90-10.02B Aggregate

Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.

Use of crushed concrete or reclaimed aggregate is acceptable only if the aggregate satisfies all aggregate requirements.

The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed

for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer. The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than 1-1/2-inch or smaller than 3/4 inch. The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B, if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

#### **90-10.02C Water**

Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

#### **90-10.02D Admixtures**

The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

### **90-10.03 PRODUCTION**

Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department. The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades, after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 90 °F will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes. The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

When a high range water-reducing admixture is added to the concrete at the job site, the total number of revolutions shall not exceed 300.

Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

#### **90-10.04 CURING MINOR CONCRETE**

Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

#### **90-10.05 PROTECTING MINOR CONCRETE**

Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 40 °F for 72 hours after placing.

#### **90-10.06 MEASUREMENT AND PAYMENT**

Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the

specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

## **90-11 MEASUREMENT AND PAYMENT**

### **90-11.01 MEASUREMENT**

Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

For concrete measured at the mixer, the volume in cubic feet shall be computed as the total weight of the batch in pounds divided by the density of the concrete in pounds per cubic foot. The total weight of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

### **90-11.02 PAYMENT**

Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.

Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor's expense and no additional compensation will be allowed therefor.

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## **SECTION 91 PAINT (Issued 05-1-06)**

**Replace Section 91-3 with:**

### **91-3 PAINTS FOR TIMBER**

#### **91-3.01 WOOD PRIMER, LATEX-BASE**

**Classification:**

This specification covers a ready-mixed priming paint for use on unpainted wood or exterior woodwork. It shall conform with the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for exterior wood primers, and be listed on the Exterior Latex Wood Primer MPI List Number 6.

#### **91-3.02 PAINT; LATEX-BASE FOR EXTERIOR WOOD, WHITE AND TINTS**

**Classification:**

This specification covers a ready-mixed paint for use on wood surfaces subject to outside exposures. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products List:

- A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
- B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
- C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

Unpainted wood shall first be primed with wood primer conforming to the provisions in Section 91-3.01, "Wood Primer, Latex-Base."

**Replace Section 91-4 with:**

**91-4 MISCELLANEOUS PAINTS**

**91-4.01 THROUGH 91-4.04 (BLANK)**

**91-4.05 PAINT; ACRYLIC EMULSION, EXTERIOR WHITE AND LIGHT AND MEDIUM TINTS**

**Classification:**

This specification covers an acrylic emulsion paint designed for use on exterior masonry. This paint shall conform to the requirements in the Detailed Performance Standards of the Master Painters Institute (MPI) for Paint, Latex, Exterior, and shall be listed on the following MPI Approved Products Lists:

- A. Exterior Latex, Flat MPI Gloss Level 1, MPI List Number 10.
- B. Exterior Latex, Semi-Gloss, MPI Gloss Level 5, MPI List Number 11.
- C. Exterior Latex, Gloss, MPI Gloss Level 6, MPI List Number 119.

This paint may be tinted by using "universal" or "all purpose" concentrates.

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**SECTION 92 ASPHALTS**

**(Issued 03-21-08)**

**Replace Section 92 with:**

**SECTION 92 ASPHALTS**

**92-1.01 DESCRIPTION**

Asphalt is refined petroleum or a mixture of refined liquid asphalt and refined solid asphalt that are prepared from crude petroleum. Asphalt is:

- 1. Free from residues caused by the artificial distillation of coal, coal tar, or paraffin
- 2. Free from water
- 3. Homogeneous

**92-1.02 MATERIALS**

**GENERAL**

Furnish asphalt under the Department's "Certification Program for Suppliers of Asphalt." The Department maintains the program requirements, procedures, and a list of approved suppliers at:

<http://www.dot.ca.gov/hq/esc/Translab/fpm/fpmcoc.htm>

Transport, store, use, and dispose of asphalt safely.

Prevent the formation of carbonized particles caused by overheating asphalt during manufacturing or construction.

**GRADES**

Performance graded (PG) asphalt binder is:

Performance Graded Asphalt Binder

Property	AASHTO Test Method	Specification				
		Grade				
		PG 58-22 <sup>a</sup>	PG 64-10	PG 64-16	PG 64-28	PG 70-10
Original Binder						
Flash Point, Minimum °C	T 48	230	230	230	230	230
Solubility, Minimum % <sup>b</sup>	T 44	99	99	99	99	99
Viscosity at 135°C, <sup>c</sup> Maximum, Pa·s	T 316	3.0	3.0	3.0	3.0	3.0
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T 315	58 1.00	64 1.00	64 1.00	64 1.00	70 1.00
RTFO Test, <sup>e</sup> Mass Loss, Maximum, %	T 240	1.00	1.00	1.00	1.00	1.00
RTFO Test Aged Binder						
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T 315	58 2.20	64 2.20	64 2.20	64 2.20	70 2.20
Ductility at 25°C Minimum, cm	T 51	75	75	75	75	75
PAV <sup>f</sup> Aging, Temperature, °C	R 28	100	100	100	100	110
RTFO Test and PAV Aged Binder						
Dynamic Shear, Test Temp. at 10 rad/s, °C Maximum G*·sin(delta), kPa	T 315	22 <sup>d</sup> 5000	31 <sup>d</sup> 5000	28 <sup>d</sup> 5000	22 <sup>d</sup> 5000	34 <sup>d</sup> 5000
Creep Stiffness, Test Temperature, °C Maximum S-value, Mpa Minimum M-value	T 313	-12 300 0.300	0 300 0.300	-6 300 0.300	-18 300 0.300	0 300 0.300

Notes:

- a Use as asphalt rubber base stock for high mountain and high desert area.
- b The Engineer waives this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."
- c The Engineer waives this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
- d Test the sample at 3°C higher if it fails at the specified test temperature. G\*·sin(delta) remains 5000 kPa maximum.
- e "RTFO Test" means the asphaltic residue obtained using the Rolling Thin Film Oven Test, AASHTO Test Method T 240 or ASTM Designation: D 2872. The residue from mass change determination may be used for other tests.
- f "PAV" means Pressurized Aging Vessel.

Performance graded polymer modified asphalt binder (PG Polymer Modified) is:

Performance Graded Polymer Modified Asphalt Binder <sup>a</sup>

Property	AASHTO Test Method	Specification Grade		
		PG 58-34 PM	PG 64-28 PM	PG 76-22 PM
Original Binder				
Flash Point, Minimum °C	T 48	230	230	230
Solubility, Minimum % <sup>b</sup>	T 44 <sup>c</sup>	98.5	98.5	98.5
Viscosity at 135°C, <sup>d</sup> Maximum, Pa·s	T 316	3.0	3.0	3.0
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T 315	58 1.00	64 1.00	76 1.00
RTFO Test, Mass Loss, Maximum, %	T 240	1.00	1.00	1.00
RTFO Test Aged Binder				
Dynamic Shear, Test Temp. at 10 rad/s, °C Minimum G*/sin(delta), kPa	T 315	58 2.20	64 2.20	76 2.20
Dynamic Shear, Test Temp. at 10 rad/s, °C Maximum (delta), %	T 315	Note e 80	Note e 80	Note e 80
Elastic Recovery <sup>f</sup> , Test Temp., °C Minimum recovery, %	T 301	25 75	25 75	25 65
PAV <sup>g</sup> Aging, Temperature, °C	R 28	100	100	110
RTFO Test and PAV Aged Binder				
Dynamic Shear, Test Temp. at 10 rad/s, °C Maximum G*sin(delta), kPa	T 315	16 5000	22 5000	31 5000
Creep Stiffness, Test Temperature, °C Maximum S-value, MPa Minimum M-value	T 313	-24 300 0.300	-18 300 0.300	-12 300 0.300

Notes:

- Do not modify PG Polymer Modified using acid modification.
- The Engineer waives this specification if the supplier is a Quality Supplier as defined by the Department's "Certification Program for Suppliers of Asphalt."
- The Department allows ASTM D 5546 instead of AASHTO T 44
- The Engineer waives this specification if the supplier certifies the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.
- Test temperature is the temperature at which G\*/sin(delta) is 2.2 kPa. A graph of log G\*/sin(delta) plotted against temperature may be used to determine the test temperature when G\*/sin(delta) is 2.2 kPa. A graph of (delta) versus temperature may be used to determine delta at the temperature when G\*/sin(delta) is 2.2 kPa. The Engineer also accepts direct measurement of (delta) at the temperature when G\*/sin(delta) is 2.2 kPa.
- Tests without a force ductility clamp may be performed.
- "PAV" means Pressurized Aging Vessel.

**SAMPLING**

Provide a sampling device in the asphalt feed line connecting the plant storage tanks to the asphalt weighing system or spray bar. Make the sampling device accessible between 24 and 30 inches above the platform. Provide a receptacle for flushing the sampling device.

Include with the sampling device a valve:

- Between 1/2 and 3/4 inch in diameter

2. Manufactured in a manner that a one-quart sample may be taken slowly at any time during plant operations
3. Maintained in good condition

Replace failed valves.

In the Engineer's presence, take 2 one-quart samples per operating day. Provide round, friction top, one-quart containers for storing samples.

### **92-1.03 EXECUTION**

If asphalt is applied, you must comply with the heating and application specifications for liquid asphalt in Section 93, "Liquid Asphalts."

### **92-1.04 MEASUREMENT**

If the contract work item for asphalt is paid by weight, the Department measures asphalt tons by complying with the specifications for weight determination of liquid asphalt in Section 93, "Liquid Asphalts."

The Engineer determines the asphalt weight from volumetric measurements if you:

1. Use a partial asphalt load
2. Use asphalt at a location other than a mixing plant and no scales within 20 miles are available and suitable
3. Deliver asphalt in either of the following:
  - 3.1. A calibrated truck with each tank accompanied by its measuring stick and calibration card
  - 3.2. A truck equipped with a calibrated thermometer that determines the asphalt temperature at the delivery time and with a vehicle tank meter complying with the specifications for weighing, measuring, and metering devices in Section 9-1.01, "Measurement of Quantities"

If you furnish hot mix asphalt from a mixing plant producing material for only one project, the Engineer determines the asphalt quantity by measuring the volume in the tank at the project's start and end provided the tank is calibrated and equipped with its measuring stick and calibration card.

The Engineer determines pay quantities from volumetric measurements as follows:

1. Before converting the volume to weight, the Engineer reduces the measured volume to that which the asphalt would occupy at 60 °F.
2. The Engineer uses 235 gallons per ton and 8.51 pounds per gallon for the average weight and volume for PG and PG Polymer Modified asphalt grades at 60 °F.
3. The Engineer uses the Conversion Table in Section 93, "Liquid Asphalts."

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## **SECTION 93 LIQUID ASPHALTS** **(Issued 11-03-06)**

### **In Section 93-1.04 replace the 9th paragraph with:**

The following Legend and Conversion Table is to be used for converting volumes of liquid asphalt products, Grades 70 to 3000, inclusive, and paving asphalt Grades PG 58-22, PG 64-10, PG 64-16, PG 64-28, and PG 70-10, and Grades PG 58-34 PM, PG 64-28 PM, and PG 76-22 PM.

**ENVIRONMENTAL PERMIT SUMMARY FORM**



**DEPARTMENT OF PUBLIC WORKS**

**ENVIRONMENTAL PERMIT SUMMARY FORM**

**Date:** March 23, 2011

**To:** Eric Laurie, P.E., Project Manager

**From:** Eric Wier, Environmental Programs Division *EW*

**Subject:** Environmental Review & Permit Status for the County Operations Center Waterline Improvements Project; ED10-184 / 320026

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	Categorical Exemption (issued 3/21/11)	X
NEPA Review	Not required	
Coastal Permit	Not required	
CZMA	Not required	
CDFG 1600	Not required – not within DFG 1600 permit jurisdiction	
USACOE 404	Not required – no impacts to Waters of U.S.	
NMFS ESA	Not required	
USFWS ESA	Not required	
RWQCB 401	Not required	
NPDES	Required if over 1 acre of disturbance	

**The special environmental conditions for this project are:**

1. If the project description changes, please re-consult with the Environmental Programs Division to determine if any permits are needed or environmental conditions need to be placed on the project.



# NOTICE OF EXEMPTION

SAN LUIS OBISPO COUNTY DEPARTMENT OF PLANNING AND BUILDING  
976 OSOS STREET • ROOM 200 • SAN LUIS OBISPO • CALIFORNIA 93408 • (805) 781-5600

*Promoting the Wise Use of Land • Helping to Build Great Communities*

County Operations Center Waterline Improvements Project; ED10-184 (320026)

### Project Title

On Kansas Avenue from 1,800 feet west of Oklahoma Ave. to 3,600 feet west of Oklahoma Ave.

### Project Location - Specific

San Luis Obispo

### Project Location – County

To upsize the water distribution system along Kansas Avenue for the County Women's Jail Expansion. The work consists of replacing approximately 1,800 linear feet of existing 6-inch water pipeline with 8-inch potable water pipeline, reconnection of service laterals, and fire hydrants.

### Description of Nature and Purpose of Project

County of San Luis Obispo

### Name of Public Agency Approving Project

Department of Public Works

### Name of Person or Agency Carrying Out Project/Beneficiaries of Project

### Exempt Status: (Check One)

- Ministerial {Sec. 21080(b)(1); 15268}
- Declared Emergency {Sec. 21080(b)(3); 15269(a)}
- Emergency Project {Sec. 21080(b)(4); 15269(b)(c)}
- Categorical Exemption. {Sec. 15302 ; Class: 2(c) }
- Statutory Exemption {Sec. \_\_\_\_}

(ENDORSED)  
**FILED**

MAR 23 2011

JULIE L. RODEWALD COUNTY CLERK  
BY ANGELA McCORMICK  
DEPUTY CLERK

**Reasons why project is exempt:** The project consists of the emergency maintenance of a public roadway and is statutorily and categorically exempt from CEQA.

Eric Wier, Environmental Resource Specialist

(805) 788-2766

### Contact Person

### Telephone

<b>If filed by applicant:</b>	
1.	Attach certified document of exemption finding
2.	Has a notice of exemption been filed by the public agency approving the project?
	Yes <input type="checkbox"/> No <input type="checkbox"/>

Signature Ellen Carroll Date 3-21-2011

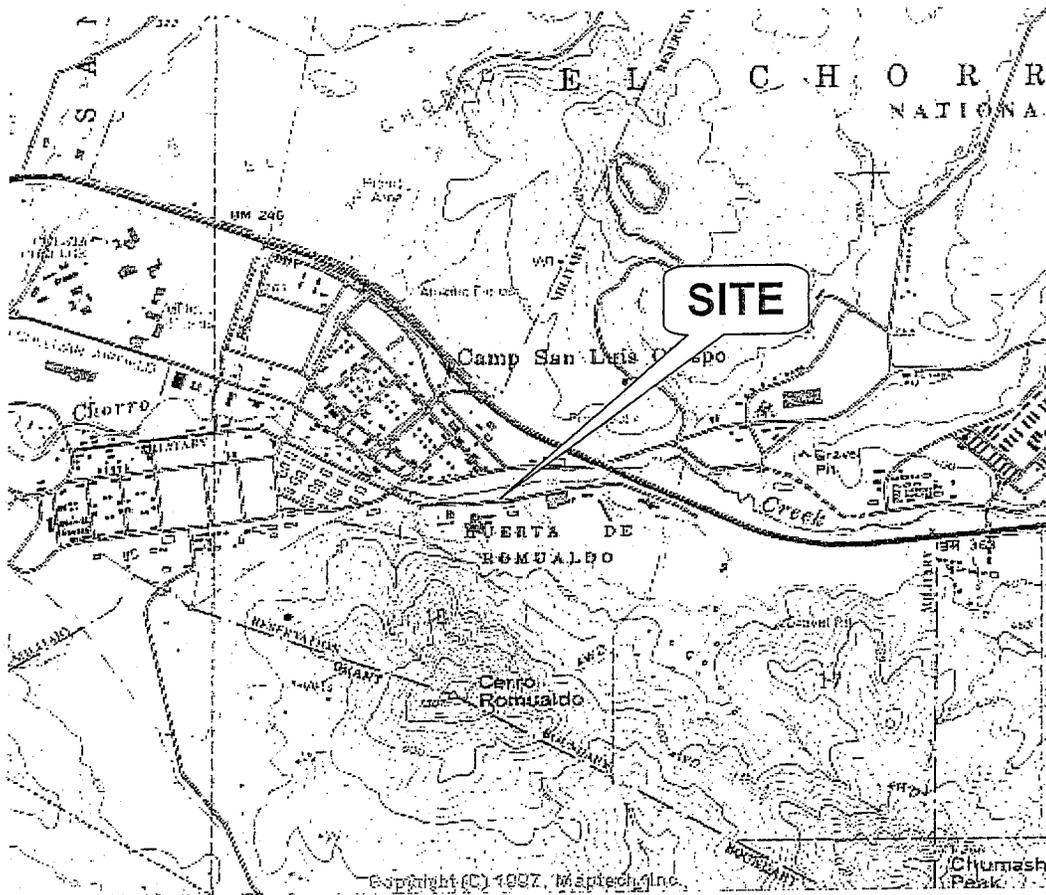
Name (Print) Ellen Carroll Title Env. Coordinator

# GEOTECHNICAL ENGINEERING REPORT



GEOTECHNICAL INVESTIGATION  
SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE  
SAN LUIS OBISPO, CALIFORNIA

October 29, 2002  
PROJECT 2-1254



PREPARED BY:

GSI SOILS INC.  
141 SUBURBAN ROAD STE D-1  
SAN LUIS OBISPO, CA 93401  
(805) 543-5493

*Contracts #740046*

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GEOTECHNICAL INVESTIGATION  
SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE  
SAN LUIS OBISPO, CALIFORNIA

PROJECT 2-1254

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation, for the proposed sewer line project to be located along Kansas Avenue in San Luis Obispo County, California. A site location map is presented in Figure 1.

The project site extends from Oklahoma Avenue to Camp San Luis Obispo (SLO). Kansas Avenue is relatively level varying from 310 feet above mean sea level (MSL) at Oklahoma Ave. to 267 feet above MSL at Camp SLO. The new line will run within the existing asphalt concrete roadway.

It is our understanding that the improvements will include a sewer line located 8 to 10 feet below existing grades. The sewer line will be 8 inches in diameter with a total length of approximately 3400 feet. Ten (10) manholes will also be constructed on concrete pads.

The project description is based on a site reconnaissance performed by a GSI SOILS, engineer and information provided by the county of San Luis Obispo. The plan provided forms the basis for the "Site Plan", Figure 2.

In the event that there is change in the nature, design or location of improvements, or if the assumed loads are not consistent with actual design loads, the conclusions and recommendations contained in this report should be reviewed and modified, if required. Evaluations of the soils for hydrocarbons or other chemical properties are beyond the scope of the investigation.

## 2.0 PURPOSE AND SCOPE

The purpose of this study was to explore and evaluate the surface and subsurface soil conditions at the site and to develop geotechnical information and design criteria for the proposed project. The scope of this study included the following items:

1. A review of available published and unpublished geotechnical and geologic data pertinent to the project site.
2. A field study consisting of a site reconnaissance and an exploratory boring program to formulate a description of the subsurface conditions.
3. A laboratory testing program performed on representative soil samples collected during our field study.
4. Engineering analysis of the data gathered during our field study, laboratory testing, and literature review. Development of recommendations for site preparation and grading, and geotechnical design criteria for sewer line installation.
5. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

## 3.0 SUBSURFACE SOIL CONDITIONS

Approximately 18 inches of asphalt concrete, base, and subbase material were found along Kansas Ave. The near surface soils encountered below the pavement generally consisted of olive to dark brown sandy clays to a depth of 3 to 4 feet. These materials were encountered in a slightly moist state and in a soft to firm condition. The surface materials were underlain by similar sandy clays and silty clays in a very soft condition particularly from Oklahoma Ave. to approximately the Detective Bureau (borings B-1 to B-5). The exception was boring B-4 where silty sand soils were encountered to a depth of 15 feet. These soils were loose to very loose and maybe old fill. Along the remainder of Kansas Avenue to Camp SLO (borings B-6 to B-8)

the sandy and silty clays were in a firm to stiff condition.

Free ground water was encountered at depths varying from 5 to 14 feet below grade in borings B-1 through B-5. Groundwater was not found in borings B-6 through B-8. Higher groundwater elevations can be expected to develop during winter months at all boring locations. A more detailed description of the soils encountered is presented graphically on the "Exploratory Boring Logs", B-1 through B-8, Appendix A. An explanation of the symbols and descriptions used on these logs are presented on the "Soil Classification Chart".

The soil profile described above is generalized; therefore, the reader is advised to consult the boring logs (Appendix A) for soil conditions at specific locations. Care should be exercised in interpolating or extrapolating subsurface conditions between or beyond trenches and borings. On the boring logs we have indicated the soil type, moisture content, grain size, dry density, and the applicable United Soil Classification System Symbol.

The locations of our exploratory borings, shown on Site Plan, Figure 2, were approximately determined from features at the site. Hence, accuracy can be implied only to the degree that this method warrants. Surface elevations at boring locations were not determined.

#### **4.0 SEISMIC CONSIDERATIONS**

The site is in a seismically active region of California, and strong ground shaking should be expected during the life of the structure. Seismicity analyses were conducted to evaluate strong ground motion hazards and to develop input parameters to be used for the seismic design of the proposed structures. The analyses essentially consisted of a review of quakes on nearby faults, and the level of strong ground motion that each active or potentially active fault is capable of generating at the site.

##### **4.1 General**

The San Andreas fault, located approximately 35 miles northeast of the site, dominates both the structure and seismicity of this region. However, faults reflecting a closer source, also have a significant potential to generate earthquakes and strong shaking at the project site. These include: 1) the offshore group, including the Hosgri and Santa Lucia Bank (Purisma and

Lompoc) faults; and 2) the Los Osos fault. In addition, the Rinconada and San Luis Range faults may be active or potentially active and pose a significant potential to generate earthquakes.

#### **4.2 San Andreas Fault**

The San Andreas Fault zone (Mojave section) is the largest active fault zone within a 100-mile radius of the site (located 35 miles northeast). The San Andreas fault is recognized as a major transform fault of regional dimensions that forms an active boundary between the Pacific and North American crustal plates. Cumulative slip along the San Andreas fault has amounted to several hundred miles, and a substantial fraction of the total slip has occurred during late Cenozoic time. The fault has well-defined topographic expression, generally lying within a rift valley or along an escarpment mountain front, and having associated sag ponds, low scarps, right-laterally deflected streams and related manifestations of recent activity. The most recent episode of large-scale movement along the reach of the San Andreas fault that is closest to the San Luis Range occurred during the great Fort Tejon earthquake of 1857. Geologic evidence pertinent to the behavior of the fault during this and earlier seismic events was studied in great detail by Wallace (1968 & 1975). Other active and potentially active faults have been identified in the vicinity of the proposed site. A list of the faults discussed above and other local faults are presented in Table 1 - Seismicity Table.

#### **4.3 Earthquake Magnitudes and Accelerations**

We have analyzed the possible earthquake magnitudes and accelerations at the site and, in our opinion, the largest ULE at the site would be a 7.8 moment magnitude earthquake on the San Andreas Fault. Such an event could produce a peak horizontal ground acceleration on the order of 0.19g. The largest LLE at the site would be a 7.6 moment magnitude earthquake, also on the San Andreas Fault. Such an event could produce a peak horizontal ground acceleration on the order of 0.17g. Due to the relative location of the Los Osos, Hosgri, San Luis Range, Rinconada and Cambria, faults to the site, higher ULE accelerations may be expected from these faults. Based on our study, accelerations of 0.47 (Los Osos), 0.29 (Hosgri), 0.43 (San Luis Range), 0.42 (Rinconada), and 0.37 (Cambria) could be anticipated. Based on these findings, it is our opinion, the most significant acceleration at the site would be 0.47g on the Los Osos Fault. This value is higher than the probabilistic value of 0.30 to 0.40g determined by

Peterson and others (1996) for this area, for 10% probability of exceedence in 50 years. The high acceleration from this fault is due to its close proximity to the site. Design of structures should comply with the requirements of the governing jurisdictions and standard practices of the Structural Engineer Association of California.

#### 4.4 Liquefaction

Liquefaction is the phenomenon in which soil temporarily loses strength due to a buildup of excess pore-water pressure caused by seismic shaking. Liquefaction occurs in loose to medium dense saturated sand, typically within the upper 50 feet of ground surface.

Blow counts observed during our field exploration indicate that the density of the upper 20 feet of soil varies throughout the layer, but the layer can generally be described as soft and/or loose in the upper 5 feet and very loose below this depth in borings B-1 through B-5. In three borings groundwater was also encountered at 5 to 14 feet below grade. In the remaining borings (B-6 through B-8) the soils were predominately in a firm condition and no groundwater was found. Due to the predominately clay soils discovered during our field exploration the potential for liquefaction would be low over most of the alignment. However, around borings B-4 the potential would increase to the high category.

#### 4.5 UBC Seismic Coefficients

A summary of the seismic factors applicable to this site is provided in Figure 4. The soil profile type would be considered an  $S_E$ , the seismic source is a Type B, and the near source factors  $N_a$  and  $N_v$  are 1.0 and 1.2 respectively. The seismic coefficients  $C_a$  and  $C_v$  would be  $0.36 N_a$  and  $0.96 N_v$  respectively.

### 5.0 CONCLUSIONS AND RECOMMENDATIONS

1. The site is suitable for the proposed sewer project provided the recommendations presented in this report are incorporated into the project plans and specifications.
2. All grading plans should be reviewed by GSI SOILS hereinafter described as the Geotechnical Engineer, prior to contract bidding. This review should be

performed to determine whether the recommendations contained within this report are incorporated into the project plans and specifications.

3. The Geotechnical Engineer should be notified at least two (2) working days before site clearing or grading operations commence, and should be present to observe the stripping of deleterious material and provide consultation to the Grading Contractor in the field.
4. Field observation and testing during the grading operations should be provided by the Geotechnical Engineer so that a decision can be formed regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the project geotechnical specifications. Any work related to grading performed without the full knowledge of, and under direct observation of the Geotechnical Engineer, may render the recommendations of this report invalid.

#### 5.1 **Clearing and Stripping**

1. All surface and subsurface deleterious materials should be removed from the proposed sewer line and disposed of off-site. This includes, but is not limited to any buried utility lines, loose fills, septic systems, debris, building materials, and any other surface and subsurface structures within proposed alignment. Voids left from site clearing, should be cleaned and backfilled as recommended for structural fill.
2. Once the site has been cleared, the exposed ground surface should be stripped to remove surface vegetation and organic soil. The surface may be disced, rather than stripped, if the organic content of the soil is not more than three percent by weight. If stripping is required, depths should be determined by a member of our staff in the field at the time of stripping. Strippings may be either disposed of off-site or stockpiled for future use in landscape areas if approved by the landscape architect.

## 5.2 Conventional Sloped Trench Excavation

1. Conventional earth moving equipment should be adequate to excavate the soils along the alignment. We anticipate the use of a large backhoe or excavator to construct the trench. Excavated soils to a depth of 3 feet or less may be placed no closer than 2 feet from the edge of the trench. If 3 feet or thicker, the soils should be no closer than 5 to 7 feet. In addition, heavy equipment should be kept at a safe distance from trench sidewalls. At a minimum, equipment should be kept 5 feet from the edge of the trench.
2. From Oklahoma Avenue to the Detective Bureau (borings B-1 to B-5) soft soils were encountered in the upper 10 feet. The trench walls to a depth of 7 feet (average groundwater depth) should be sloped at an inclination of 1.5:1 (horizontal:vertical). However, below the water table to a depth of 10 to 12 feet slopes of 2:1 (H:V) or flatter are more likely. Dewatering will be required also to maintain the proposed slopes. Between the Detective Bureau and Camp SLO (borings B-6 to B-8) the 1:1 (H:V) slopes should be applicable for the firm to stiff clays encountered in the upper 8 to 10 feet. Due to the conditions encountered at the site alternative trenching or installation methods may be more appropriate. The following report sections discuss the use of micro tunneling and support shields.
3. It should be noted that it is the *Contractor's* responsibility to maintain safe cut slopes based on actual field conditions and according to OSHA requirements. The slopes presented are those we expect will be used in project design and we have assumed that in general the slopes will not be open for more than 2 to 3 days and occasionally for 5 days. The stability of the slopes may be compromised somewhat where these conditions exist due to softening or piping of the saturated materials.
4. As noted previously, surface water, ground water and shallow perched ground water should be anticipated along portions of the alignment. Dewatering will be necessary for installation of the sewer line. The *Contractor* should be

responsible for proper design, installation, and operation of dewatering facilities during construction.

5. Where the excavation bottom is locally wet, soft and yielding, it is recommended that the bottom of the trench be stabilized prior to placement of pipe bedding. Methods such as the use of a washed gravel along the trench bottom covered with a geotextile fabric such as Supac 8NP or placement of a Class I or II base material over a similar fabric could be used. The *Contractor* should be responsible for design and implementation of trench stabilization techniques.
6. Where the temporary trench slopes are inclined as described above, no shoring is required. However, in some locations where adjacent features such as roads, or structures are located, the *Contractor* may elect to use shoring in order to minimize the top width of the trench. In no case should personnel enter trenches with vertical sidewalls greater than 5 feet deep without proper shoring. Design and installation of the shoring should be the responsibility of the *Contractor* and should be performed according to OSHA requirements.
7. The areas around shored excavations will experience some amount of ground settlement. For the types of soils to be encountered along the pipeline alignment (assuming average to good workmanship in shoring), we anticipate a maximum settlement of about 0.4 percent of the depth of excavation, immediately adjacent to the shoring. For a 5 foot deep trench, this translates to nearly 1/4-inch settlement. The amount of settlement should decrease more or less linearly away from the trench wall, reaching zero settlement at a distance from the trench wall equal to twice the trench depth, or about 10 feet away for a 5 foot deep trench.

### 5.3 Shored Excavations

1. If vertical excavations are planned, the trenches should be shored. As indicated above, the trench will require dewatering. Lateral earth pressures to be used in the design of the shorings are presented in Figure 3.

2. Trench shoring products that could be considered are steel or corrugated aluminum hydraulic shoring devices, trench shields, and trench plates. The shallow depth to ground water, particularly from Oklahoma Avenue to the Detective Bureau will necessitate a dewatering system to be installed with the shores. The loose conditions of the possible fill sands (boring B-4) may also result in collapse of the trenches during excavation. Some form of excavation supports (slurry, etc.) may be required during digging.
3. The areas around shored excavations will experience some amount of ground settlement. For the types of soils to be encountered along the pipeline alignment (assuming average to good workmanship in shoring), we anticipate a maximum settlement of about 0.4 percent of the depth of excavation, immediately adjacent to the shoring. For a 10 foot deep trench, this translates to nearly 1/2-inch settlement. The amount of settlement should decrease more or less linearly away from the trench wall, reaching zero settlement at a distance from the trench wall equal to twice the trench depth, or about 20 feet away for a 10 foot deep trench.

#### 5.4 Microtunneling

1. An alternative to trenching would be microtunneling. Microtunneling is a system of remotely controlled pipejacking that typically uses laser guides to accurately place the pipe. A slurry pressure balance system would be required for this site due to the high groundwater table.
2. Jacking and receiving pits will likely be vertically sided excavations with sheet piling and/or shoring and bracing systems. Due to the soft soils and shallow water table, sheet piling would likely be the preferred choice. As discussed above, ground water control will be required. Systems such as well points or deep wells could be considered. If sheet piling is used, they should be driven to a depth of approximately 20 to 25 feet below grade. The lateral pressures presented in Figure 3 could be used in the design of the piling.

3. It is unlikely that boulders or other natural obstructions would impede the advance of the equipment. However, the soft condition of the soils may result in loss of ground during tunneling. If this occurs, equipment that can exert a stabilizing pressure on the tunnel face may be required.

**5.5 Pipe Zone Backfill**

1. For purposes of the following discussion, Pipe Zone Backfill is defined as the material that extends from 6 inches below the pipe to 12 inches above. It forms the contact between the pipe and the foundation upon which it rests.
2. A common Pipe Zone Backfill (or compacted granular material) that GSI Soils typically recommends conforms to the following gradation:

<b>Gradation for Pipe Zone Backfill</b>	
<b>Sieve Size</b>	<b>Percent Passing by Weight</b>
3/4-inch	100
No. 4	29-90
No. 200	0-12

In addition to these gradation requirements, we recommend that the Pipe Zone Backfill have a minimum Sand Equivalent of 30 (California Standard Test No. 217). A Pipe Zone Backfill that meets the gradation and Sand Equivalent, will have good filter capability to prevent fines from migrating from the adjacent soils.

3. If the pipe manufacturers do not have special requirements to the contrary, Pipe Zone Backfill should be placed in loose lifts not exceeding 6 to 8 inches and compacted by mechanical means to at least 90 percent of the maximum dry density, as determined by ASTM Test Procedure D1557-91 or not less than 70 percent of relative density, as determined by ASTM D4253 and D4254. The pipe should be placed on the flat surface of compacted Pipe Zone Backfill material or

on bedding material that is shaped appropriately as required by design.

4. It should be noted that extra care should be taken to properly compact the backfill where the pipe enters or leaves appurtenant structures. This is sometimes the most difficult place to achieve proper compaction, but it is critical that the pipeline be properly supported so as to minimize differential movement between the pipe and structure. If welding pits are excavated adjacent to any structure or along the pipeline alignment, the pit should be backfilled with aggregate base material and/or lean concrete to ensure proper support. Another alternative would be to design flexible joints to accommodate the differential settlement adjacent to the structure.

#### **5.6 Trench Backfill**

1. Trench Backfill is the material that is placed in the pipeline trench above the Pipe Backfill, from 12 inches above the top of the pipe to 18 inches below final grade, or if the trench is under pavement, 18 inches below the pavement subgrade.
2. Trench Backfill should consist of native material excavated from the trench, with all deleterious material, such as organics, concrete, and asphalt removed. Materials which are classified as Pt, OH, CH, MH, or OL according to ASTM D2487, should not be used in the Trench Backfill. No particles larger than 3 inches should be allowed. The native materials primarily consist of sandy clays (CL). About 25 percent of materials excavated overall from the trench are estimated to be too highly plastic to serve as acceptable trench backfill material. This material should not be used as backfill, and should be replaced with less plastic material excavated from other portions of the trench.
3. Trench Backfill along all pipelines should be spread evenly in loose, horizontal layers not exceeding 8 inches in thickness. This thickness is recommended to facilitate compaction. The moisture content of the fill should be within +1 percent to +3 percent of the optimum moisture content and compacted using mechanical equipment. Each lift of trench backfill should be compacted to no less than 85

percent of the maximum dry density as determined by ASTM Test Procedure D1557-91.

4. If flooding/jetting is acceptable, it should be a free draining granular material as discussed above and adequately compacted. Based on our observation of the site materials, flooding and/or jetting of the trench backfill derived from most native materials will not be considered feasible.
5. The final 18 inches of backfill should be placed in the same manner and at the same percent of relative compaction specified for Trench Backfill. Within roadway or other vehicle traffic areas the backfill should be compacted to 95 percent of the maximum dry density as determined by the ASTM Test Procedure D1557-91.

**5.7 Thrust Block Requirements**

1. The pipe may require some thrust block supports where the pipeline will make relatively abrupt changes in elevation. For design, a passive earth pressure of 200 pcf should be used for all geotechnical terrain segments.
2. If frictional forces are required for thrust analyses in the design of steel pipes, a coefficient of friction between the pipe and the surrounding backfill soil may be considered. Unless otherwise specified by the manufacturer, the following general coefficient of friction/friction angles are provided.

<b>Recommended Coefficient of Friction/Friction Angle</b>	
	<b>Recompacted Native Soils, Sandy Clays (CL)</b>
Steel <sup>1</sup>	0.25/14°
Concrete or Mortar <sup>1</sup>	0.30/17°
PVC	0.18/10°
<sup>1</sup> NAFACDM7.02 (1986)	

**5.8 Manholes**

1. In order to help minimize potential settlement problems associated with manholes supported on soft soils, the soils engineer should be consulted for specific site recommendations during grading. At a minimum the manhole concrete pads should be supported on 2 feet of compacted crushed gravel. Where soft conditions are encountered a layer of fabric (Mirafi 600x or equivalent) should be placed below the crushed gravel.
2. An allowable dead plus live load bearing pressure of 1000 psf may be used for design of the manholes. For lateral loads a friction factor of 0.25 and a passive resistance of 250 pcf could be used.

**5.9 Preparation of Paved Areas**

1. Pavement areas should be scarified to a depth of 12 inches below existing grade or finished subgrade. The soil should then be wetted to slightly above optimum moisture content and compacted a minimum of 90 percent of maximum dry density.
2. The upper 6 inches of subgrade beneath all paved areas should be compacted to at least 95 percent relative compaction. Subgrade soils should not be allowed to dry out or have excessive construction traffic between the time of water conditioning and compaction, and the time of placement of the pavement structural section.

**5.10 Structural Fill**

1. On-site soils free of organic and deleterious material are suitable for use as structural fill. Structural fill should not contain rocks larger than 6 inches in greatest dimension, and should have no more than 15 percent larger than 2.5 inches in greatest dimension.
2. Import should be free of organic and other deleterious material and should have low expansion potential, with a plasticity index of 12 or less. Before delivery to

the site, a sample of the proposed import should be tested in our laboratory to determine its suitability for use as structural fill.

3. Structural fill using on-site inorganic soil or approved import should be placed in layers, each not exceeding eight inches in thickness before compaction. On-site inorganic or imported soil should be conditioned with water, or allowed to dry, to produce a soil water content at approximately optimum value, and should be compacted to at least 90 percent relative compaction based on ASTM D1557-91.

**5.11 Pavement Design**

1. The following table provides recommended pavement sections based on an estimated R-Value of 8 for the near surface clay soils encountered at the site.
2. All asphalt pavement construction and materials used should conform with Sections 26 and 39 of the latest edition of the Standard Specifications, State of California, Department of Transportation. Aggregate bases and sub-bases should also be compacted to a minimum relative compaction of 95 percent based on ASTM D1557-91.

RECOMMENDED MINIMUM ASPHALT CONCRETE PAVEMENT SECTIONS DESIGN THICKNESS		
T.I.	A.C. (in.)	A.B. (in.)
4.0	2.0	8.5
4.5	2.5	9.0
5.0	2.5	10.5
5.5	3.0	11.0
6.0	3.0	14.0
7.0	3.5	16.0
8.0	4.5	17.5
T.I. = Traffic Index A.C. = Asphaltic Concrete - must meet specifications for Caltrans Type B Asphalt Concrete A.B. = Aggregate Base - must meet specifications for Caltrans Class II Aggregate Base (R-Value = minimum 78)		

3. R-value samples should be obtained and tested at the completion of rough grading and the pavement sections confirmed or revised. A minimum of 6 inches of Class II aggregate base is recommended beneath all asphaltic concrete pavement sections and all sections should be crowned for good drainage.
4. Using the R-Value of 8, a Modulus of Rupture for concrete of 500 psi (based on a minimum strength of 3,000 psi) minimum pavement sections are presented in the following table for Traffic Indices (TI) of 4.0 to 8.0.

RECOMMENDED MINIMUM CONCRETE PAVEMENT SECTIONS		
Traffic Index (T.I.)	Concrete inches (ft)	Caltrans Class II Aggregate Base inches* (ft)
4.0	6.0 (.50)	4.0 (.33)
5.0	6.5 (.54)	4.0 (.33)
6.0	7.0 (.58)	4.0 (.33)
7.0	7.5 (.63)	4.0 (.33)
8.0	8.0 (.66)	4.0 (.33)

\* A minimum of 4 inches of Class II aggregate base is recommended.

5. Concrete pavement construction should generally comply with the requirements of Sections 40 and 90 of the latest edition of the Standard Specifications, State of California, Department of Transportation.
6. Recommendations for mix design, curing, joints and reinforcement should be as promulgated by the Portland Cement Association. Control and construction joints should be used to separate the pavements into approximately square shaped areas at a spacing of no more than 20 feet on-center, each way. A concrete shrinkage of approximately 1/16-inch per 10 feet of length should be anticipated and joints should be designed accordingly.

7. It is recommended that all joints in and adjacent to the PCC pavement be sealed to preclude entry of water into the soils underlying paved areas.

**5.12 Corrosion**

1. Soil resistivity tests were performed on samples obtained from borings B-1 at 2-feet, boring B-8 at 5 feet. Resistivity values of 2400 and 1880 ohm-cm were measured respectively.
2. One (1) soil sample was also tested to measure pH, and the concentrations of chloride and sulfate. The results are presented in the following table.

<b>Chemical Tests</b>					
<b>Sample Location</b>	<b>Depth</b>	<b>Soil Type</b>	<b>pH</b>	<b>Sulfates (ppm)</b>	<b>Chloride (ppm)</b>
B-8	2'	Silty Sand (SM)	7.0	45	170

3. The results indicate that sulfate salt concentrations should not effect normally formulated Type II concrete. Similarly the chloride concentrations and resistivity results indicate that the potential for corrosion of ferrous pipes is in the mildly corrosive to moderately corrosive range. We would recommend that a corrosion consultant be contacted regarding protection of ferrous pipes.

**6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS**

1. It should be noted that it is the responsibility of the owner or his/her representative to notify **GSI Soils** a minimum of 48 hours before any stripping, grading, or foundation excavations can commence at this site.
2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed during our study. Should any variations or undesirable conditions be encountered during grading of the site,

**GSI Soils** will provide supplemental recommendations as dictated by the field conditions.

3. This report is issued with the understanding that it is the responsibility of the owner or his/her representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project, and incorporated into the project plans and specifications. The owner or his/her representative is responsible for ensuring that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.
4. As of the present date, the findings of this report are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they be due to natural processes or to the works of man on this or adjacent properties. Legislation or the broadening of knowledge may result in changes in applicable standards. Changes outside of our control may find this report to be invalid, wholly or partially. Therefore, this report should not be relied upon after a period of three (3) years without our review nor is it applicable for any properties other than those studied.
5. Validity of the recommendations contained in this report is also dependent upon the prescribed testing and observation program during the site preparation and construction phases. Our firm assumes no responsibility for construction compliance with these design concepts and recommendations unless we have been retained to perform continuous on-site testing and review during all phases of site preparation, grading, and foundation/slab construction.

October 29, 2002

Project 2-1254

Thank you for the opportunity to have been of service in preparing this report. If you have any questions or require additional assistance, please feel free to contact the undersigned at (805) 543-5493.

Sincerely,

**GSI SOILS**

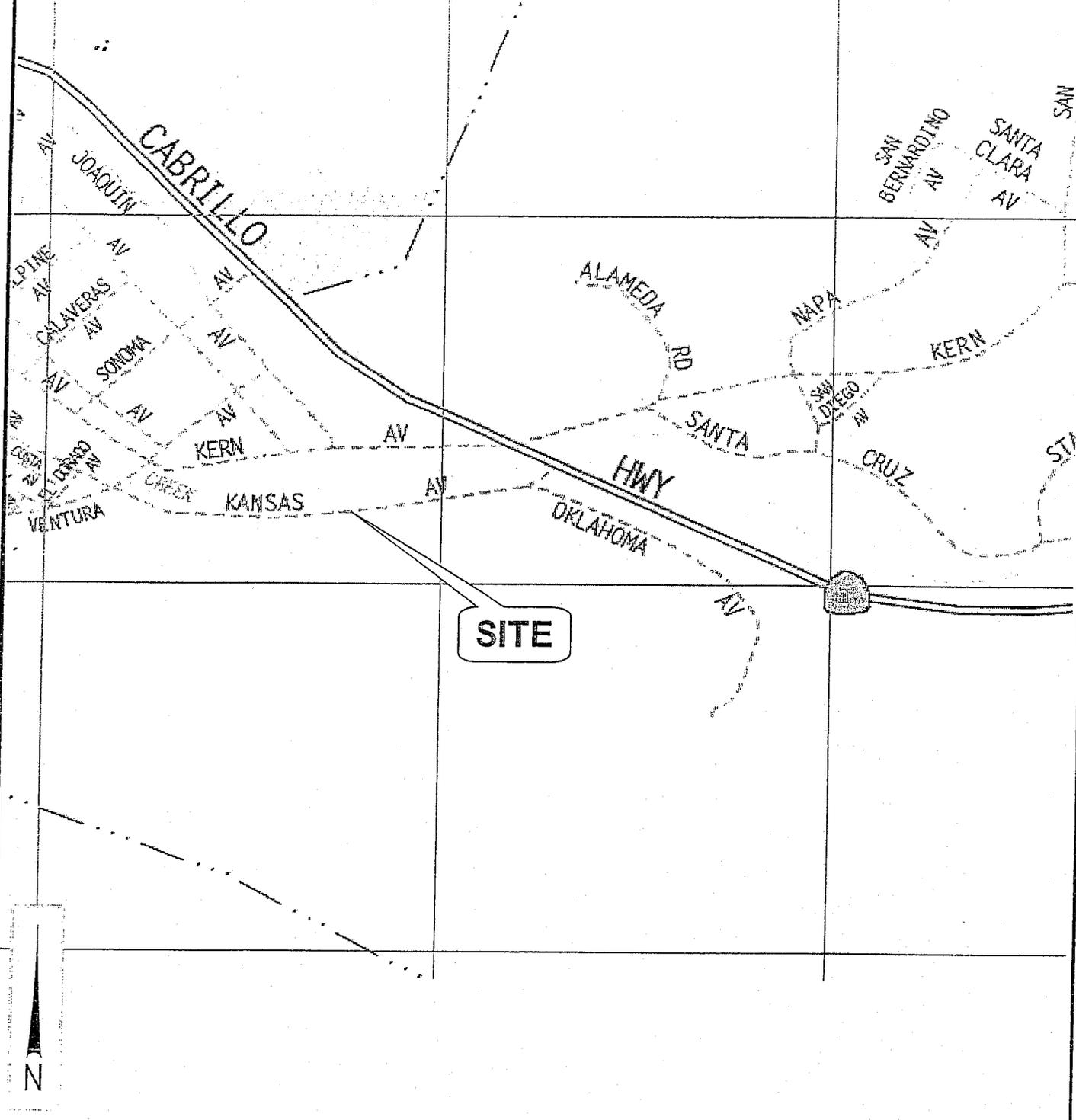


Ronald J. Church  
Senior Engineer  
GE #2184



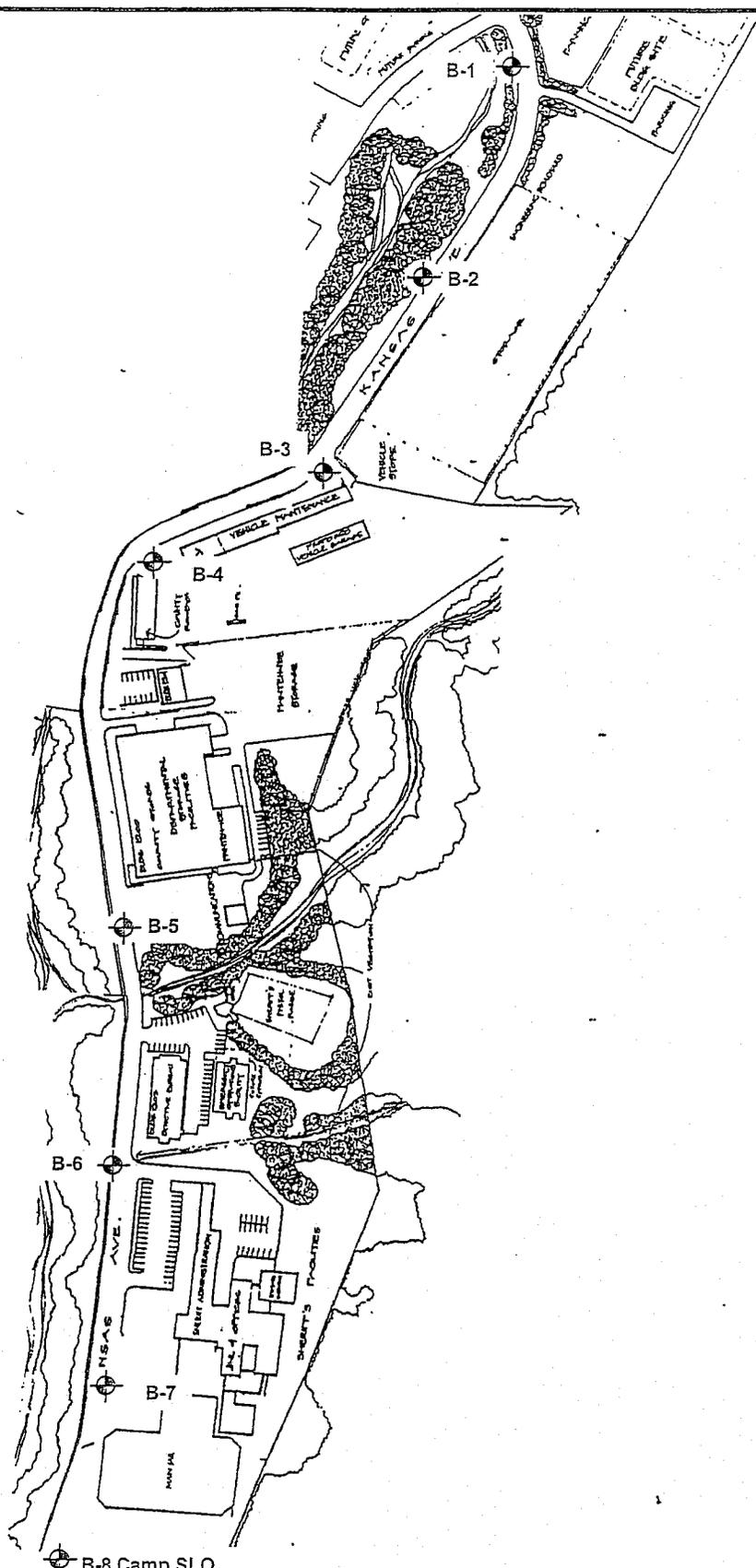
## FIGURES AND TABLES

633



SITE MAP  
 SEWER LINE REPLACEMENT PROJECT  
 KANSAS AVENUE  
 SAN LUIS OBISPO, CALIFORNIA

Project No.	Figure No.
2-1254	1



*Handwritten signature or initials.*

⊕ Boring Location

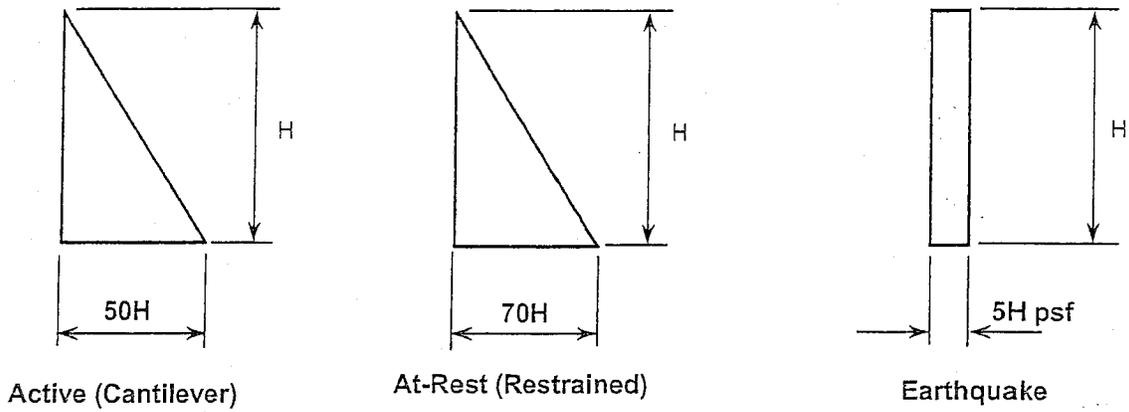
⊕ B-8 Camp SLO



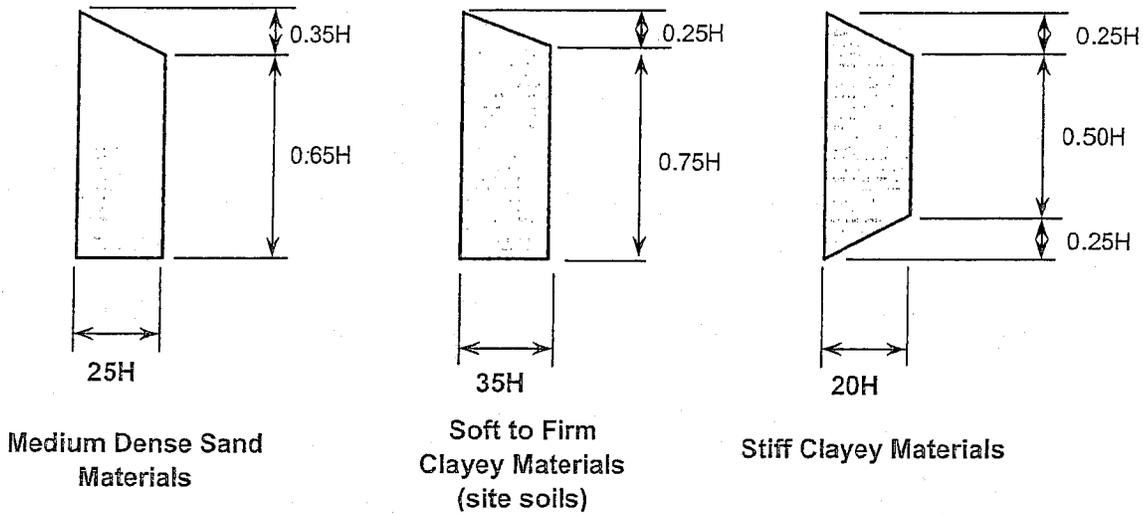
SITE PLAN  
SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE  
SAN LUIS OBISPO, CALIFORNIA

Project No.	Figure No.
2-1254	2

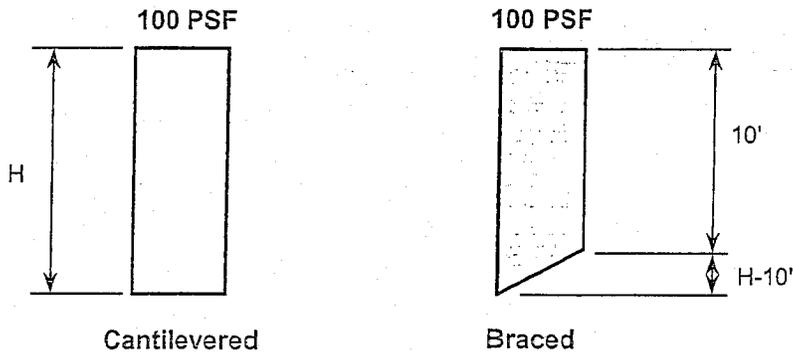
PERMANENT WALLS (DRAINED)



TEMPORARY WALLS (BRACED EXCAVATIONS, DRAINED)



ADDITIONAL LOADS DUE TO CONSTRUCTION<sup>(a)</sup>



<sup>(a)</sup> Based on surcharge load of 200 psf



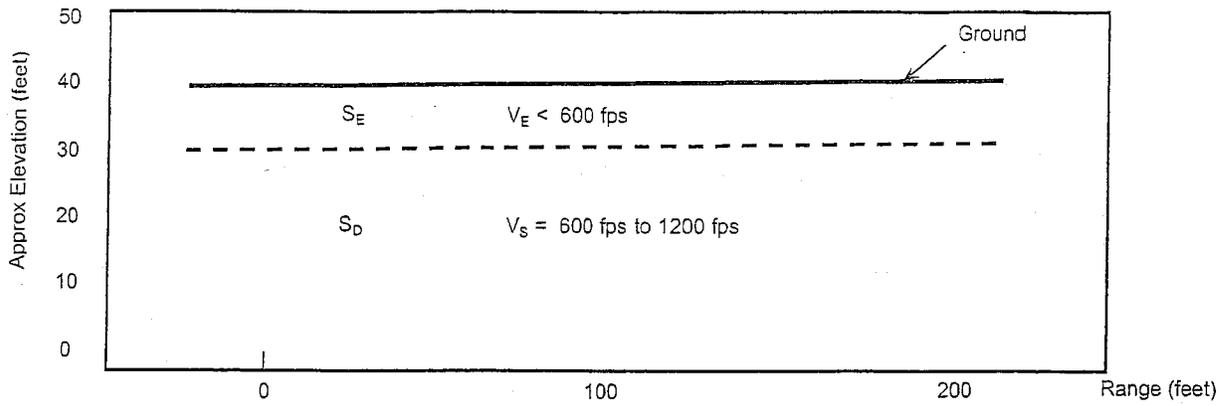
LATERAL EARTH PRESSURES

Project No.

Figure No.

2-1254

3



Soil Profile Type

- S<sub>E</sub>
- S<sub>D</sub>
- S<sub>C</sub>
- S<sub>B</sub>
- S<sub>A</sub>

Seismic Source Type

- Seismic Type A
- Seismic Type B
- Seismic Type C

Closest Distance to Active Fault

- < 2 km
- 5 km
- 10 km
- < 15 km

Seismic Coefficient

- C<sub>a</sub> (Seismic Coefficient) = 0.44 N<sub>a</sub>
- N<sub>a</sub> (Near-Source Factor) = 1.0
- C<sub>v</sub> (Seismic Coefficient) = 0.64 N<sub>v</sub>
- N<sub>v</sub> (Near-Source Factor) = 1.2

Soil Profile Type

- S<sub>A</sub> = Hard Rock
- S<sub>B</sub> = Rock
- S<sub>C</sub> = Very Dense Soil and Soft Rock
- S<sub>D</sub> = Stiff Soil Profile
- S<sub>E</sub> = Soft Soil Profile

Shear Wave Velocity, V<sub>s</sub> (fps)

- > 5,000
- 2,500 to 5,000
- 1,200 to 2,500
- 600 to 1,200
- < 600

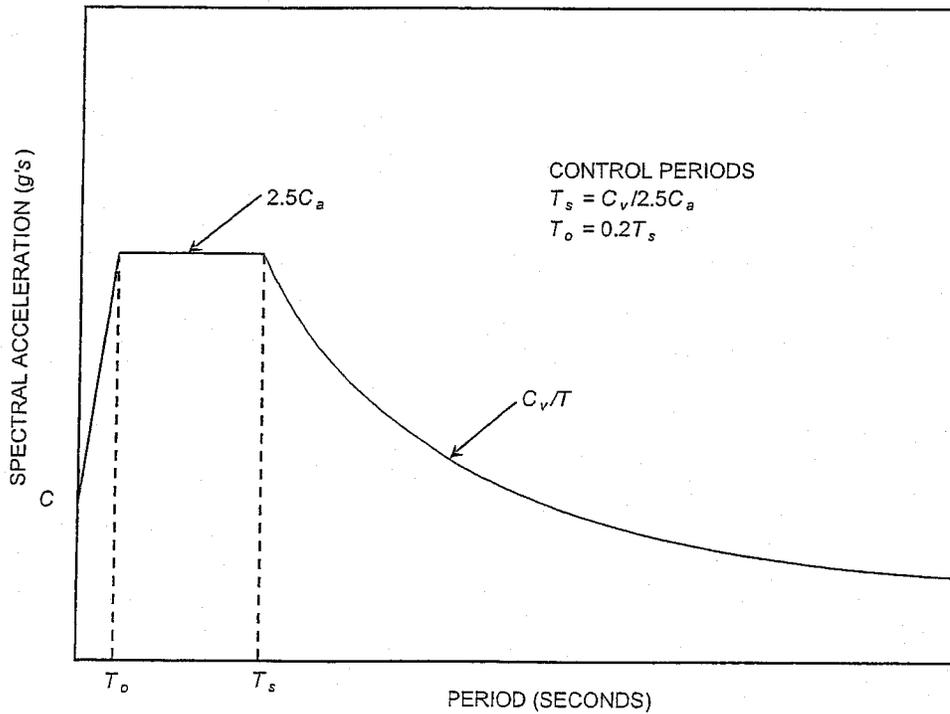


FIGURE 16.3 - DESIGN RESPONSE SPECTRA



UBC SEISMIC FACTORS AND COEFFICIENTS, CHAPTER 16

Project No.

2-1254

Figure No.

4

PROJECT:  
SEWER LINE REPLACEMENT PROJECT

PROJECT NUMBER: 2-1254  
DATE: October 29, 2002

LATITUDE: 35.3217 DEGREES  
LONGITUDE: 12.7275 DEGREES  
SOIL CLASS\*: C Gb= 0  
Gc= 1

SOIL CLASSES\*: A - HARD BEDROCK  
B - SOFT BEDROCK & TERRACE  
C - ALLUVIUM  
D - BAY MUDS, PEAT

TABLE 1  
SEISMICITY TABLE

LOWER LEVEL EARTHQUAKE (LLE) and UPPER LEVEL EARTHQUAKE (ULE)  
PEAK HORIZONTAL GROUND ACCELERATION (PHGA) ESTIMATE  
(PREDICTIVE PHGA EQUATION FROM BOORE, JOYNER AND FUMAL, 1993\*)

FAULT ZONE/ ACTIVITY LEVEL	LLE MOMENT MAGNITUDE (Mw)	ULE MOMENT MAGNITUDE (Mw)	DISTANCE TO SITE (km)	DIRECTION FROM SITE (COMPASS)	MAX. DURATION OF SHAKING** (seconds)	LLE PHGA* (g)	ULE PHGA* (g)
Los Osos [H]	6.6	6.8	4	SW	24	0.45	0.49
Hosgri [H]	6.8	7.3	21	SW	28	0.24	0.31
San Andreas [H]	7.6	7.8	58	NE	20	0.17	0.19
San Simeon [H]	6.6	7.3	56	NW	11	0.11	0.15
Oceanic [LQ]	6.7	6.9	10	SE	24	0.36	0.40
San Luis Range [LQ]	6.7	7.0	39	SE	24	0.15	0.17
Rinconada [LQ]	6.8	7.3	17	NE	26	0.27	0.35
Cambria [LQ]	6.1	6.3	21	NW	12	0.17	0.19
Wilmar Ave-SL Bay-Olson [LQ]	6.3	6.5	21	S	26	0.19	0.21
Oceano [LQ]	5.7	6.0	21	S	23	0.14	0.16
Casmalia [LQ]	6.3	6.5	44	S	17	0.11	0.12
Lion's Head [LQ]	6.3	6.6	50	S	17	0.10	0.12
Point San Luis [LQ]	6.5	7.0	19	SW	24	0.22	0.28
Big Pine [LQ]	6.5	6.9	124	SE	18	0.05	0.07
Los Alamos-Baseline [LQ]	6.6	6.8	98	SE	22	0.07	0.08
Santa Lucia Bank [Q]	6.8	7.3	64	W	20	0.11	0.14
La Panza [Q]	6.5	7.0	29	NE	23	0.17	0.21
San Juan [Q]	6.5	7.0	48	E	22	0.11	0.14
Ozena [Q]	6.5	7.0	108	SE	17	0.06	0.08

\* BOORE, JOYNER AND FUMAL, 1993: U.S.G.S. OPEN-FILE REPORT 93-509

S.B. = SIERRA BLOCK

\*\* BOLT, B.A., 1973: DURATION OF STRONG GROUND MOTION: PROC. FIFTH WORLD CONFERENCE ON EARTHQUAKE ENGINEERING, ROME, PAPER NO. 92, PP. 1304-1313.

Mw BASED ON PUBLISHED SLIP RATE DATA, WHERE AVAILABLE AND BRACKETED, i.e.

PETERSEN AND WESNOUSKY, 1994, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, VOL 84, No. 5, pp. 1608 - 1649

WORKING GROUP ON CALIF. EARTHQUAKE PROBABILITIES, 1995, BULL. OF SEISMO. SOC. OF AM., VOL. 85, No. 2, pp. 379 - 439.

PETERSEN AND OTHERS, 1996, CALIF. DIV. OF MINES & GEOLOGY, OFR 96-08 // U.S. GEOLOGICAL SURVEY OFR 96-706

ALTERNATELY, WHEN SLIP RATE DATA IS ABSENT OR NON-BRACKETED Mw BASED ON:

(1) A POSTULATED RUPTURE L (M/ULE) OR  $L_{seg}$  (M/LE) AND ASSOCIATED SLIP RATE, WHERE L IS TOTAL FAULT LENGTH (ALL SEGMENTS);

OR

(2) A PUBLISHED SOURCE CATALOG OF ESTIMATED LLE OR ULE EVENTS, i.e.:

SCHWARTZ, 1994, ATC 35-1 SEMINAR PROCEEDINGS, pp. 4-1 to 4-9.

MUALCHIN AND JONES, 1992, C.D.M.G. OPEN-FILE REPORT 92-1.

LLE = 10% EXCEEDENCE IN 50 YEARS

ULE =  $M_{max}$  [PETERSEN: CDMG OFR 96-08]

[Q] = QUATERNARY/POTENTIALLY ACTIVE; [LQ] = LATE QUATERNARY/POTENTIALLY ACTIVE; [H] = HOLOCENE/ACTIVE

**APPENDIX A**

Field Investigation  
Key to Boring Logs  
Boring Logs

## FIELD INVESTIGATION

### Test Hole Drilling

The field investigation was conducted on October 1 and 2, 2002. Eight (8) exploratory borings were drilled at the approximate locations indicated on the Site Plan, Figure 2. The locations of these borings were approximated in the field.

Undisturbed and bulk samples were obtained at various depths during test hole drilling. The undisturbed samples were obtained by driving a 2.4-inch inside diameter sampler into soils. Bulk samples were also obtained during drilling.

### Logs of Boring

A continuous log of soils, as encountered in the borings was recorded at the time of the field investigation, by a Staff Engineer. The Exploration Boring Logs are attached.

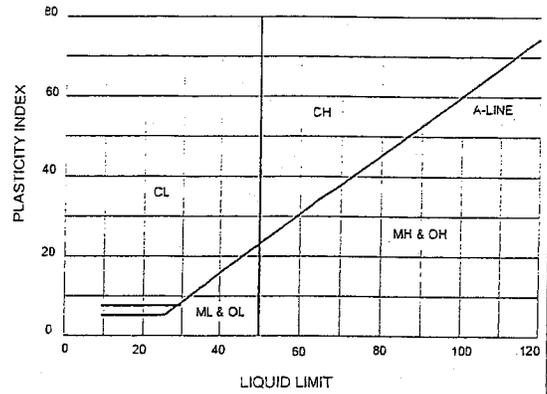
Locations and depth of sampling, in-situ soil dry densities and moisture contents are tabulated in the Boring Logs.

# UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION	SYMBOLS	TYPICAL NAMES	
<b>GRAVELS</b> Over 50% > #4 sieve	CLEAN GRAVELS WITH LITTLE OR NO FINES GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES	
	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES	
	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES	
	GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES	
<b>SANDS</b> Over 50% < #4 sieve	CLEAN SANDS WITH LITTLE OR NO FINES SW	WELL GRADED SANDS, GRAVELLY SANDS	
	SP	POORLY GRADED SANDS, GRAVELLY SANDS	
	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES	
	SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES	
<b>SILTS AND CLAYS</b> Liquid limit < 50	ML	INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	
	OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	<b>SILTS AND CLAYS</b> Liquid limit > 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC CLAYS	PI	PEAT AND OTHER HIGHLY ORGANIC SOILS	

## PLASTICITY CHART

USED FOR CLASSIFICATION OF FINE GRAINED SOILS



### SOIL GRAIN SIZE

		U.S. STANDARD SIEVE								
		6"	3"	3/4"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL			SAND			SILT	CLAY	
		COARSE	FINE		COARSE	MEDIUM	FINE			
		150	75	19	4.75	2.0	0.425	0.075	0.002	
SOIL GRAIN SIZE IN MILLIMETERS										

### SAMPLE DRIVING RECORD

BLOWS PER FOOT	DESCRIPTION
25	25 BLOWS DROVE SAMPLER 12 INCHES, AFTER INITIAL 6 INCHES OF SEATING
50/7"	50 BLOWS DROVE SAMPLER 7 INCHES, AFTER INITIAL 6 INCHES OF SEATING
Ref/3"	50 BLOWS DROVE SAMPLER 3 INCHES DURING OR AFTER INITIAL 6 INCHES OF SEATING

NOTE: TO AVOID DAMAGE TO SAMPLING TOOLS, DRIVING IS LIMITED TO 50 BLOWS PER 6 INCHES DURING OR AFTER SEATING INTERVAL

### KEY TO TEST DATA

<b>B</b>	Bag Sample	CONS	Consolidation (ASTM D2435)
	Drive, No Sample Collected	DS	Cons. Drained Direct Shear (ASTM D3080)
	2 1/2" O.D. Mod. California Sampler, Not Tested	PP	Pocket Penetrometer
	2 1/2" O.D. Mod. California Sampler, Tested	GSD	Grain Size Distribution (ASTM D422)
	Standard Penetration Test	CP	Compaction Test (ASTM D1557)
	Sample Attempted with No Recovery	EI	Expansion Index (ASTM D4829)
	Water Level at Time of Drilling	LL	Liquid Limit (in percent)
	Water Level after Drilling	PI	Plasticity Index

#### RELATIVE DENSITY

SANDS, GRAVELS, AND NON PLASTIC SILTS	BLOWS/FOOT
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

#### RELATIVE DENSITY

CLAYS AND PLASTIC SILTS	STRENGTH	BLOWS/FOOT
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32



PROJECT NO.:	2-1254	SOIL CLASSIFICATION CHART
DATE DRILLED:	10/2/02	AND BORING LOG LEGEND
<b>SEWER LINE REPLACEMENT PROJECT</b>		FIGURE NO.
<b>SAN LUIS OBISPO, CALIFORNIA</b>		<b>A-1</b>

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-1

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT): 8.0

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS	
359	1		Baserock										
358	2		Sandy Clay: dark grey, slightly moist to moist, fine to medium grained, soft	CL	B		37.3						
357	3												
356	4		moist to very moist, firm										
355	5				5	29.5							
354	6												
353	7												
352	8			saturated									
351	9			very soft		B		44.3					
350	10												
349	11					2	56.8						
348	12												
347	13					B		67.8					
346	14												
345	15			stiff			9						
344	16			Boring Terminated at 15 feet									
343	17												
342	18												
341	19												
340	20												

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-2

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-2

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT): 8.0

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLAST. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
359	1		Baserock/Redrock									
358	2		Sandy Clay: dark brown, moist, fine to medium grained, trace gravels, soft	CL	B		22.4					
357	3											
356	4											
355	5		firm			▲	10	22.8	88.3			
354	6											
353	7											
352	8		saturated			B		24.0				
351	9											
350	10					■	5	35.9				
349	11											
348	12					B		39.8				
347	13											
346	14											
345	15		stiff	Boring Terminated at 15 feet		■	9					
344	16											
343	17											
342	18											
341	19											
340	20											

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-3

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-3

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT): 9.0

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS		
359	1		AC Baserock											
358	2		Sandy Clay: dark greyish brown, moist to moist, fine to medium grained, soft  very moist, firm  saturated  very soft  firm	CL	B		28.6							
357	3													
356	4													
355	5							5	41.2		36	19		
354	6													
353	7							B						
352	8													
351	9													
350	10								2					
349	11													
348	12							B		56.7				
347	13													
346	14													
345	15							5						
344	16					Boring Terminated at 15 feet								
343	17													
342	18													
341	19													
340	20													

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-4

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-4

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT): 5.0

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
359	1		Base/Redrock									
358	2		Sand PG, brown, slightly moist, fine to medium grained, trace gravels, loose (fill)	SP	B		9.8					
357	3											
356	4											
355	5		saturated			4	20.3	97.2				
354	6											
353	7		greyish brown		B		30.2					
352	8											
351	9											
350	10		very loose			3	49.4					
349	11											
348	12				B							
347	13											
346	14											
345	15		Boring Terminated at 15 feet			2	62.6					
344	16											
343	17											
342	18											
341	19											
340	20											

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-5



LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-6

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			AC Baserock									
359	1		Sandy Clay, yellow brown, moist to moist, fine to medium grained, soft	CL	B		26.2					
358	2											
357	3		Silty Clay, dark brown, moist, fine to medium grained, soft	CL	▲	10	23.2	105.0				
356	4											
355	5											
354	6		moist		B		21.2					
353	7											
352	8											
351	9											
350	10		Clayey Sand, yellow brown, slightly moist, trace gravels, loose	SC	■	6						
349	11											
348	12				B		9.6					
347	13											
346	14											
345	15		Boring Terminated at 15 feet		■	10	19.6					
344	16											
343	17											
342	18											
341	19											
340	20											

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-7

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-7

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS	
			AC Baserock										
359	1		Silty Clay, yellow brown, moist, fine to medium grained, soft  stiff  very stiff	CL									
358	2				B	24.2	32	16					
357	3												
356	4												
355	5						8	29.2					
354	6												
353	7						B	22.0					
352	8												
351	9												
350	10							24	11.0				
349	11		Clayey Sand, yellow brown, slightly moist, trace gravels, medium dense	SP									
348	12				B								
347	13												
346	14												
345	15		Boring Terminated at 15 feet			26	10.3						
344	16												
343	17												
342	18												
341	19												
340	20												

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-8

LOGGED BY: PRF

DRILL RIG: Simco 2400

BORING NO.: B-8

ELEVATION: 360'

BORING DIAMETER (INCH): 4

DATE DRILLED: 2 October 2002

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Baserock									
359	1		Silty Sand, yellow brown, slightly moist, fine to medium grained, loose	SM								
358	2		moist		B		9.8					
357	3											
356	4											
355	5		Clayey Sand, brown, moist, trace gravels, medium dense	SC		11	10.4					
354	6											
353	7				B		14.0					
352	8											
351	9											
350	10					22						
349	11											
348	12				B		13.0					
347	13											
346	14		very dense									
345	15		Sandy Clay, yellow brown, moist to very moist, trace gravels, soft	CL		70						
344	16											
343	17											
342	18				B		23.3					
341	19											
340	20		Boring Terminated at 20 feet									

EXPLORATORY BORING LOGS



SEWER LINE REPLACEMENT PROJECT  
KANSAS AVENUE

PROJECT NO.  
2-1254

DATE  
October-02

FIGURE NO.  
A-9

## **APPENDIX B**

Laboratory Testing  
Moisture-Density Tests  
Direct Shear Test  
R-Value Test  
Expansion Index  
Atterberg Limits  
Optimum-Moisture/Maximum Density

## LABORATORY TESTING

### Moisture-Density Tests

The field moisture content, as a percentage of the dry weight of the soil, was determined by weighing samples before and after oven drying. Dry densities, in pounds per cubic foot, were also determined for the undisturbed samples. Results of these determinations are shown in the Exploration Drill Hole Logs.

### Direct Shear Test

Direct shear tests were performed on undisturbed samples, to determine strength characteristics of the soil. The test specimens were soaked prior to testing. Results of the shear strength tests are attached.

### Resistance (R) Value Test

An R-Value test was estimated based on sieve analysis and plasticity on a bulk sample obtained from boring B-2. The results of the tests indicate that the soils have an R-Value of 8.

### Expansion Index Tests

Expansion index (EI) testing was performed on samples obtained from borings B-2 and B-5. EI values of 42 and 30 were obtained respectively. The test procedures were performed in accordance with Uniform Building Code Standard 29-2.

### Atterberg Limits

The liquid limit, plastic limit and plasticity index was determined for selected samples in accordance with ASTM D4318. The results are presented on the boring logs.

### Optimum-Moisture/Maximum Density

A dry density of determination at predetermined moisture contents was obtained in the laboratory by compacting prepared soil specimens in accordance with ASTM Test Method D1557. Data for the test provide an indication of the increase in dry density, which can be obtained from the designated compactive effort, and establish the relationship of the water content to the maximum obtainable dry density. A zero air void curve developed for an

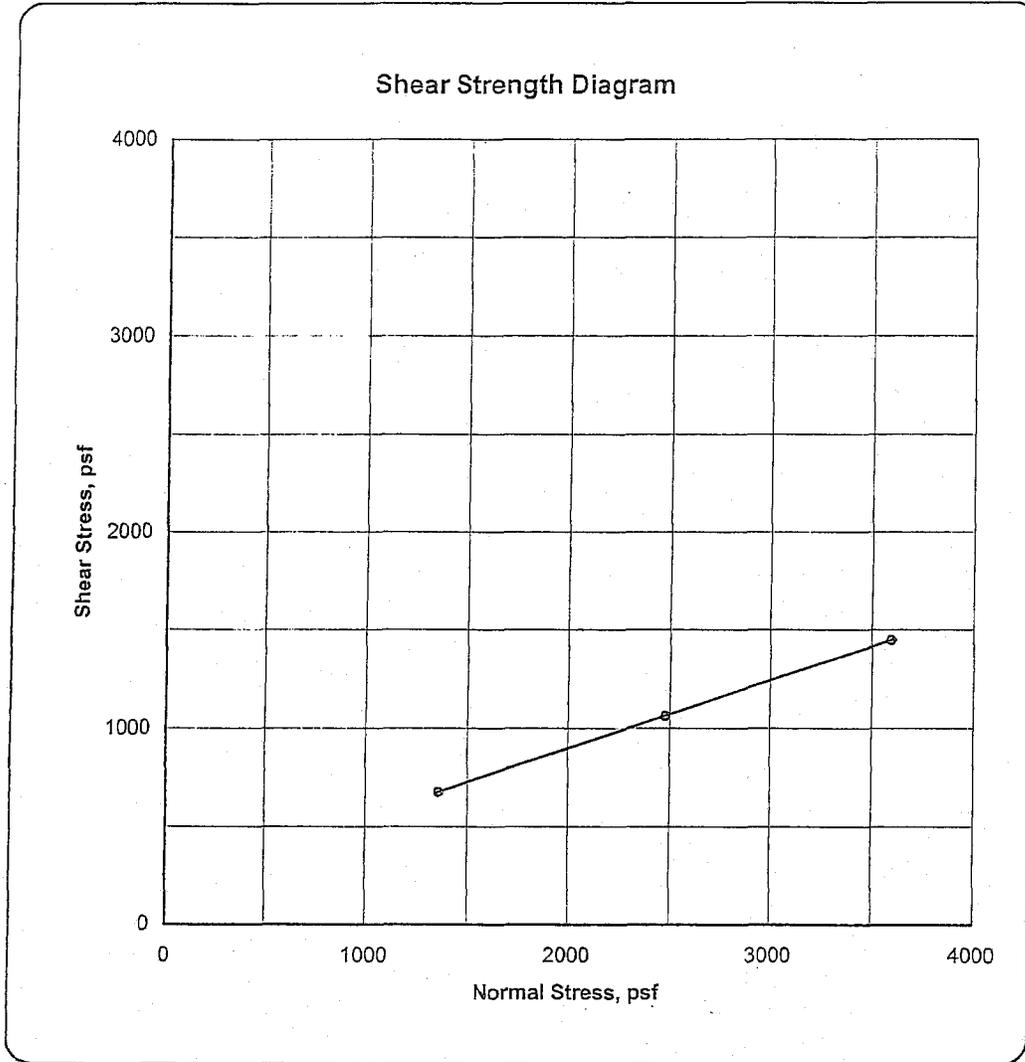
October 29, 2002

Project 2-1254

assumed specific gravity is plotted concurrently with the compaction data to provide a measure of the degree of saturation of the compacted soil.

# DIRECT SHEAR TEST

ASTM D3080-90 (Modified for unconsolidated-undrained conditions)



Project: KANSAS AVENUE

Project No. 2-1254

Sample Location: B-2 @ 5'

Initial Dry Density (pcf) 88.3

Soil Description: **Sandy Clay**

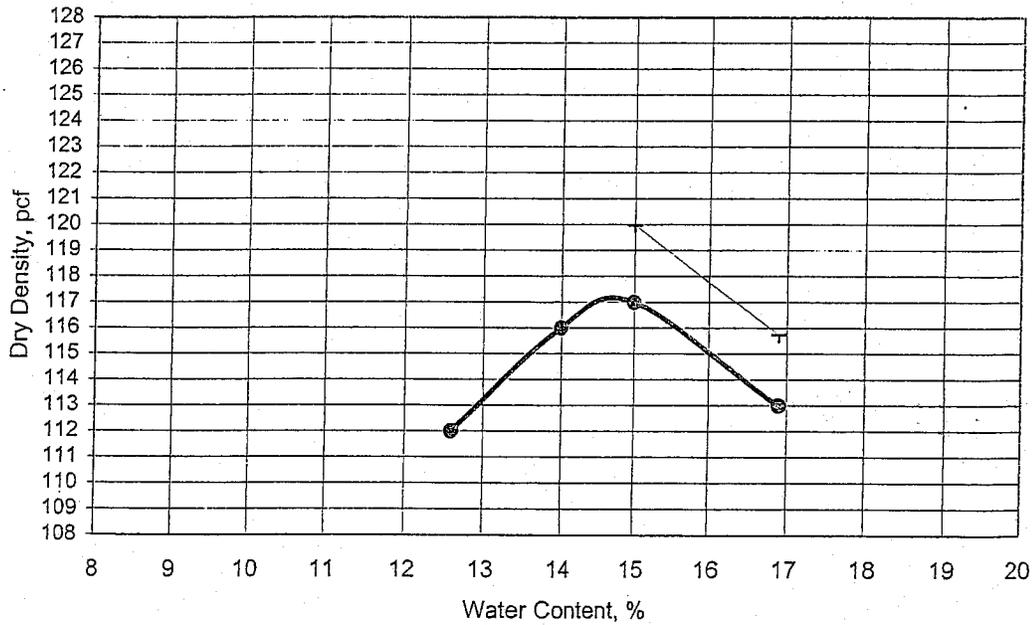
Initial Moisture (%) 22.8

Sample Type:  Remolded  
 Ring

Peak Shear Angle 19  
Cohesion (psf) 210

MAXIMUM DENSITY/ OPTIMUM MOISTURE  
ASTM D1557

DATE: 10/17/02  
SOIL TYPE: Silty Sand  
LOCATION: B-8, 1 to 3 feet  
PROJECT: 2-1254  
SITE LOCATION: Kansas Ave, Camp Roberts  
Max Dry Density: 117.3 pcf  
Optimum Moisture: 14.80%



## ADDENDUM TO GEOTECHNICAL INVESTIGATIONS – ADDITIONAL BORINGS



February 9, 2006  
Project 5-3576

Cesar Romero  
Boyle Engineering Corporation  
1194 Pacific Street, Suite 204  
San Luis Obispo, CA 93401

**GSI SOILS INC.**  
141 Suburban Road, Suite D-1  
San Luis Obispo, CA 93401  
Tel: (805) 543-5493  
Fax: (805) 543-2748

524 East Chapel Street  
Santa Maria, CA 93454  
Tel: (805) 349-0140  
Fax: (805) 349-8861

**Subject:** Addendum to Geotechnical Investigation- Additional Borings  
Sewer Line Replacement Project  
Kansas Avenue  
San Luis Obispo, California

**Reference:** Geotechnical Investigation, Sewer Line Replacement Project, Kansas Avenue,  
San Luis Obispo, California by GSI Soils Inc., dated October 29, 2002, Project 2-  
1215.

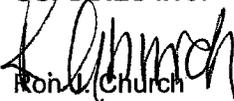
Dear Cesar:

As requested, seven (7) additional exploratory borings were drilled at the above noted project on December 30, 2005, January 5 and 9, 2006. A site map, site plan, and logs of the borings are attached. Previous borings (reference report drilled 10/2/02) indicated that shallow groundwater (5 to 9 feet deep) was present over this section of Kansas Avenue.

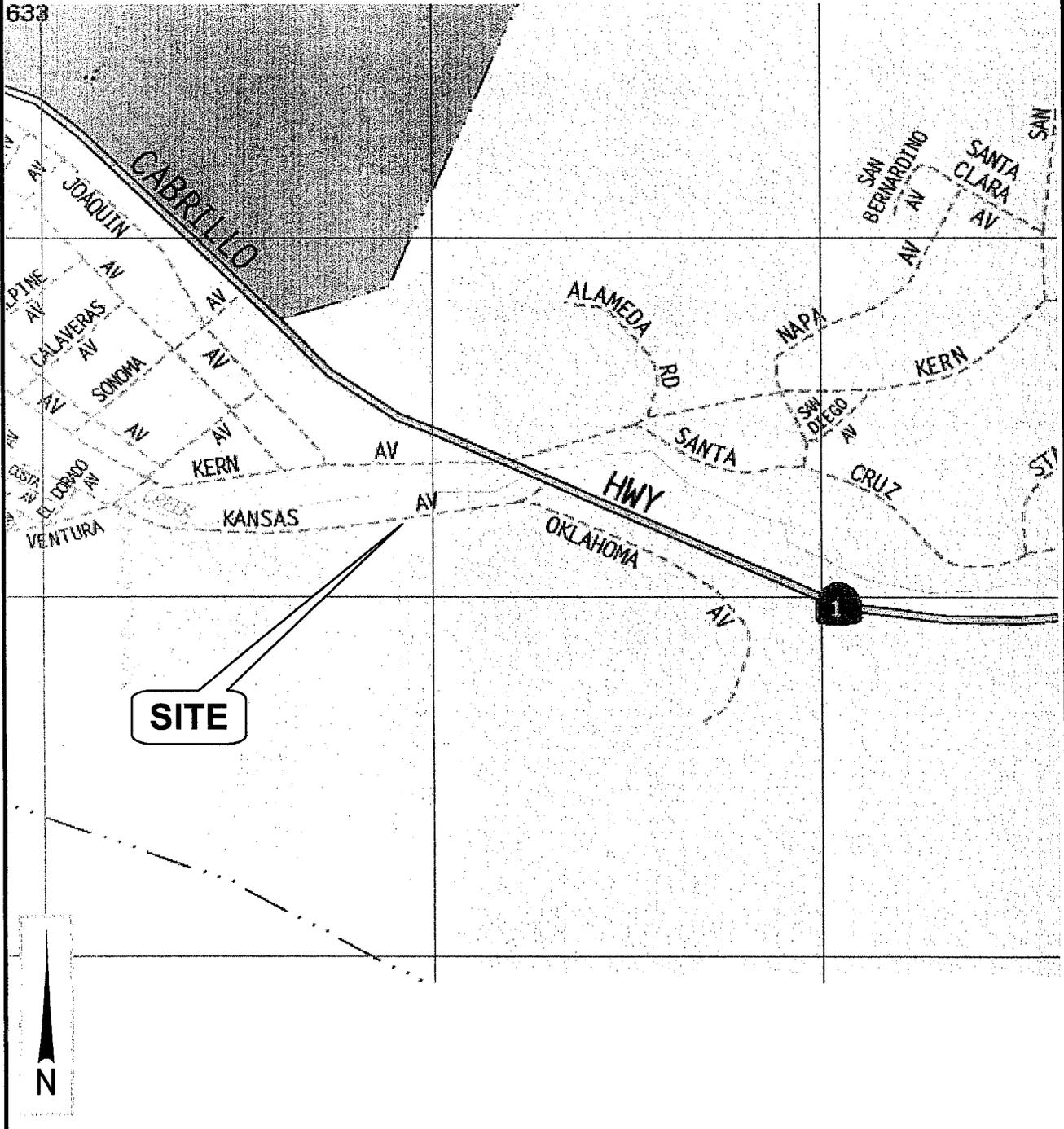
Our recent borings (Dec. 2005/ Jan. 2006) show that the depth to groundwater varies from 4 to 9 feet. This indicates that the groundwater depth has change minimally since 2002. Further monitoring of the groundwater depths at boring locations B-4 and B-6 will be performed.

We appreciate the opportunity to have been of service. If you require additional assistance, please do not hesitate to contact me at (805) 543-5493.

Sincerely,  
**GSI SOILS INC.**

  
Ron Church  
Senior Engineer  
GE #2184

633

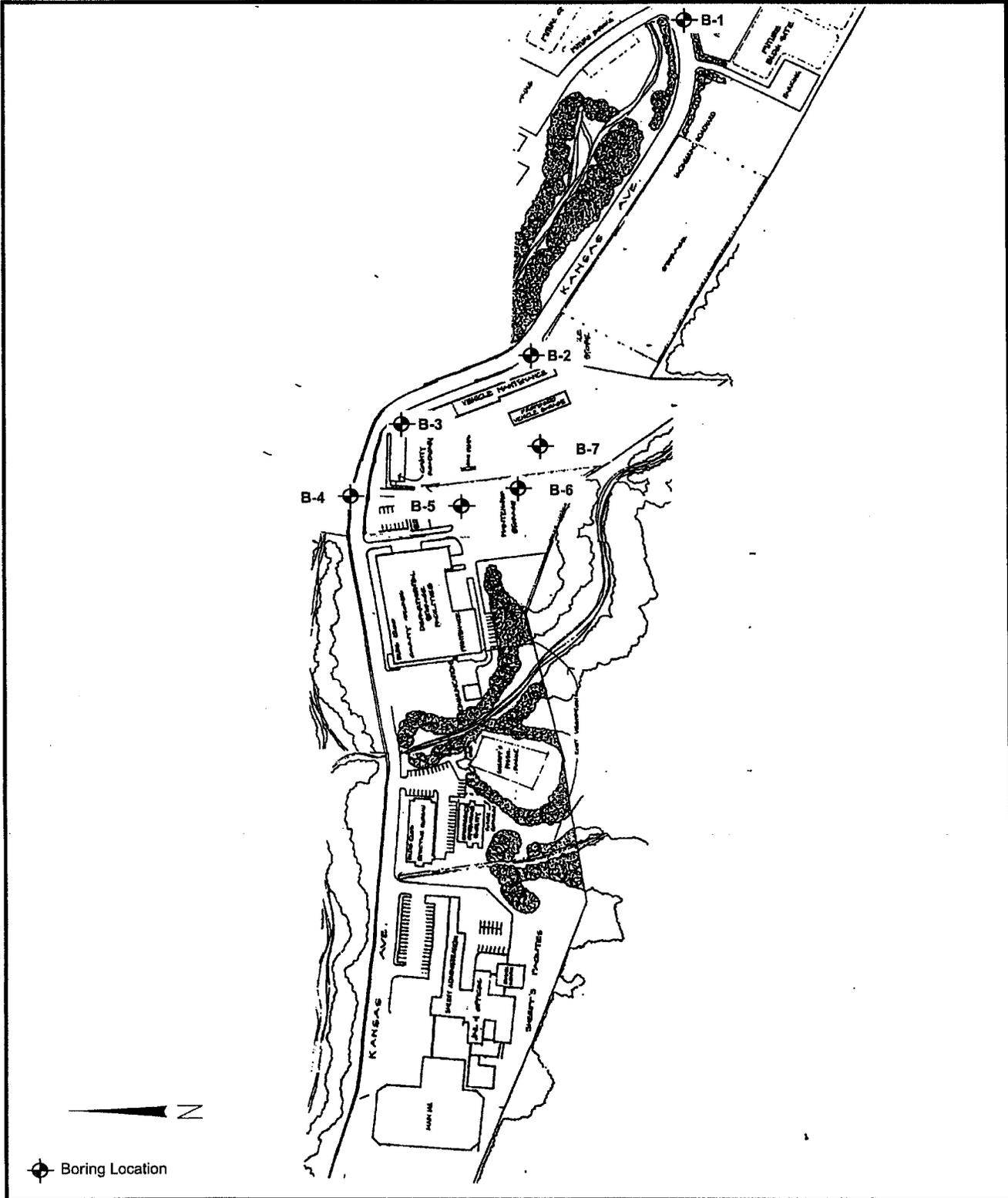


**SITE MAP**  
**KANSAS AVENUE SEWER PROJECT**  
**KANSAS AVENUE**  
**SAN LUIS OBISPO, CALIFORNIA**

<b>Project No.</b>	<b>Figure No.</b>
--------------------	-------------------

5-3576

1



**SITE PLAN**  
**KANSAS AVENUE SEWER PROJECT**  
**KANSAS AVENUE**  
**SAN LUIS OBISPO, CALIFORNIA**

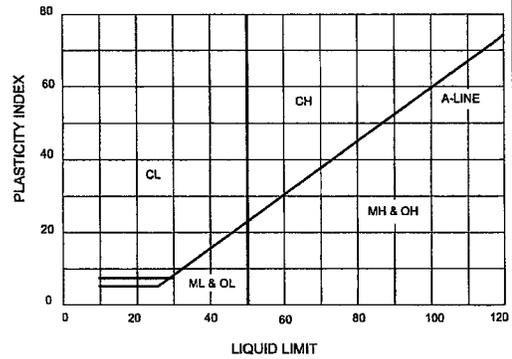
Project No.	Figure No.
5-3576	2

## UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION		SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS Over 50% > #200 sieve	GRAVELS Over 50% > #4 sieves	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
	SANDS Over 50% < #4 sieve	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
SC			CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES	
FINE GRAINED SOILS Over 50% < #200 sieve	SILTS AND CLAYS Liquid limit < 50	ML	INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	
		OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
	SILTS AND CLAYS Liquid limit > 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS	
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS	
	HIGHLY ORGANIC CLAYS	PI	PEAT AND OTHER HIGHLY ORGANIC SOILS	

### PLASTICITY CHART

USED FOR CLASSIFICATION OF FINE GRAINED SOILS



U.S. STANDARD SIEVE

### SOIL GRAIN SIZE

	6"	3"	3/4"	4	10	40	200		
			GRAVEL		SAND				
			COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	150	75	19	4.75	2.0	0.425	0.075	0.002	
	SOIL GRAIN SIZE IN MILLIMETERS								

### SAMPLE DRIVING RECORD

BLOWS PER FOOT	DESCRIPTION
25	25 BLOWS DROVE SAMPLER 12 INCHES, AFTER INITIAL 6 INCHES OF SEATING
50/7"	50 BLOWS DROVE SAMPLER 7 INCHES, AFTER INITIAL 6 INCHES OF SEATING
Ref/3"	50 BLOWS DROVE SAMPLER 3 INCHES DURING OR AFTER INITIAL 6 INCHES OF SEATING

NOTE: TO AVOID DAMAGE TO SAMPLING TOOLS, DRIVING IS LIMITED TO 50 BLOWS PER 6 INCHES DURING OR AFTER SEATING INTERVAL

### KEY TO TEST DATA

B	Bag Sample	CONS	Consolidation (ASTM D2435)
I	Drive, No Sample Collected	DS	Cons. Drained Direct Shear (ASTM D3080)
Z	2 1/2" O.D. Mod. California Sampler, Not Tested	PP	Pocket Penetrometer
Z	2 1/2" O.D. Mod. California Sampler, Tested	GSD	Grain Size Distribution (ASTM D422)
O	Standard Penetration Test	CP	Compaction Test (ASTM D1557)
O	Sample Attempted with No Recovery	EI	Expansion Index (ASTM D4829)
V	Water Level at Time of Drilling	LL	Liquid Limit (in percent)
V	Water Level after Drilling	PI	Plasticity Index

#### RELATIVE DENSITY

SANDS, GRAVELS, AND NON PLASTIC SILTS	BLOWS/FOOT
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

#### RELATIVE DENSITY

CLAYS AND PLASTIC SILTS	STRENGTH	BLOWS/FOOT
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32



PROJECT NO.: 5-3576

DATE DRILLED: 12/30/2005

SOIL CLASSIFICATION CHART

AND BORING LOG LEGEND

**KANSAS AVENUE SEWER PROJECT  
SAN LUIS OBISPO, CALIFORNIA**

FIGURE NO.

**A-1**

LOGGED BY: **BP** DRILL RIG: **Simco 2400** BORING NO.: **B-1**

ELEVATION: **360'** BORING DIAMETER (INCH): **4** DATE DRILLED: **30 December 2005**

GROUNDWATER DEPTH (FT): **6.0**

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS	
359	1		Sandy Clay: dark brown, moist, fine to coarse grained, trace gravel and silt, firm	CL									
358	2				B		25.6						
357	3			increasing sand and gravel		▲	8	36.1					
356	4												
355	5												
354	6			saturated									
353	7												
352	8			decreasing sand and gravel, some organics				51.7					
351	9												
350	10												
349	11												
348	12												
347	13							60.9					
346	14			no organics									
344	16			Boring terminated at 16 feet Groundwater encountered at 6 feet below grade and stabilized at that depth									
343	17												
342	18												
341	19												
340	20												

**EXPLORATORY BORING LOGS**



**KANSAS AVENUE SEWER PROJECT  
KANSAS AVENUE**

PROJECT NO.  
**5-3576**

DATE  
**February-06**

FIGURE NO.  
**A-2**

LOGGED BY: **BP** DRILL RIG: **Simco 2400** BORING NO.: **B-2**

ELEVATION: **360'** BORING DIAMETER (INCH): **4** DATE DRILLED: **30 December 2005**

GROUNDWATER DEPTH (FT): **3.5**

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS		
359	1		Sandy Clay: dark brown, moist, fine to coarse grained, trace gravel and silt, firm	CL										
358	2				B	39.9								
357	3													
356	4					very moist								
355	5													
354	6					saturated								
353	7													
352	8					some organics		B	64.2					
351	9													
350	10													
349	11													
348	12													
347	13							B	54.7					
346	14													
345	15					Boring terminated at 15 feet								
344	16		Groundwater encountered at 6 feet below grade rising to 4 feet after 1 hour											
343	17													
342	18													
341	19													
340	20													

**EXPLORATORY BORING LOGS**



**KANSAS AVENUE SEWER PROJECT  
KANSAS AVENUE**

PROJECT NO.  
**5-3576**

DATE  
**February-06**

FIGURE NO.  
**A-3**

LOGGED BY: **BP** DRILL RIG: **Simco 2400** BORING NO.: **B-3**

ELEVATION: **360'** BORING DIAMETER (INCH): **4** DATE DRILLED: **30 December 2005**

GROUNDWATER DEPTH (FT): **5.0**

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
359	1		Sandy Clay: dark brown, moist, fine to coarse grained, trace gravel and silt, firm	CL	B							
358	2		decreasing sand, very moist									
357	3											
356	4						29.4					
355	5			saturated								
354	6											
353	7											
352	8					B		36.9				
351	9											
350	10											
349	11											
348	12											
347	13					B		41.7				
346	14											
345	15			Boring terminated at 15 feet								
344	16		Groundwater encountered at 5 feet below grade and stabilized at that elevation									
343	17											
342	18											
341	19											
340	20											

**EXPLORATORY BORING LOGS**



**KANSAS AVENUE SEWER PROJECT  
KANSAS AVENUE**

PROJECT NO.  
**5-3576**

DATE  
**February-06**

FIGURE NO.  
**A-4**

LOGGED BY: **PF** DRILL RIG: **Simco 2400** BORING NO.: **B-4**

ELEVATION: **280'** BORING DIAMETER (INCH): **4** DATE DRILLED: **9 January 2006**

GROUNDWATER DEPTH (FT): **9.0**

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
279	1		Asphalt Concrete over Baseroack	GP								
278	2		Silty Sandy Clay: yellow brown, slightly moist, fine to coarse grained, soft (fill)	CL-CH	B		13.8					
277	3											
276	4			Silty Clay: dark brown, moist, fine to medium grained, firm	CL	II	6	12.5				
275	5											
274	6											
273	7											
272	8					B		19.5				
271	9			saturated, stiff								
270	10											
269	11											
268	12											
267	13					B		33.1				
266	14			very stiff								
264	16			Boring terminated at 16 feet Groundwater encountered at 9 feet below grade and stabilized at that elevation								
263	17											
262	18											
261	19											
260	20											

**EXPLORATORY BORING LOGS**



**KANSAS AVENUE SEWER PROJECT  
KANSAS AVENUE**

PROJECT NO.  
**5-3576**

DATE  
**February-06**

FIGURE NO.  
**A-5**







**APPLICABLE STANDARD DRAWINGS AND PLANS**  
**(Not limited those included herein)**

DIST. COUNTY ROUTE TOTAL PROJECT SHEET NO. SHEETS

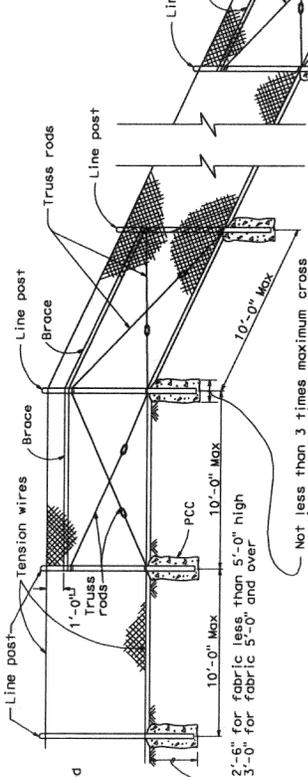
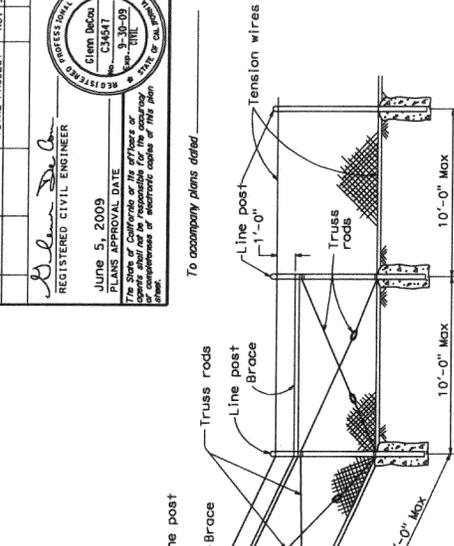
REGISTERED CIVIL ENGINEER

JUNE 5, 2009

PLANS PREPARED DATE

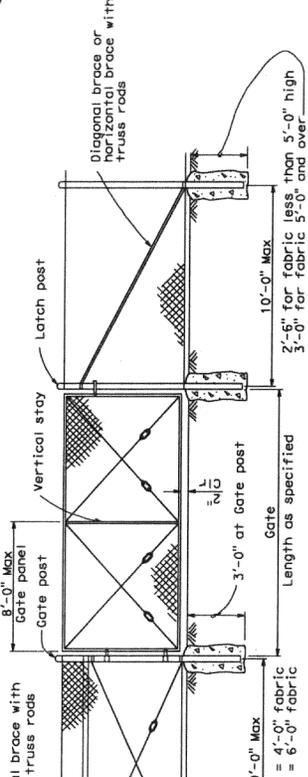
THE STATE OF CALIFORNIA, BY THE OFFICER OR CLERK THEREOF, HEREBY CERTIFIES THAT THIS PLAN IS A TRUE AND CORRECT REPRESENTATION OF THE WORK OF SAID ENGINEER.

Professional Engineer Seal: State of California, License No. 35260, Civil Engineering, Exp. 12/31/11



**CHAIN LINK FENCE ON SHARP BREAK IN GRADE**

Brace to be removed after all other fence construction is completed unless otherwise directed by the Engineer.



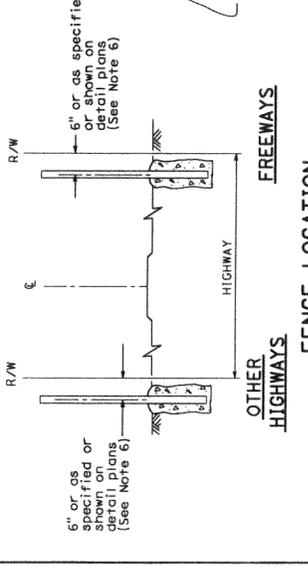
**CHAIN LINK GATE INSTALLATION**

**NOTES:**

- The below table shows examples of post and brace sections which may comply with the Specifications.
- Sections shown in the tables must also comply with the strength requirements and other provisions of the Specifications.
- Other sections which comply with the strength requirements and other provisions of the Specifications may be used on approval of the Engineer.
- Options exercised shall be uniform on any one project.
- Dimensions shown are nominal.
- Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.

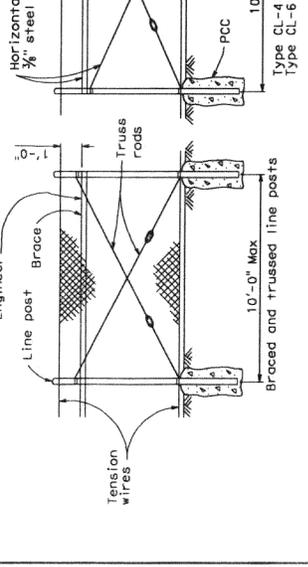
**TYPICAL MEMBER DIMENSIONS (See Notes)**

FENCE HEIGHT	LINE POSTS			END, LATCH & CORNER POSTS		
	ROUND ID	H	ROLL FORMED ID	ROUND ID	H	ROLL FORMED ID
6' & less	1 1/2"	1 7/8" x 1 3/8"	2"	3/2" x 3/2"	2" x 1 3/4"	1 1/4"
Over 6'	2"	2 1/4" x 2"	2" x 1 3/4"	3/2" x 3/2"	2 1/2" x 2 1/2"	1 1/4"



**FENCE LOCATION**

Brace to be removed after all other fence construction is completed unless otherwise directed by the Engineer.



**CORNER POST**

**NOTES:**

- Horizontal brace with truss rod may be used as an alternate to a diagonal brace.
- End and corner post assembly shall be uniform on any one project.
- Dimensions shown are nominal.
- Offset to be 2'-0" at monument locations, measured at right angles to R/W lines. Taper to achieve offset to be at least 20'-0" long.

**TYPICAL MEMBER DIMENSIONS (See Notes)**

FENCE HEIGHT	LINE POSTS			END, LATCH & CORNER POSTS		
	ROUND ID	H	ROLL FORMED ID	ROUND ID	H	ROLL FORMED ID
6' & less	1 1/2"	1 7/8" x 1 3/8"	2"	3/2" x 3/2"	2" x 1 3/4"	1 1/4"
Over 6'	2"	2 1/4" x 2"	2" x 1 3/4"	3/2" x 3/2"	2 1/2" x 2 1/2"	1 1/4"

**GATE POST**

FENCE HEIGHT	GATE WIDTHS	NOMINAL ID	WEIGHT PER FOOT
6'-0" and Less	Up thru 6'-0"	2 1/2"	4.95 LB
	Over 6'-0" thru 12'-0"	4"	10.79 LB
	Over 12'-0" thru 18'-0"	5"	14.62 LB
Over 6'-0"	Over 18'-0" to 24'-0" Max	6"	18.97 LB
	Up thru 6'-0"	3"	7.58 LB
	Over 6'-0" thru 12'-0"	5"	14.62 LB
Over 6'-0"	Over 12'-0" thru 18'-0"	6"	18.97 LB
	Over 18'-0" to 24'-0" Max	8"	28.55 LB

Above post dimensions and weights are minimums. Larger sizes may be used on approval of the Engineer.

**CHAIN LINK FENCE**

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION

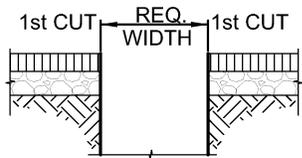
NO SCALE

RSP A85 DATED JUNE 5, 2009 SUPERSEDES STANDARD PLAN A85  
DATED MAY 1, 2006 - PAGE 111 OF THE STANDARD PLANS BOOK DATED MAY 2006.

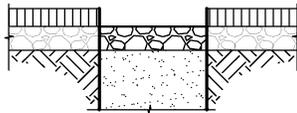
**REVISED STANDARD PLAN RSP A85**

Revisions

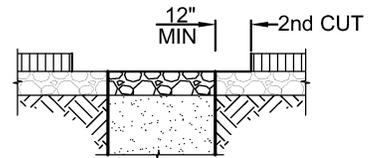
Description	Approved	Date	Description	Approved	Date



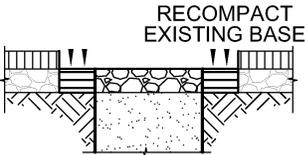
STEP 1: SAWCUT PER TO CONSTRUCT TRENCH PER U-4. SAWCUT SHALL FOLLOW ALIGNMENT OF STRUCTURE.



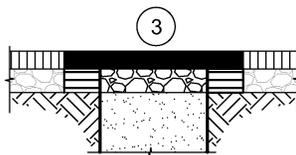
STEP 2: BACKFILL & COMPACT NEW TRENCH TO TOP OF EXIST BASE SECTION PER U-4.



STEP 3: SAWCUT PER NOTE 1 TO REMOVE AN ADDITIONAL 12" MIN OF ASPHALT SURFACE.

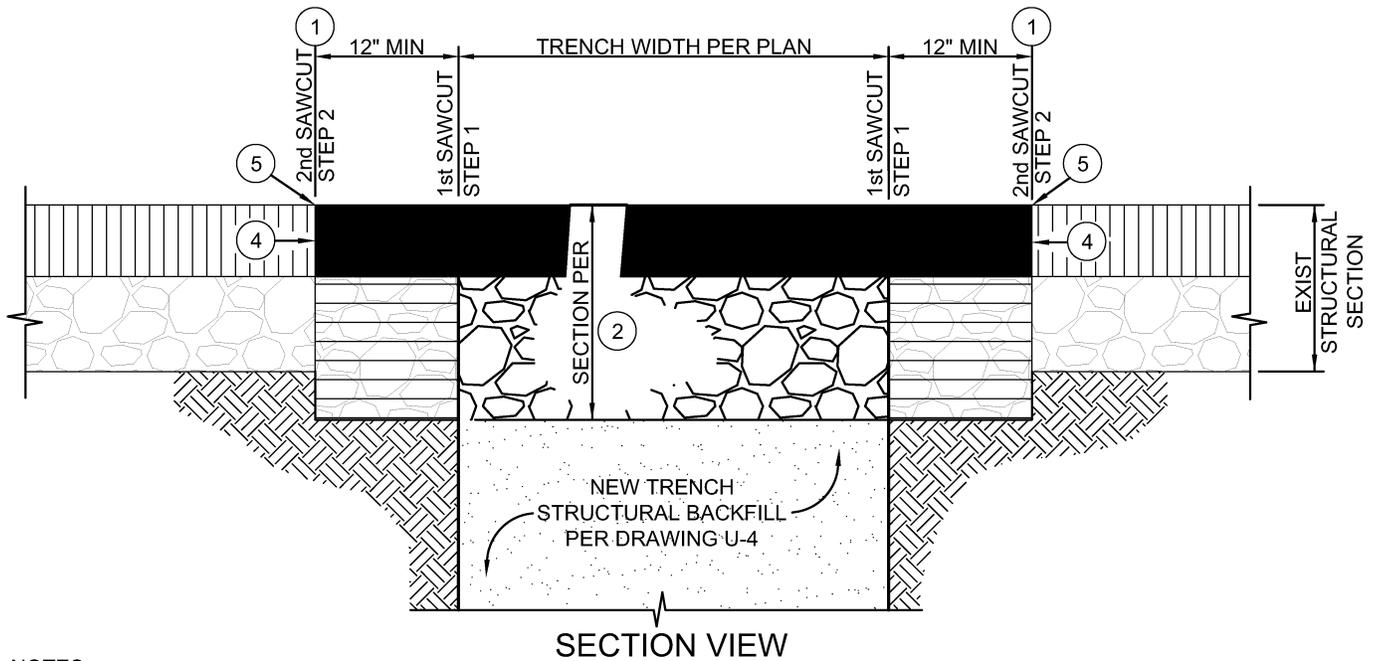


STEP 4: RECOMPACT EXISTING BASE SECTION TO 95% RELATIVE COMPACTION.



STEP 5: PAVE ROADWAY PER DEPARTMENT APPROVED SECTION.

**PAVEMENT REPAIR PROCEDURE**



NOTES:

- SAWCUT TO REMOVE DAMAGED OR FAILED PAVEMENT SECTION ADJACENT TO THE EDGE OF TRENCH AS NECESSARY TO PROVIDE A CLEAN JOIN LINE. ALL SAWCUTS SHALL BE PERPENDICULAR OR PARALLEL TO CENTERLINE, OUTSIDE THE NORMAL VEHICLE TIRE PATH WITHIN A TRAVEL LANE, AND SHALL NOT BE ALLOWED WITHIN DESIGNATED BICYCLE LANES. 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.
- THE STRUCTURAL ROAD REPAIR SECTION SHALL MATCH THE EXISTING STRUCTURAL SECTION THICKNESS OR AS REQUIRED BY THE DEPARTMENT. TYPICAL ROAD WIDENING SECTION SHALL BE:
  - ASPHALT CONCRETE PER THE DESIGN STANDARDS TO 95% RELATIVE COMPACTION, OVER
  - CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION, OVER
  - TRENCH SECTION PER DRAWING U-4 (STRUCTURAL BACKFILL TO 95% MIN RELATIVE COMPACTION)
- NEW PAVEMENT SHALL BE PLACED IN LIFTS NOT EXCEEDING 3-INCHES (COMPACTED). WHERE EXISTING PAVEMENT IS 3.5-INCHES THICK OR GREATER SEE STANDARD DRAWING R-4a FOR TRENCH REPAIR REQUIREMENTS.
- A TACK COAT SHALL BE APPLIED TO ALL HORIZONTAL AND VERTICAL CONFORM SURFACES PRIOR TO PAVING.
- AFTER PAVING, APPLY "CRAFCO SUPERFLEX" TO ALL SURFACE SEAMS PER MANUFACTURER'S RECOMMENDATIONS.
- THE DEPARTMENT SHALL PROVIDE ADDITIONAL REQUIREMENTS WHEN TRENCHING IN EXISTING ROADS HAVING CONCRETE STRUCTURAL SECTIONS.

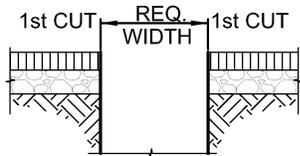


SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**TRENCH REPAIR**  
 EXISTING AC PAVEMENT LESS THAN 3.5" THICK

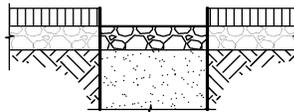
Scale: NTS	Issued: Aug. 2006
Drawing No: <b>R-4</b>	
Sheet No: 1 OF 1	

Revisions

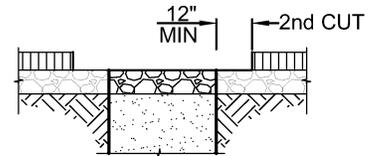
Description	Approved	Date	Description	Approved	Date



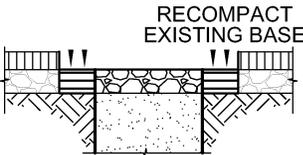
STEP 1: SAWCUT PER TO CONSTRUCT TRENCH PER U-4. SAWCUT SHALL FOLLOW ALIGNMENT OF STRUCTURE



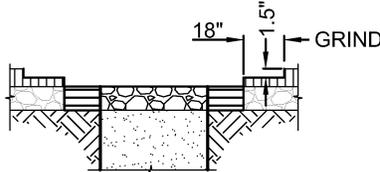
STEP 2: BACKFILL & COMPACT NEW TRENCH TO TOP OF EXIST BASE SECTION PER U-4



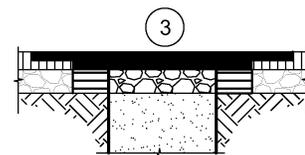
STEP 3: SAWCUT PER NOTE 1 TO REMOVE AN ADDITIONAL 12" MIN OF ASPHALT SURFACE



STEP 4: RECOMPACT EXISTING BASE SECTION TO 95% RELATIVE COMPACTION.

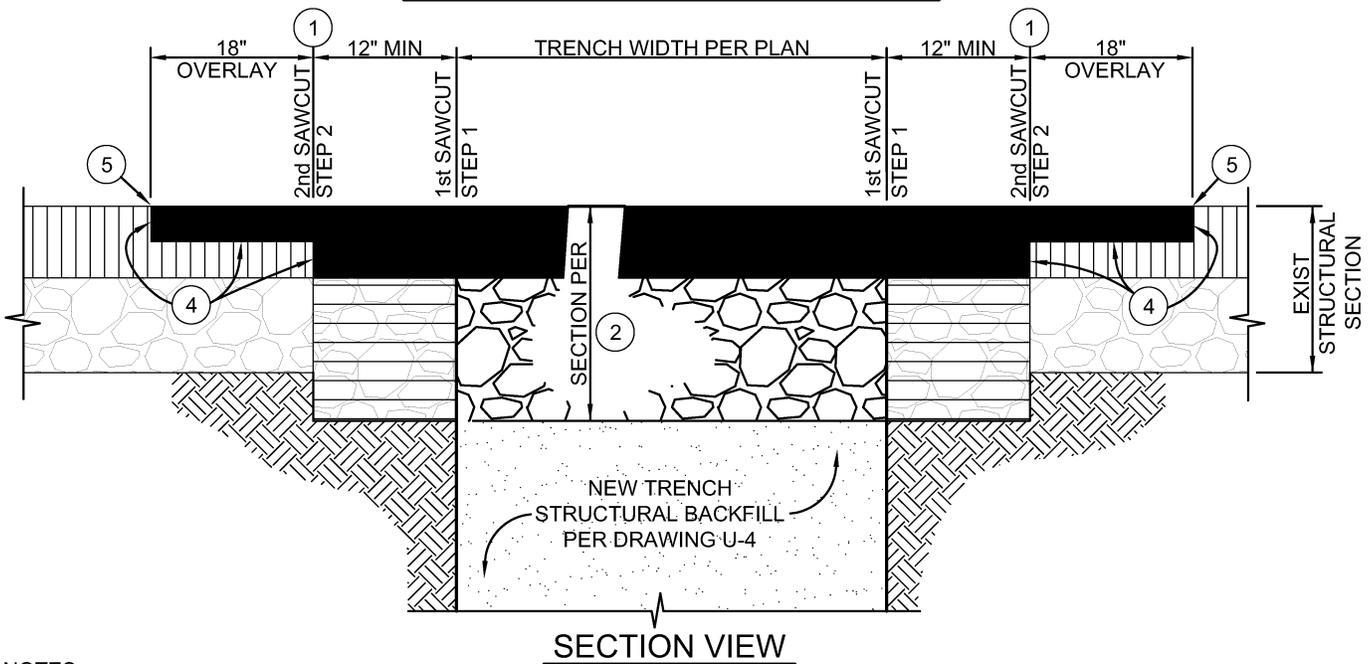


STEP 5: WHEN EXISTING AC IS  $\geq 3.5"$  THICK, GRIND 18" WIDE x 1.5" DEEP OF OFF EXISTING ASPHALT SURFACE.



STEP 6: PAVE ROADWAY TO MATCH EXISTING SECTION OR AS REQUIRED BY THE DEPARTMENT.

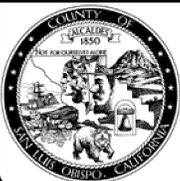
**PAVEMENT REPAIR PROCEDURE**



**SECTION VIEW**

NOTES:

- SAWCUT TO REMOVE DAMAGED OR FAILED PAVEMENT SECTION ADJACENT TO THE EDGE OF TRENCH AS NECESSARY TO PROVIDE A CLEAN JOIN LINE. ALL SAWCUTS SHALL BE PERPENDICULAR OR PARALLEL TO CENTERLINE, OUTSIDE THE NORMAL VEHICLE TIRE PATH WITHIN A TRAVEL LANE, AND SHALL NOT BE ALLOWED WITHIN DESIGNATED BICYCLE LANES. 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.
- THE STRUCTURAL ROAD REPAIR SECTION SHALL MATCH THE EXISTING STRUCTURAL SECTION THICKNESS OR AS REQUIRED BY THE DEPARTMENT. TYPICAL ROAD WIDENING SECTION SHALL BE:  
 ■ ASPHALT CONCRETE PER THE DESIGN STANDARDS TO 95% RELATIVE COMPACTION, OVER  
 ▨ CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION, OVER  
 ▩ TRENCH SECTION PER DRAWING U-4 (STRUCTURAL BACKFILL TO 95% MIN RELATIVE COMPACTION)
- NEW PAVEMENT SHALL BE PLACED IN LIFTS NOT EXCEEDING 3-INCHES (COMPACTED), WITH A MINIMUM LIFT NOT LESS THAN 1.5-INCHES.
- A TACK COAT SHALL BE APPLIED TO ALL HORIZONTAL AND VERTICAL CONFORM SURFACES PRIOR TO PAVING.
- AFTER PAVING, APPLY "CRAFCO SUPERFLEX" TO ALL SURFACE SEAMS PER MANUFACTURER'S RECOMMENDATIONS.
- THE DEPARTMENT SHALL PROVIDE ADDITIONAL REQUIREMENTS WHEN TRENCHING IN EXISTING ROADS HAVING CONCRETE STRUCTURAL SECTIONS.



**SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS**  
**TRENCH REPAIR**  
**EXISTING AC PAVEMENT 3.5" THICK OR GREATER**

Scale: NTS	Issued: Aug. 2006
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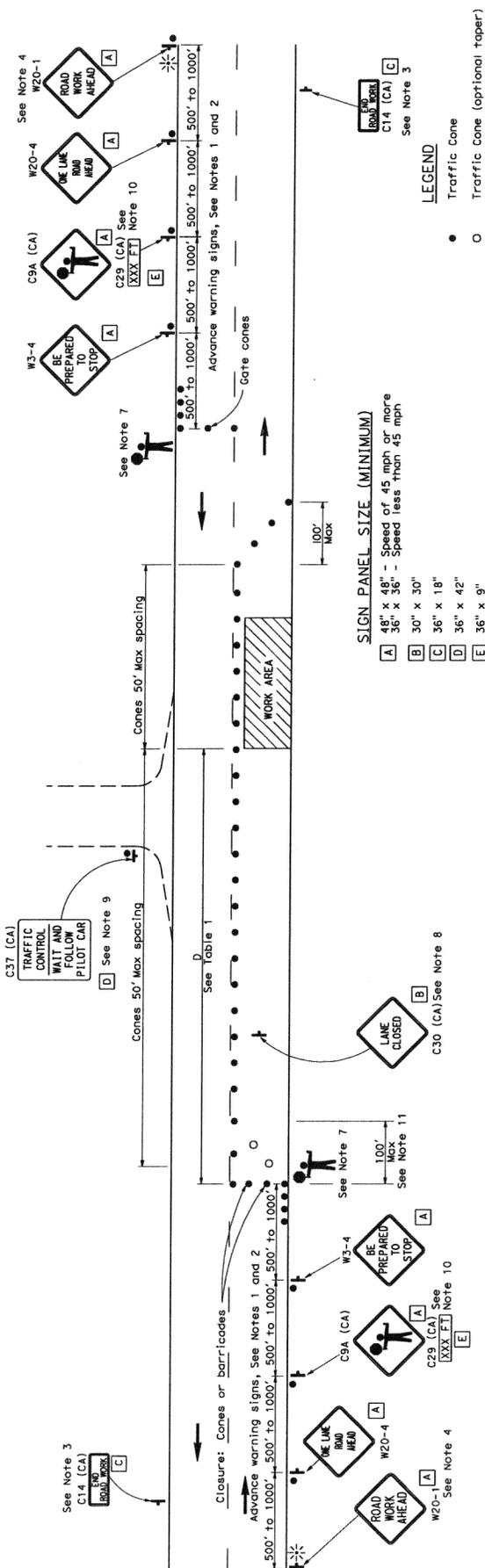
DIST. COUNTY ROUTE POST MILES TOTAL PROJECT SHEET NO. TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 M. J. ...  
 No. ...  
 State of California  
 License No. ...  
 Exp. ...

PLANS APPROVAL DATE  
 MAY 1, 2006  
 The undersigned hereby certifies that the information furnished herein is true and correct to the best of his knowledge and belief, and that he is a duly licensed professional engineer in the State of California.

To get to the California web site, go to <http://www.mvta.gov>

TYPICAL LANE CLOSURE WITH REVERSIBLE CONTROL



**LEGEND**

- Traffic Cone
- Traffic Cone (optional taper)
- ↑ Temporary Sign
- Direction of Travel
- ⚡ Portable Flashing Beacon
- ♠ Flagger

**SIGN PANEL SIZE (MINIMUM)**

A	48" x 48"	Speed of 45 mph or more
B	36" x 36"	Speed less than 45 mph
C	36" x 18"	
D	36" x 42"	
E	36" x 9"	

**TABLE 1**

Approach Speed	Downgrade	
	Minimum D	Maximum D *
25 and below	155	158
30	200	205
35	250	257
40	305	315
45	360	378
50	425	446
55	495	520
60	570	598
65	645	682

\* Use on sustained downgrade steeper than -3 percent and longer than 1 mile.

**NOTES:**  
 Unless otherwise specified in the special provisions, all temporary warning signs shall have black legend on orange background. California code are designated by (CA). Otherwise, Federal (MUTCD) codes are shown.

- NOTES:**
- Where approach speeds are low, advance warning signs may be placed at 300' spacing, and closer in urban areas.
  - Each advance warning sign in each direction of travel shall be equipped with a daytime reflective red-orange in size and shall be orange or fluorescent red-orange in color. Flashing beacons shall be placed at the intervals indicated for lane closure during hours of darkness.
  - A C14 (CA) "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane control unless the end of work area is obvious, or ends within a larger project's limits.
  - If the W20-1 sign would follow within 2000' of a stationary W20-1 or C11 (CA) "ROAD WORK NEXT MILES", use a W20-4 sign for the first advance warning sign.
  - All cones used for lane closures during the hours of darkness shall be fitted with retroreflective bands (or sleeves) as specified in the specifications.
  - Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used instead of cones for daytime closures only.

STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
**TRAFFIC CONTROL SYSTEM  
 FOR LANE CLOSURE ON  
 TWO LANE CONVENTIONAL  
 HIGHWAYS**  
 NO SCALE

**Revisions**

Description	Approved	Date	Description	Approved	Date

**NOTES:**

THE "CALIFORNIA WATERWORKS STANDARDS" SETS FORTH THE MINIMUM SEPARATION REQUIREMENTS FOR WATER MAINS AND SEWER LINES AS CONTAINED IN SECTION 64630, TITLE 22, CALIFORNIA ADMINISTRATIVE CODE. THE FOLLOWING IS A SUMMARY OF THOSE REQUIREMENTS:

1. PARALLEL CONSTRUCTION: THE HORIZONTAL DISTANCE BETWEEN PRESSURE WATER MAINS AND SEWER LINES SHALL BE AT LEAST 10-FEET MEASURED FROM THE NEAREST EDGES OF THE FACILITIES.
2. PERPENDICULAR CONSTRUCTION (CROSSING): PRESSURE WATER MAINS SHALL BE AT LEAST 12-INCHES ABOVE SANITARY SEWER LINES WHERE THESE LINES MUST CROSS MEASURED FROM THE NEAREST EDGES OF THE FACILITIES.
3. COMMON TRENCH: WATER MAINS AND SEWER LINES SHALL NOT BE INSTALLED IN THE SAME TRENCH.
4. WHEN ADEQUATE PHYSICAL SEPARATION CANNOT BE ATTAINED, AN INCREASE IN THE FACTOR OF SAFETY SHOULD BE PROVIDED BY INCREASING THE STRUCTURAL INTEGRITY OF BOTH THE PIPE MATERIALS AND JOINTS.
5. LOCAL CONDITIONS MAY CREATE A SITUATION WHERE THERE IS NO ALTERNATIVE BUT TO INSTALL WATER MAINS OR SEWER LINES AT A DISTANCE LESS THAN THAT REQUIRED BY THE BASIC SEPARATION STANDARDS. IN SUCH CASES, ALTERNATIVE CONSTRUCTION CRITERIA AS SPECIFIED IN THIS STANDARD SHALL BE FOLLOWED.
6. DUE TO SPECIAL HAZARDS, INSTALLATIONS OF WATER MAINS AND SEWER LINES 24-INCHES DIAMETER OR LARGER SHALL BE REVIEWED AND APPROVED BY THE HEALTH AGENCY PRIOR TO CONSTRUCTION.
7. THE CONSTRUCTION CRITERIA SHOULD APPLY TO THE HOUSE LATERALS THAT CROSS ABOVE A PRESSURE WATER MAIN BUT NOT TO THOSE HOUSE LATERALS THAT CROSS BELOW A PRESSURE WATER MAIN.

ALTERNATIVE CRITERIA FOR CONSTRUCTION THE CONSTRUCTION CRITERIA FOR SEWER LINES OR WATER MAINS WHERE THE BASIC SEPARATION STANDARDS CANNOT BE ATTAINED ARE SHOWN AS CASE 1 & CASE 2 ON SHEETS 2 AND 3 OF U-3.



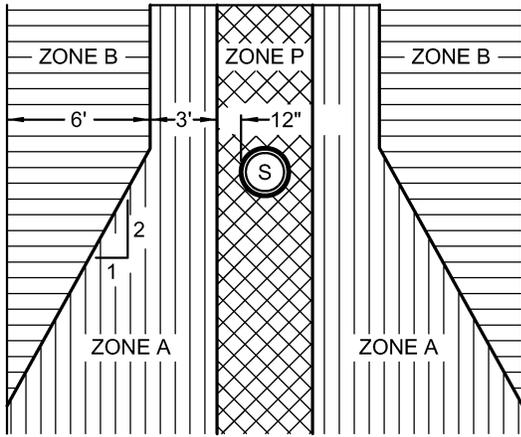
**SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS**

# UTILITY SEPARATION CRITERIA

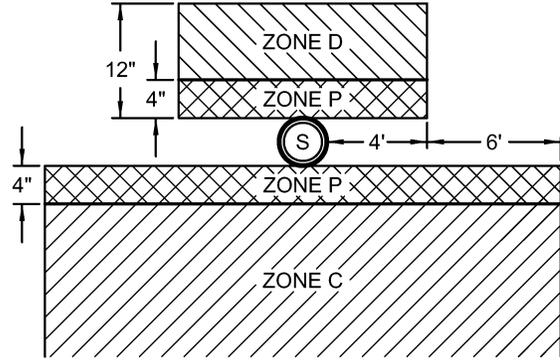
Scale:	Issued: Aug. 2006
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Revisions

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PARALLEL



CROSSING

ZONE	SPECIAL CONSTRUCTION REQUIRED FOR WATER:
A	NO WATER MAINS PARALLEL TO SEWERS SHALL BE CONSTRUCTED WITHOUT APPROVAL FROM THE HEALTH AGENCY.
B	IF THE SEWER PARALLELING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE B REQUIREMENTS, THE WATER MAIN SHALL BE CONSTRUCTED OF: 1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING. 2. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT.
C	IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE C REQUIREMENTS, THE WATER MAIN SHALL HAVE NO JOINTS IN ZONE C AND BE CONSTRUCTED OF: 1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING. 2. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT.
D	IF THE SEWER CROSSING THE WATER MAIN DOES NOT MEET THE CASE 1, ZONE D REQUIREMENTS, THE WATER MAIN SHALL HAVE NO JOINTS WITHIN 4-FOOT FROM EITHER SIDE OF THE SEWER AND SHALL BE CONSTRUCTED OF: 1. DUCTILE IRON PIPE WITH HOT DIP BITUMINOUS COATING. 2. CLASS 200 PRESSURE RATED PLASTIC WATER PIPE (DR 14 PER AWWA C900) OR EQUIVALENT.
P	ZONE P IS A PROHIBITED ZONE, SECTION 64630(E)(2) CALIFORNIA ADMINISTRATIVE CODE, TITLE 22.

**CASE 2: NEW WATER MAIN**

ALTERNATIVE CONSTRUCTION CRITERIA  
APPLIES TO NEW WATER MAINS OR EXISTING SEWER MAINS



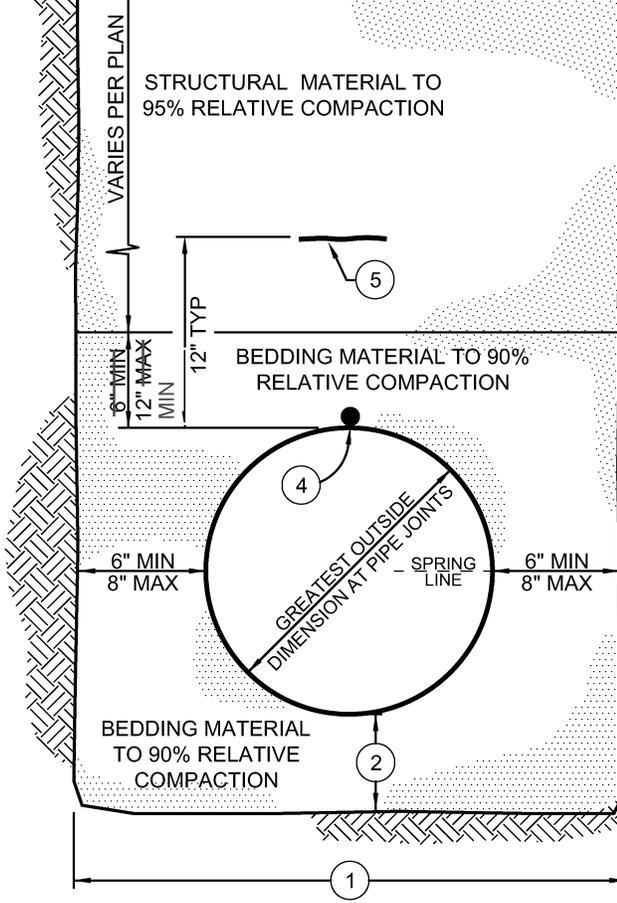
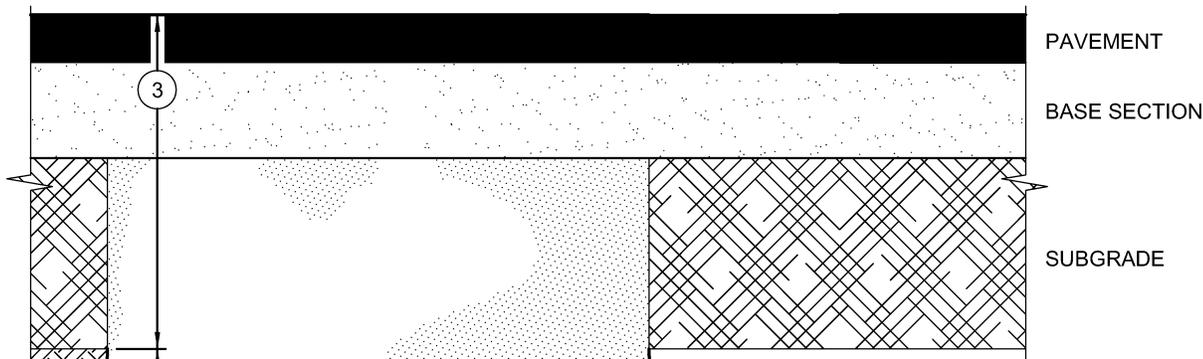
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**UTILITY SEPARATION CRITERIA**  
CASE 2: NEW WATER MAINS

Scale: NTS	Issued: Aug. 2006
Drawing No: <b>U-3b</b>	
Sheet No:	3 OF 3

Revisions

Description	Approved	Date	Description	Approved	Date
LOCATION OF DETECTOR WIRE & TAPE, NOTES 4 & 5	REM	NOV 07			
MISC CLARIFICATION	GDM	NOV 08			

WHEN TRENCHING INTO EXISTING ROADS ALL WORK SHALL BE DONE IN ACCORDANCE WITH STANDARD DRAWINGS R-4 OR R-4a.



Attention is directed to Geotechnical Investigation for conventional trench and shoring excavations.

NOTES:

- TRENCH WIDTH SHALL BE PIPE DIAMETER PLUS 12" (6" EACH SIDE OF PIPE) FOR PIPES 36" DIAMETER OR LESS, AND PIPE DIAMETER PLUS 16" (8" EACH SIDE) FOR PIPE DIAMETERS GREATER THAN 36".
- BEDDING MEASUREMENT IS 6" BELOW GREATEST OUTSIDE DIMENSION AT PIPE JOINTS. PIPE SHALL BE BACKFILLED TO THE SPRING LINE AND COMPACTED TO 90% PRIOR TO COMPLETING INITIAL BACKFILL.
- ROAD STRUCTURAL SECTION SHALL BE BASED ON THE TI AND R VALUE AT TIME OF CONSTRUCTION:
  - ASPHALT CONCRETE PER THE DESIGN STANDARDS TO 95% RELATIVE COMPACTION, OVER
  - ▨ CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION, OVER
  - ▧ 12" MINIMUM SUBGRADE TO 95% RELATIVE COMPACTION
- FOR WATER, 14-GAUGE INSULATED COPPER TRACER WIRE SHALL BE LAID ATOP ALL PIPES AND SERVICE LATERALS.
- FOR WATER AND SEWER, 3" WIDE POLYETHYLENE NON-DETECTABLE TAPE MARKED AND COLOR CODED PER THE DESIGN STANDARDS SHALL BE BURIED IN THE TRENCH 12-INCHES ABOVE ALL PIPES AND LATERALS.
- REFER TO STANDARD DRAWINGS U-3 TO U-3b FOR ADDITIONAL REQUIREMENTS FOR WATER AND SEWER TRENCHES.

BEDDING MATERIAL		STRUCTURAL MATERIAL	
SIEVE SIZES	PERCENT PASSING	SIEVE SIZES	PERCENT PASSING
1"	100%	3"	100%
No. 4	80% - 100%	No. 4	35% - 100%
No. 200	0% - 15%	No. 30	20% - 100%

see Special Provisions for bedding material gradation

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**TRENCH DETAIL**  
FOR NEW ROADS

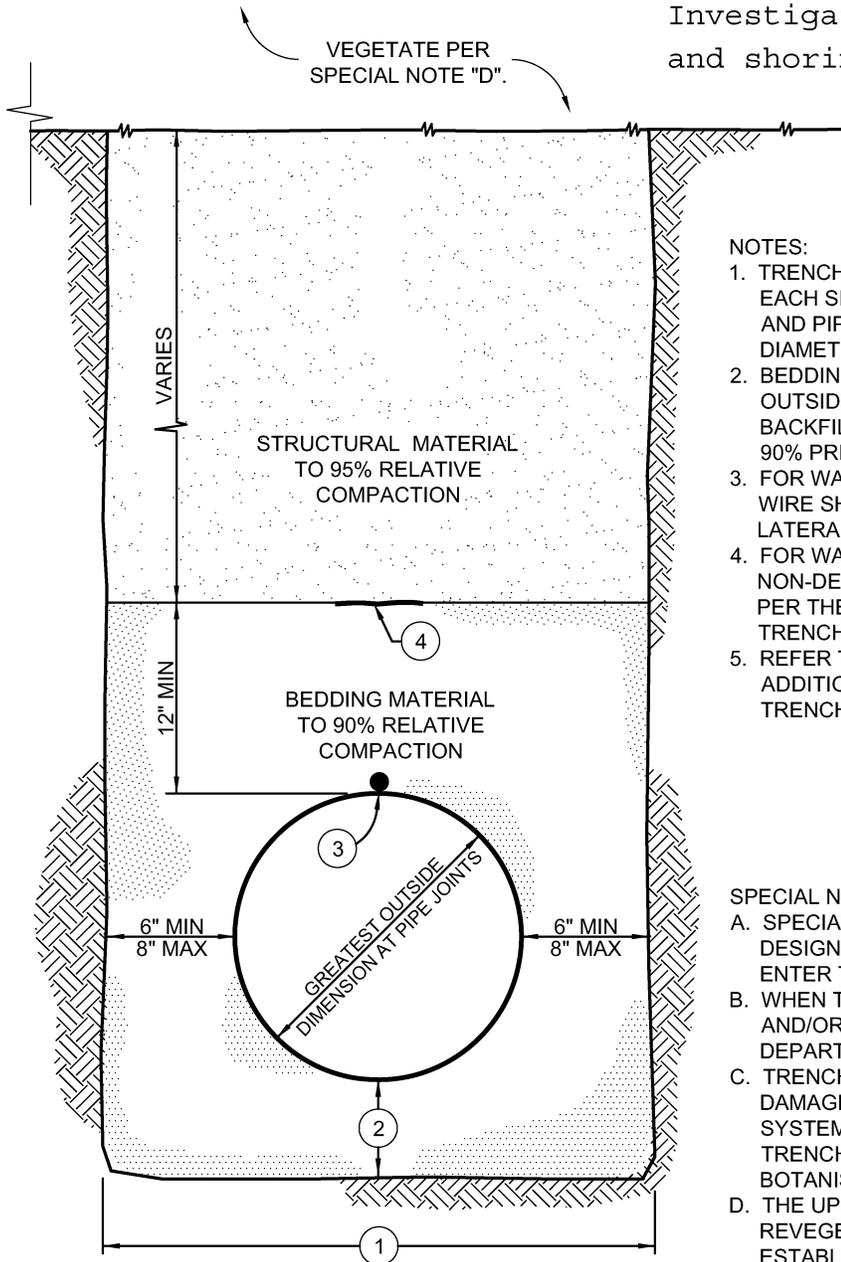


Scale: NTS	Issued: Aug. 2006
Drawing No:	<b>U-4</b>
Sheet No:	1 OF 1

Revisions

Description	Approved	Date	Description	Approved	Date
LOCATION OF DETECTOR WIRE & TAPE, NOTES 3 & 4	REM	NOV 07			
REMOVE "SEWER" FROM NOTE 3	GDM	NOV 08			

Attention is directed to Geotechnical Investigation for conventional trench and shoring excavations.



NOTES:

1. TRENCH WIDTH SHALL BE PIPE DIAMETER PLUS 12" (6" EACH SIDE OF PIPE) FOR PIPES 36" DIAMETER OR LESS, AND PIPE DIAMETER PLUS 16" (8" EACH SIDE) FOR PIPE DIAMETERS GREATER THAN 36".
2. BEDDING MEASUREMENT IS 6" BELOW GREATEST OUTSIDE DIMENSION AT PIPE JOINTS. PIPE SHALL BE BACKFILLED TO THE SPRING LINE AND COMPACTED TO 90% PRIOR TO COMPLETING INITIAL BACKFILL.
3. FOR WATER, 14-GAUGE INSULATED COPPER TRACER WIRE SHALL BE LAID ATOP ALL PIPES AND SERVICE LATERALS.
4. FOR WATER AND SEWER, 3" WIDE POLYETHYLENE NON-DETECTABLE TAPE MARKED AND COLOR CODED PER THE DESIGN STANDARDS SHALL BE BURIED IN THE TRENCH 12-INCHES ABOVE ALL PIPES AND LATERALS.
5. REFER TO STANDARD DRAWINGS U-3 TO U-3b FOR ADDITIONAL REQUIREMENTS FOR WATER AND SEWER TRENCHES.

SPECIAL NOTES:

- A. SPECIAL CONSIDERATION SHALL BE TAKEN BY THE DESIGNER TO ENSURE SURFACE DRAINAGE WILL NOT ENTER THE TRENCH.
- B. WHEN TRENCHING ON STEEP SLOPES, CUT-OFF WALLS AND/OR PIPE ANCHORS MAY BE REQUIRED BY THE DEPARTMENT AND SHALL BE DETAILED ON THE PLANS.
- C. TRENCHING ALIGNMENT SHALL BE DESIGNED TO AVOID DAMAGE TO EXISTING TREES AND THEIR ROOT SYSTEMS. WHEN ADJACENT TO TREES THEN THE TRENCHING RECOMMENDATIONS OF THE PROJECT BOTANIST SHALL BE FOLLOWED.
- D. THE UPPER SURFACE SHALL BE SCARIFIED AND REVEGETATED. VEGETATIVE COVER SHALL BE ESTABLISHED PRIOR TO ACCEPTANCE OF WORK.

see Special Provisions for bedding material gradation

BEDDING MATERIAL		STRUCTURAL MATERIAL	
SIEVE SIZES	PERCENT PASSING	SIEVE SIZES	PERCENT PASSING
1"	100%	3"	100%
No. 4	80% - 100%	No. 4	35% - 100%
No. 200	0% - 15%	No. 30	20% - 100%

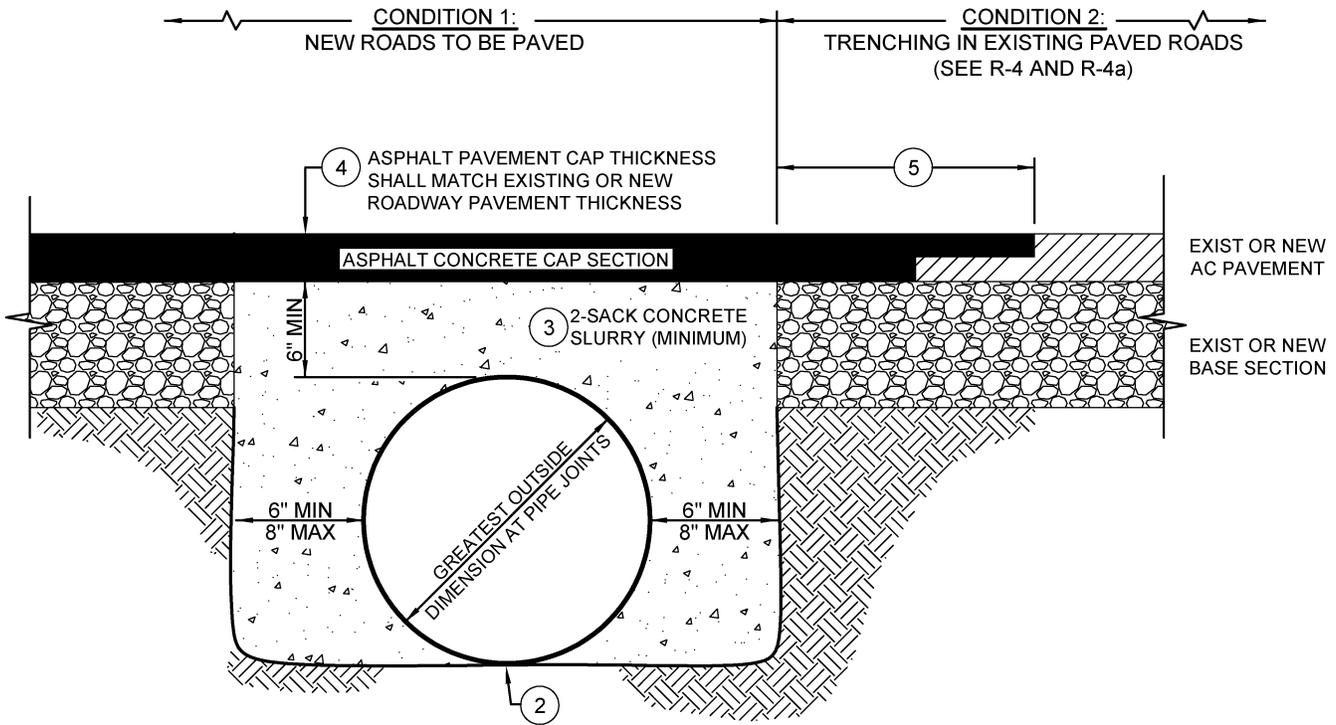


SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**TRENCH DETAIL**  
 NON-PAVED AREAS

Scale: NTS	Issued: Aug. 2006
Drawing No: <b>U-4a</b>	
Sheet No:	1 OF 1

Revisions

Description	Approved	Date	Description	Approved	Date
NOTE 3	REM	NOV 07			
CHANGE 3 SACK TO 2 SACK, MISC CLARIFICATIONS	GDM	NOV 08			



NOTES:

1. USE OF THIS STANDARD DRAWING REQUIRES PRIOR DEPARTMENT APPROVAL AND SHALL ONLY BE ALLOWED IF REQUIRED COVER CANNOT BE ATTAINED.
2. PIPE SHALL BE PLACED ON UNDISTURBED NATIVE MATERIAL UNLESS EXISTING SOILS CONDITIONS REQUIRE ADDITIONAL MEASURES.
3. CONCRETE SLURRY TRENCH BACKFILL SHALL CONFORM TO STATE STANDARD 90-1.01, 188 LBS/CY CEMENTITIOUS MATERIAL [2 SACK], TO SURFACE OF BASE COURSE SECTION. DO NOT PLACE AGGREGATE BASE ABOVE SLURRY BACKFILL.
4. ASPHALT CONCRETE PAVEMENT THICKNESS TO MATCH EXISTING PAVEMENT SECTION OR MATCH APPROVED PAVEMENT THICKNESS FOR NEW ROADS.
5. WHEN TRENCHING INTO EXISTING STRUCTURAL SECTION PAVEMENT REPAIR SHALL BE IN ACCORDANCE WITH STANDARD DRAWING R-4 OR R-4a.
6. PIPE SHALL BE SECURED IN PLACE TO KEEP LINE AND GRADE WHILE CONCRETE SLURRY IS PLACED AND UNTIL THE SLURRY HAS SET.
7. THE DEPARTMENT MAY REQUIRE ADDITIONAL WORK WHEN TRENCHING IN EXISTING ROADS HAVING CONCRETE STRUCTURAL SECTIONS.



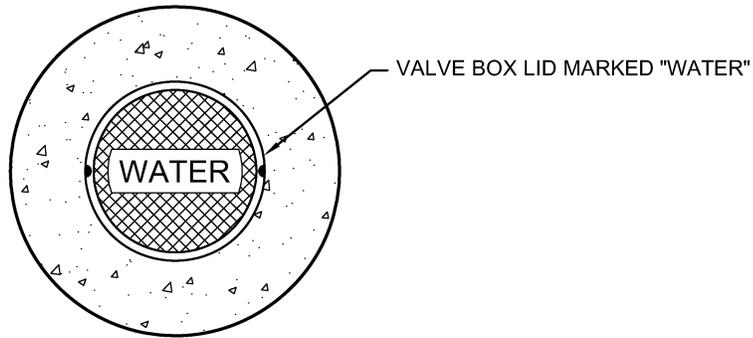
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SHALLOW TRENCH DETAIL

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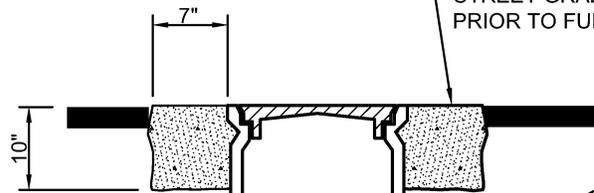
Description	Approved	Date	Description	Approved	Date
NOTE 1, CONCRETE COLLAR NOTE	REM	NOV 07			



LID

10" MIN THICK CIRCULAR CONCRETE COLLAR SHALL CONFORM TO STATE STANDARD 90-1.01, 565 LBS/CY CEMENTITIOUS MATERIAL [6 SACK], TROWELLED TO STREET GRADE, AND ALLOWED TO CURE 48 HOURS PRIOR TO FULL TRAFFIC USE.

VALVE BOX - BROOKS No. 3RT OR APPROVED EQUAL WITH EXTENSIONS TO VALVE

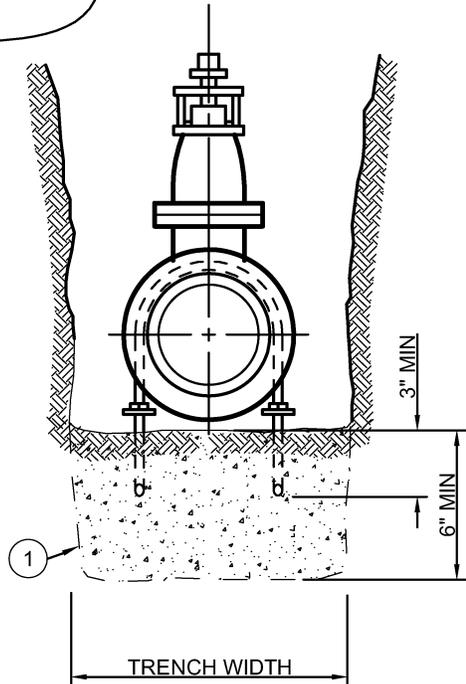
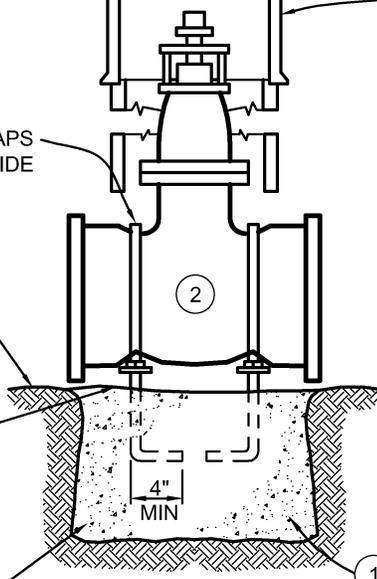


ANCHOR STRAPS EACH SIDE

TRENCH BOTTOM

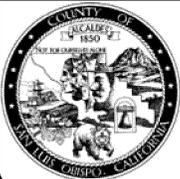
VALVE ANCHOR SHALL BE POURED LEVEL WITH TRENCH BOTTOM ANCHOR STRAPS SHALL BE FASTENED TO CONCRETE EMBEDDED ANCHOR BOLTS

P.C.C. BLOCK IS HUB-TO-HUB WIDTH



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.



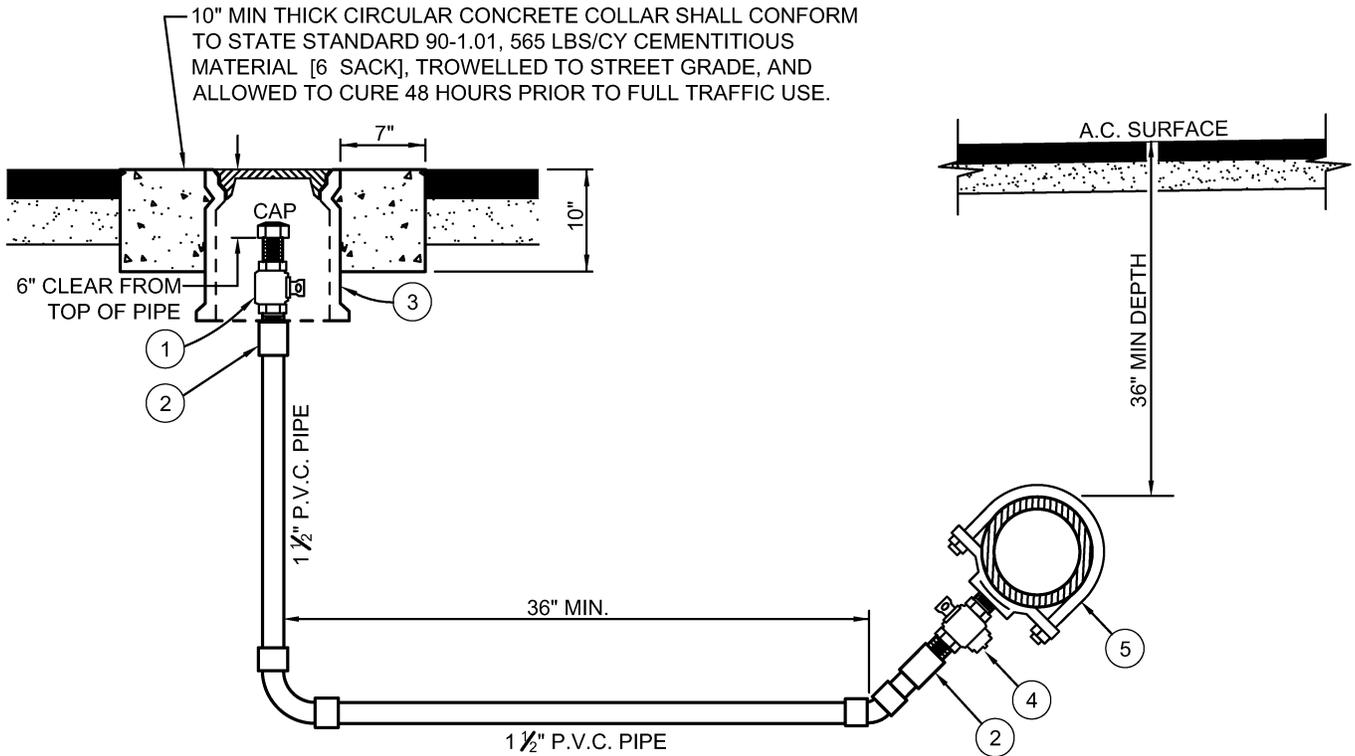
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

VALVE ANCHOR & BOX

Scale: NTS	Issued: Aug. 2006
Drawing No: <b>W-3</b>	
Sheet No: 1 OF 1	

Revisions

Description	Approved	Date	Description	Approved	Date
CONCRETE COLLAR NOTE, REMOVE THRUST BLOCK	REM	NOV 07			

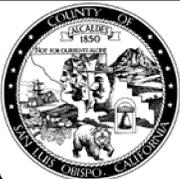


ON-RUN CONNECTION OR DEAD END

NOTES:

1. 14-GAUGE INSULATED COPPER TRACER WIRE SHALL BE LAID IN THE TRENCH ABOVE THE PIPE AND BROUGHT ABOVE GRADE THROUGH ANY METER OR VALVE BOXES.
2. COLOR CODED BLUE 3" WIDE POLYETHYLENE NON-DETECTABLE TAPE MARKED "CAUTION BURIED WATER LINE BELOW" SHALL BE BURIED IN THE TRENCH AND ABOVE THE PIPE AND TRACER WIRE.
3. UNDER NO CIRCUMSTANCES SHALL UTILITY LIDS AND CONCRETE COLLARS BE LOCATED WITHIN CURBS, GUTTERS, SIDEWALKS, DRIVEWAY APRONS, CURB RAMPS, OR CROSS GUTTERS.

ITEM NO.	NO. REQ'D.	SIZE AND DESCRIPTION	MATERIAL SPECIFICATION
1	1	1-1/2" CURB STOP	JAMES JONES J-182 WITH LOCKWING, MUELLER, OR APPROVED EQUAL
2	2	1-1/2" ADAPTER	I.P. THREAD-P.V.C. SLIP
3	1	VALVE BOX WITH CAST IRON LID	CHRISTY G-8, BROOKS 3-RT, OR APPROVED EQUAL
4	1	1-1/2" CORPORATION STOP	JAMES JONES J-40, MUELLER H-10012, OR APPROVED EQUAL
5	1	SERVICE SADDLE	MUELLER BRONZE DOUBLE STRAP BR 2B 0899 IP 200, O.A.E.



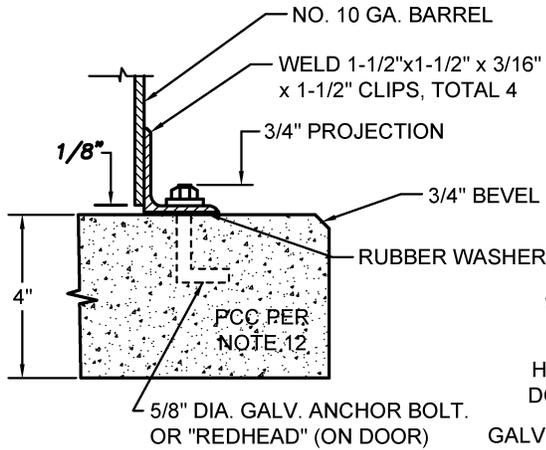
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1-1/2" BLOW-OFF ASSEMBLY

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Drawing No:	
	<b>W-5</b>
Sheet No:	1 OF 1

Revisions

Description	Approved	Date	Description	Approved	Date
NOTES 1-7, ADDED NOTES 11 & 12, MISC NOTES, & DRAFTING	REM	NOV 07			



**DETAIL "A"**

**SURFACE PREPARATION AND PAINT:**

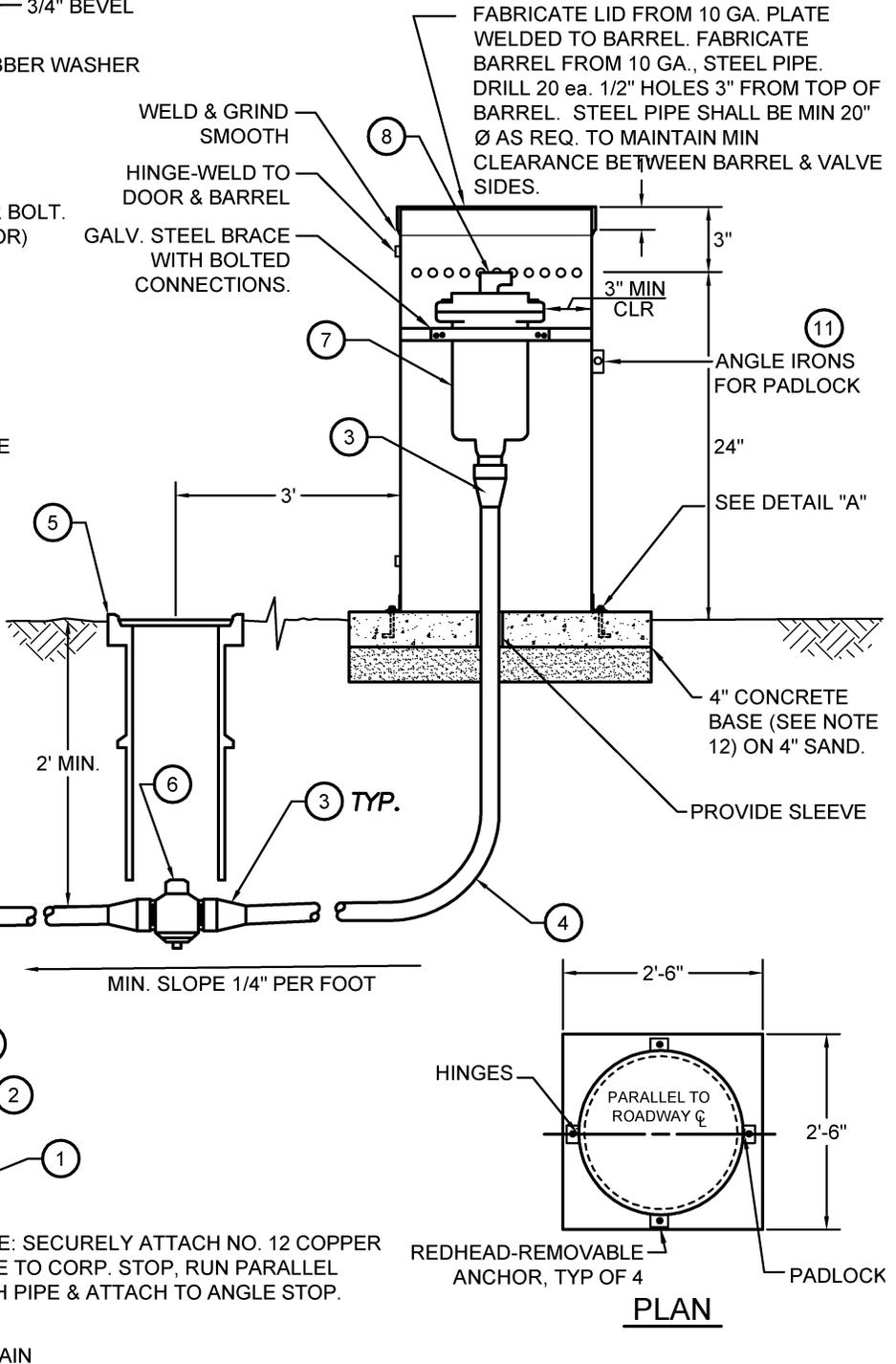
- a. PREPARE BOTH INSIDE AND OUTSIDE PIPE SURFACES BY WIRE BRUSH CLEANING.
- b. INSIDE AND OUTSIDE SURFACES SHALL BE PRIMER COATED WITH TWO COATS. PRIMER SHALL BE "RUST-OLEUM CLEAN METAL PRIMER", OR APPROVED EQUAL.
- c. PAINT SHALL BE RUST-OLEUM INDUSTRIAL ENAMEL COLOR "SAFETY BLUE", OR APPROVED EQUAL, TWO COATS OF PAINT ARE REQUIRED.

FABRICATE LID FROM 10 GA. PLATE WELDED TO BARREL. FABRICATE BARREL FROM 10 GA., STEEL PIPE. DRILL 20 ea. 1/2" HOLES 3" FROM TOP OF BARREL. STEEL PIPE SHALL BE MIN 20" Ø AS REQ. TO MAINTAIN MIN CLEARANCE BETWEEN BARREL & VALVE SIDES.

WELD & GRIND SMOOTH  
HINGE-WELD TO DOOR & BARREL  
GALV. STEEL BRACE WITH BOLTED CONNECTIONS.

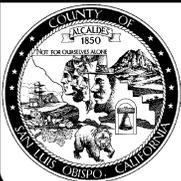
**NOTES:**

1. BRONZE SERVICE SADDLE, DOUBLE STRAP, WITH AWWA I.P. THREADS.
2. CORPORATION STOP w/ I.P. THREADS.
3. MUELLER INSTA-TITE CONNECTION.
4. POLYETHYLENE PIPE, PIPE SIZE SHOULD MATCH AIR & VACUUM RELIEF VALVE SIZE AS SPECIFIED IN TABLE 6-5 OF THESE STANDARDS.
5. CAST IRON TRAFFIC COVER & EXTENSIONS AS REQUIRED.
6. BALL VALVE.
7. AIR & VACUUM RELIEF VALVE w/STAINLESS STEEL TRIM
8. SCH. 80 PVC ELBOW
9. 14-GAUGE INSULATED COPPER TRACER WIRE SHALL BE LAID IN THE TRENCH ABOVE THE PIPE AND BROUGHT ABOVE GRADE THROUGH ANY METER OR VALVE BOXES.
10. COLOR CODED BLUE 3" WIDE POLYETHYLENE NON-DETECTABLE TAPE MARKED "CAUTION BURIED WATER LINE BELOW" SHALL BE BURIED IN THE TRENCH AND ABOVE THE PIPE AND TRACER WIRE.
11. ANGLE 1-1/2"x1-1/2"x3/16" LONG. WELD TO BARREL AND DOOR WITH HOLES FOR PADLOCK (2 REQ.).
12. CONCRETE BASE SHALL CONFORM TO STATE STANDARD 90-1.01, 565 LBS/CY CEMENTITIOUS MATERIAL [6 SACK].



NOTE: SECURELY ATTACH NO. 12 COPPER WIRE TO CORP. STOP, RUN PARALLEL WITH PIPE & ATTACH TO ANGLE STOP.

**PLAN**



**SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS**  
**AIR and VACUUM RELIEF ASSEMBLY**

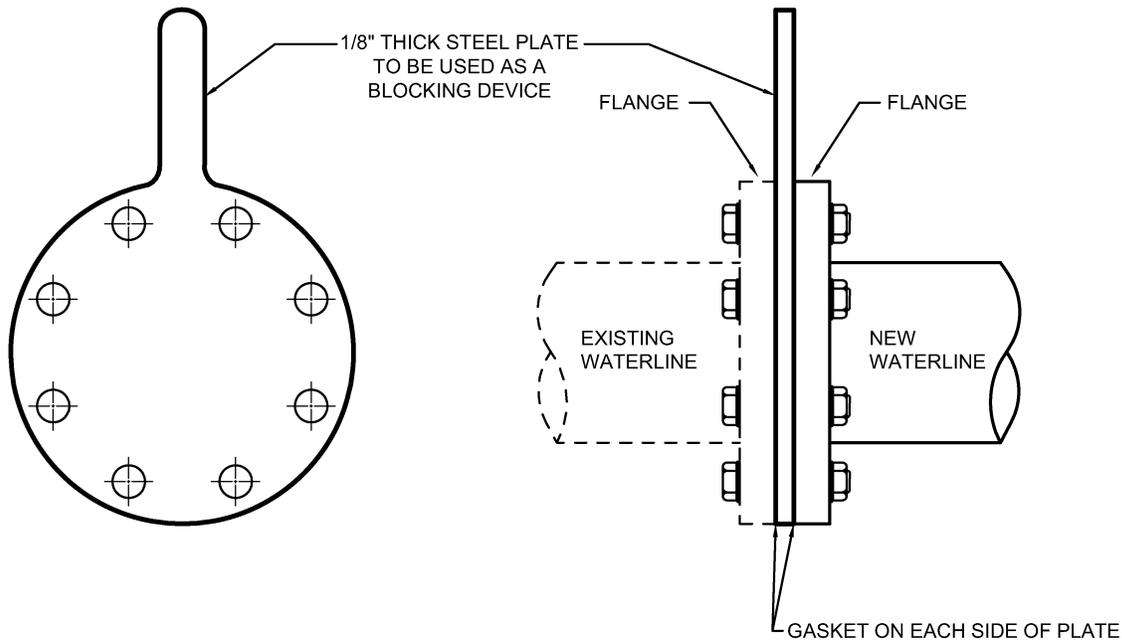
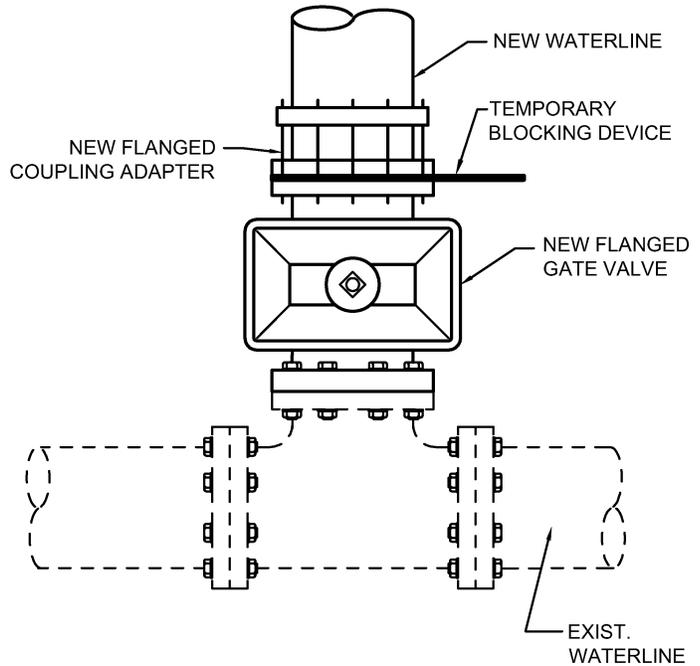
Scale: NTS	Issued: Aug. 2006
Drawing No: <b>W-6</b>	
Sheet No: 1 OF 1	

Revisions

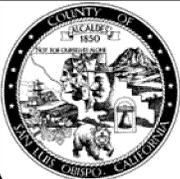
Description	Approved	Date	Description	Approved	Date

NOTES:

1. DIRECT CONNECTION TO THE EXISTING WATER SYSTEM SHALL NOT BE PERMITTED UNTIL THE NEW INSTALLATION HAS PASSED BACTERIA TESTING AND A PHYSICAL CHECK BY THE WATER QUALITY MANAGER. SEPARATION SHALL BE ACHIEVED BY THE INSTALLATION OF THE TEMPORARY BLOCKING DEVICE AS SHOWN HEREON
2. PRESSURE TESTING AGAINST VALVES SHALL NOT BE ALLOWED. NEW VALVES SHALL BE SWABBED WITH CHLORINE PRIOR TO INSTALLATION.
3. WHEN TEMPORARY BLOCKING DEVICE IS REMOVED, THE CONTRACTOR SHALL ADJUST FITTING TO ELIMINATE 1/8" GAP WITHOUT FORCING THE JOINT TOGETHER.
4. TEST PRESSURE SHALL BE 50 PSI GREATER THAN THE WORKING PRESSURE OF THE PIPE MEASURED AT THE LOWEST ELEVATION OF THE SYSTEM OR 150 PSI, WHICHEVER IS GREATER.



PROCEDURE FOR CONNECTING NEW WATERLINES TO EXISTING SYSTEM (ALTERNATIVE TO THE OLD INDUSTRIAL STANDARD METHOD): AT THE POINT OF CONNECTION TO THE EXISTING SYSTEM, ALL JOINTS BETWEEN FITTINGS AND VALVES SHALL BE FLANGED. ANY CHANGE REQUIRES WRITTEN APPROVAL FROM THE DEPARTMENT. AT THE JOINT THAT CONNECTS THE EXISTING SYSTEM TO THE NEW LINE, A BLOCKING DEVICE SHALL BE INSTALLED. THIS DEVICE SHALL BE CONSTRUCTED OF 1/8" THICK STEEL PLATE. IT SHALL BE INSTALLED BETWEEN THE TWO FLANGES WITH A GASKET ON EACH SIDE. THIS WILL ALLOW ALL FITTINGS, VALVES, AND THE PIPELINE TO BE DISINFECTED AND PRESSURE TESTED AS ONE UNIT. AFTER THE NEW SYSTEM HAS MET ALL REQUIREMENTS, THE DEPARTMENT WILL ALLOW THE CONTRACTOR TO REMOVE THE BLOCKING DEVICE. THE DEVICE AND BOTH GASKETS ARE TO BE REMOVED AND A NEW GASKET SHALL BE INSTALLED BETWEEN THE FLANGES. THE NEW SYSTEM IS THEN IN SERVICE.



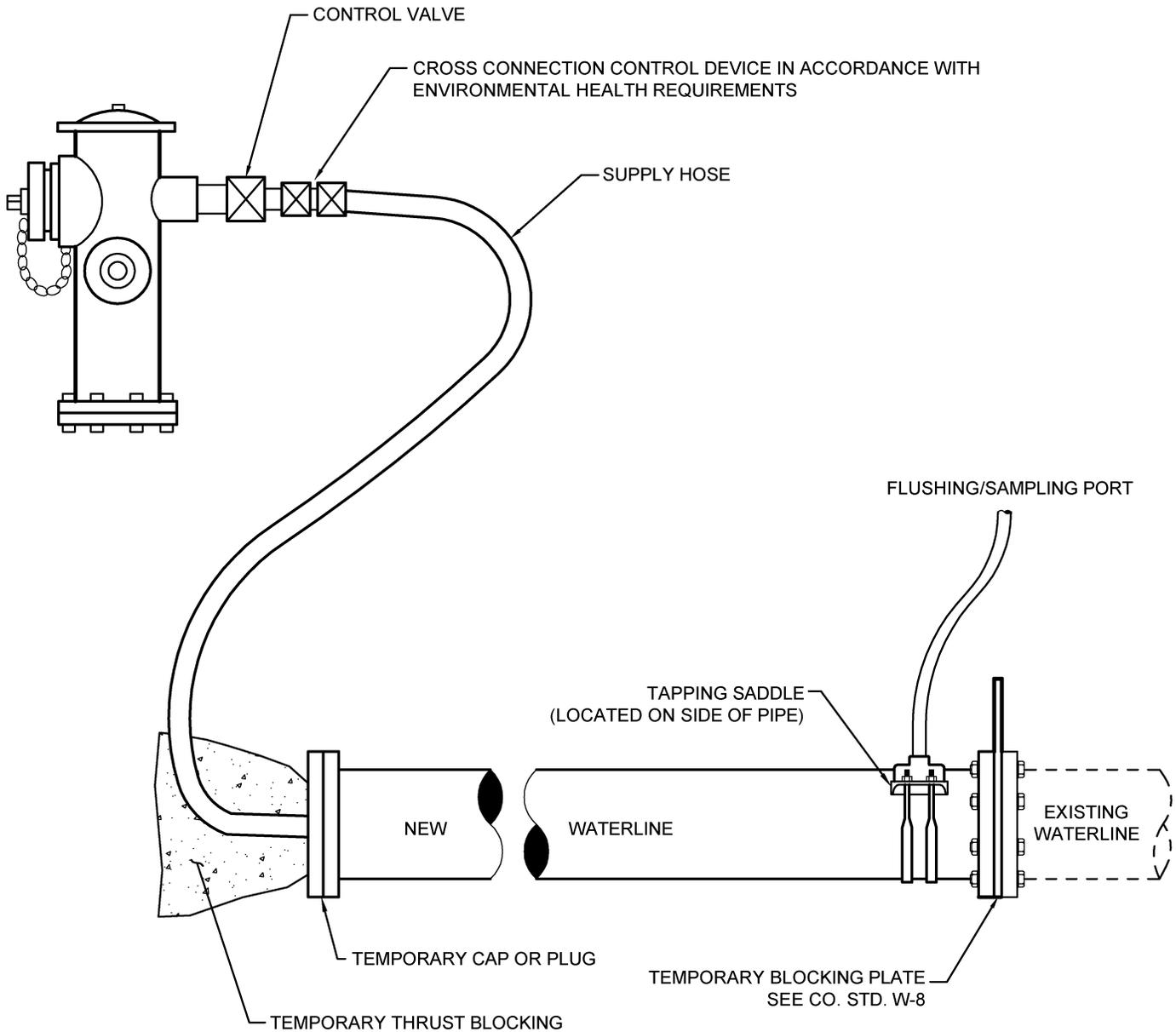
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

NEW WATERLINE  
CONNECTION DETAILS

Scale:	Issued:
NTS	Aug. 2006
Drawing No:	<b>W-8</b>
Sheet No:	1 OF 1

Revisions

Description	Approved	Date	Description	Approved	Date



NOTES:

1. DIRECT CONNECTION TO THE EXISTING WATER SYSTEM SHALL NOT BE PERMITTED UNTIL THE NEW INSTALLATION HAS PASSED BACTERIA TESTING. MAINTAIN AIR GAP PER AWWA STD. C651



SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**NEW WATERLINE  
 FLUSHING DETAIL**

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NK



# SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

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July 15, 2002

## PROCEDURAL MEMORANDUM 0-3 (Revised)

**TO:** Division Heads  
Hydraulics Personnel

**FROM:** Director of Public Works *NK 7/17/02*

**SUBJECT:** Waterline Disinfection Procedures

The following memorandum outlines the revised procedures to be followed by laboratory personnel, water operators, inspectors and contractors for the disinfection and testing of new waterline extensions and/or water mains. This procedure is an extraction from the American Waterworks Association (AWWA) Standards for Disinfecting Water Mains (C651-99) and the new drinking water requirements from the California Department of Health Services. **Note: This Memorandum should be included in specifications for all waterline projects.**

This standard presents essential procedures for disinfecting new and repaired water mains, including installation of fire hydrants. All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspection, repair, or other activities that might lead to contamination of water shall be disinfected before they are returned to service. Additionally, steps shall be taken to prevent contaminated materials from entering the water main during storage, construction, or repair.

Any activity associated with this procedure that may disrupt or affect the overall water system in regard to: system pressure, water supplied to consumers, contamination of existing lines, or other major events must be cleared through the Water Quality Manager prior to commencing that activity.

### **BASIC DISINFECTION PROCEDURE**

The basic disinfection procedure shall be:

1. Inspect all materials to be used to insure the integrity of the materials.
2. Prevent contaminating materials from entering the water main during storage, construction, or repair and noting potential contamination at the construction site.
3. Remove, by flushing, those materials that may have entered the water main.

4. Chlorinate any residual contamination that remains in the new water main using the "continuous-feed" method as described below. Note that "tablet/granule" and "slug" methods are no longer acceptable.

Before the main is chlorinated, it shall be filled to remove air pockets and flushed to remove particles. The flushing velocity in the main shall not be less than 2.5 ft/s.

Water supplied from a temporary backflow-protected connection to the existing distribution system or other approved supply source shall flow at a constant metered rate into the newly installed water main. The point of entry shall not be more than 5 feet from the beginning of the new line.

Liquid Sodium hypochlorite solution conforming to ANSI/AWWA B300 standards shall be fed at or before the entry point in an amount sufficient to produce not less than 25 mg/L of free chlorine residual throughout the new main and its appurtenances. Chlorine application shall not cease until the entire main is filled with the heavily chlorinated water.

The chlorinated water shall be retained in the main for a minimum of 24 hours, during which time all valves and hydrants in the treated section shall be operated to ensure disinfection of the appurtenances. At the end of the 24 hour period, the treated water in all portions of the main shall have a free chlorine residual of not less than 10 mg/L.

### **FINAL FLUSHING**

1. Clear the main of heavily chlorinated water. After a 24-hour retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is not higher than that generally prevailing in the distribution system or acceptable for domestic use (typically 2ppm).
2. Dispose of heavily chlorinated water. The environment to which the chlorinated water is to be discharged shall be inspected. If there is any question that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. Where necessary, Federal, State and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

### **BACTERIOLOGICAL TESTS**

1. **Standard conditions.** After final flushing and before the new water main is connected to the distribution system, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. At least one set of samples shall be collected from every 1,200 ft of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for bacteriological (chemical and physical) quality in accordance with Standard Methods for the Examination of Water and Wastewater; and shall show

the absence of coliform organisms. A standard plate count and general physical analysis (odor, turbidity, color) are also required.

2. **Sampling procedure.** Samples for bacteriological analysis shall be collected by Water Treatment Operators or laboratory personnel in sterile bottles with sodium thiosulfate as required by Standard Methods for the Examination of Water and Wastewater. No hose or fire hydrant shall be used in collection of samples. A combination blow off and sampling tap for mains up to including eight-inch diameter may be used as corporation stop that is installed in the main with a copper-tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use. Each sample site must be positioned so that it may be flushed for several minutes (during sampling) without contamination of the hose bib, sample bottles, etc. when samples are being taken.
3. **Notification procedure.** Initial arrangement for scheduling sampling of new/repared main shall be made with the Water Quality Manager. The Water Quality Manager will arrange sampling dates and time with the Water System Operator in charge of the effected system. The Water System Operator shall notify the Engineering Inspector of the time and particular location that samples are to be taken. The Inspector shall insure that the Contractor in charge of the line has installed adequate sampling stations (see attached drawing) on the days that samples are to be taken.

Once it has been determined that all bacteriological and general physical analysis meet current requirements, the Water Quality Manager shall notify the in-charge Water System Operator of the same. The Operator shall in turn notify the Engineering Inspector in charge of the job. It shall be the Inspector's responsibility to notify the contractor/property owner of the test results.

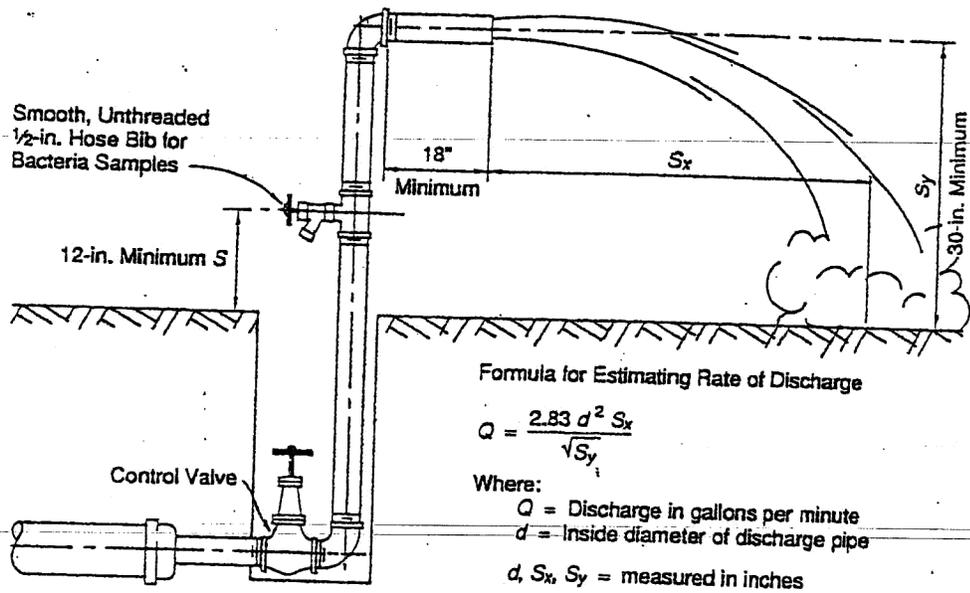
If the test results do not meet current requirements, the same notification procedure as outlined above shall be followed. Once the contractor/property owner has been notified it shall be his responsibility to perform the following (as determined by the Water Quality Manager): flush the line, re-chlorinate the lines (for a period of 24 hours), flush to an acceptable chlorine residual level, have the line re-sampled.

4. **Analysis Charges.** Unless otherwise stated in the construction contract, the cost of the initial sampling and analysis shall be paid by the contractor/property owner. In the event that follow-up analyses are required due to failed tests, the contractor/property owner will be liable for all costs associated with the follow-up sampling and analysis.

Attachment

File: Procedural Manual

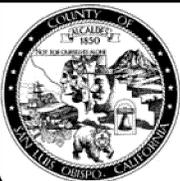
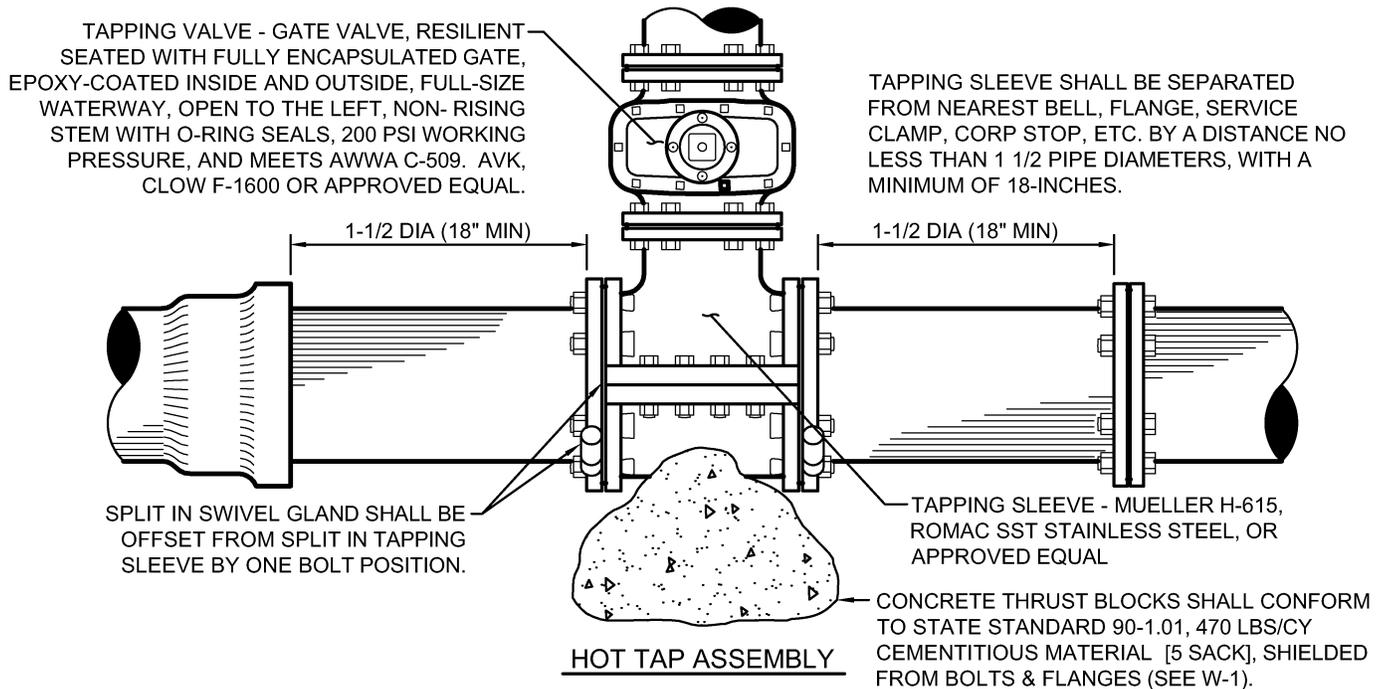
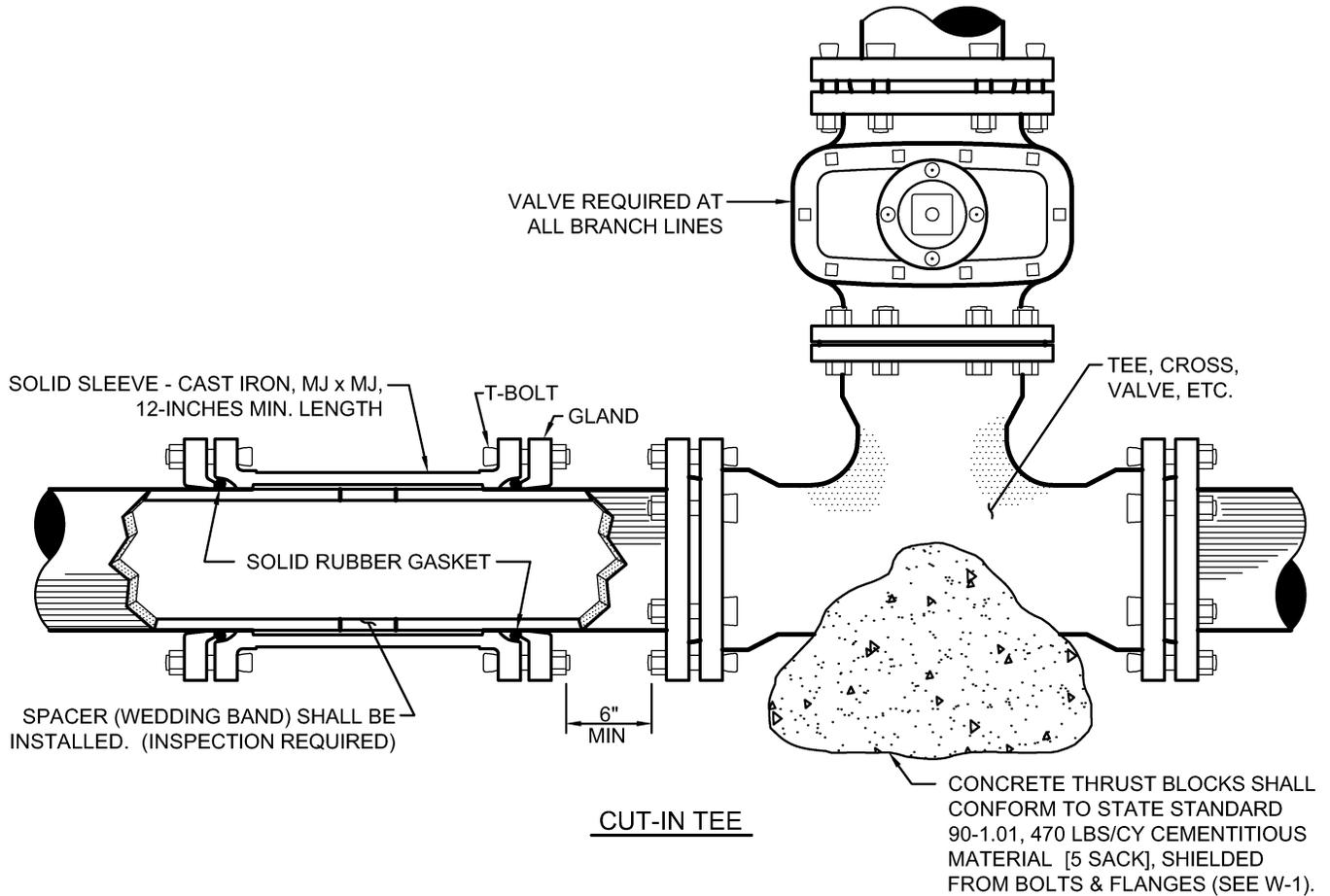
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NOTE: This figure applies to pipes up to and including 8-in. (200 mm) diameter.

Revisions

Description	Approved	Date	Description	Approved	Date
THRUST BLOCK NOTES	REM	NOV 07			



SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS  
**WATERLINE CUT-IN TEE  
 & HOT TAP ASSEMBLY**

Scale: NTS	Issued: Aug. 2006
Drawing No: <b>W-10</b>	
Sheet No:	1 OF 1

## PROJECT PLANS